This care process model (CPM) was developed by Intermountain Healthcare’s OB Development Team under the guidance of the Women and Newborns Clinical Program. It recommends an evidence-based approach for preventing and managing spontaneous or medically indicated deliveries before 37 weeks gestation.

Why Focus on Preterm Birth?

- **It’s common.** Approximately 12% of U.S. births occur before term.\(^1,2\) Of these, about 70% to 80% are spontaneous preterm births (PTBs); the remaining are medically indicated due to maternal or fetal problems.\(^3\)

- **It’s dangerous.** PTB accounts for 75% of perinatal deaths and is a major determinant of short- and long-term morbidity in infants and children.\(^2,3\) Up to 50% of cases of long-term neurologic impairment in children are attributed to PTB.\(^1\)

- **It’s expensive.** The Institute of Medicine estimates that the combined annual cost of PTB in the U.S. is $26.2 billion — more than $51,000 per infant.\(^4\)

- **Consistent, evidence-based care can improve outcomes.** Effective clinical practice has been hampered by numerous challenges: the pathophysiology of preterm labor remains poorly understood; there are few interventions supported by evidence; the few available interventions don’t work for all women.\(^5,6\) Nevertheless, studies suggest that we can improve clinical outcomes if we consistently identify patients at risk for PTB and, when possible, provide appropriate, risk-specific treatment to prevent or mitigate it.\(^2,7-9\) Additionally, a practical and evidence-based approach to managing preterm labor (PTL) should help us use resources wisely and know which women can be safely discharged without treatment.

Key Recommendations for Providers

- **Identify all patient risk factors for preterm birth — and implement best-practice interventions to lower these risks.** This CPM gives numerous recommendations for screening, education, medication, monitoring, and other measures to prevent PTB.

- **Use every contact with your patient — before, during, and after pregnancy — to educate her about preterm birth and what she can do to lower her risk of delivering early.** For a woman with a prior preterm birth, education should include an individual PTB recurrence risk assessment.

- **Follow the risk-specific care protocols presented in this CPM,** noting that among the clinical interventions supported by evidence, the appropriate use of progesterone and cerclage yield the most improvement in outcomes.

What’s Inside

<table>
<thead>
<tr>
<th>PTB Prevention</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTB Prevention Map</td>
<td>2</td>
</tr>
<tr>
<td>PTB Risk Factors, Interventions</td>
<td>3</td>
</tr>
<tr>
<td>Recommended Evaluations</td>
<td>4</td>
</tr>
<tr>
<td>Estimating PTB Recurrence</td>
<td>5</td>
</tr>
<tr>
<td>Supporting Planned &amp; Healthy Pregnancies</td>
<td>9</td>
</tr>
<tr>
<td>Substance Use Screening &amp; Intervention</td>
<td>11</td>
</tr>
<tr>
<td>Risk-specific Protocols for Care in Pregnancy</td>
<td>12</td>
</tr>
<tr>
<td>Prior Spontaneous PTB</td>
<td>13</td>
</tr>
<tr>
<td>Prior Indicated PTB-Preeclampsia</td>
<td>14</td>
</tr>
<tr>
<td>Short Cervix</td>
<td>15</td>
</tr>
<tr>
<td>Chronic Hypertension during Pregnancy</td>
<td>16</td>
</tr>
<tr>
<td>IDDM</td>
<td>17</td>
</tr>
<tr>
<td>Twins</td>
<td>18</td>
</tr>
<tr>
<td>APS</td>
<td>19</td>
</tr>
<tr>
<td>Discussions: Cerclage &amp; Progesterone</td>
<td>20</td>
</tr>
</tbody>
</table>

PTL Management

- **PTL Management** | 22 |
- **PTL Management Algorithm** | 22 |
- **Algorithm Notes & Medication Table** | 23 |

Resources & References

- **Summary of Resources** | 24 |
- **References** | 26 |

Goals & Measures

This CPM aims to help reduce the rate of preterm birth among our patients and to improve clinical and financial outcomes associated with preterm birth. As part of its implementation, Intermountain measures several aspects of care; these are identified in the text by the measurement symbol.
Most preterm birth occurs among women with no known risk factors — and there are few interventions proven effective to address known risks. Nevertheless, recent studies show that targeted prevention efforts can yield positive results and that even a modest reduction in PTB has significant impact, improving lives and lowering costs. The map below outlines how Intermountain pursues this reduction, by focusing on key moments of contact with patients before, during, and after pregnancy; identifying PTB risk factors as early as possible; and aggressively providing best-practice interventions to lower risk and improve outcomes. The map also identifies the measures we’ll use to assess practice and document the impact of implementing the model across the Intermountain system.

**Preconception Care**

- **FOR ALL PATIENTS**, as part of routine preconception care:
  - IDENTIFY PTB risk factors and COUNSEL/REFER/TREAT as appropriate (page 3); note these recommended interventions:
    - COUNSEL re: family planning
    - SCREEN for and TREAT all genitourinary infections
    - SCREEN for and TREAT smoking and substance abuse
    - OPTIMIZE treatment of chronic disease
  - SET EXPECTATIONS for prenatal care, especially for patients with IDDM, APS chronic hypertension and other conditions requiring special care during pregnancy (pages 12–19)

- Provide interventions listed above and
  - DETERMINE and DISCUSS:
    - evaluations recommended or received (page 4)
    - patient’s PTB recurrence risk (pages 5–7)
    - interventions recommended before or during next pregnancy (pages 12–19)

- If all risk factors, prior PTB is most strongly associated with PTB

**Prenatal Care**

- **FOR ALL PATIENTS**, as part of routine prenatal care:
  - IDENTIFY PTB risk factors and COUNSEL/REFER/TREAT as appropriate (page 3); note these recommended interventions:
    - SCREEN for and TREAT asymptomatic bacteriuria
    - SCREEN for and TREAT smoking and substance abuse
    - SCREEN for short cervical length on routine anatomic survey (abdominal u/s)

- Provide interventions listed above and
  - FOLLOW RISK-SPECIFIC CARE PROTOCOL (pages 12–19); protocols give guidance re:
    - medication (17P, progesterone suppositories, antihypertensives, ASA, VTE prophylaxis, etc.)
    - cerclage placement
    - extra monitoring for mother and baby
    - timing of delivery

**Postpartum Care**

- **IN THE HOSPITAL**, before patient is discharged
- **IN TARGETED FOLLOW-UP**, with patients with prior PTB

**Patient with prior PTB?**

- Provide interventions listed above and
  - FOLLOW RISK-SPECIFIC CARE PROTOCOL (pages 12–19)

**MEASURES:**

- Screen for short cervix on routine anatomic survey (all patients)
- Provide progesterone as appropriate (patients with prior PTB and/or short cervix)
- Offer cervical cerclage as appropriate (patients with short cervix)

Preventive care supported by INTERMOUNTAIN PATIENT EDUCATION: See page 25 for a list of relevant materials for patients and families
### PTB Risk Factors and Interventions

The table below lists risk factors and preventive interventions for spontaneous and indicated preterm birth. Note that there are often multiple associations between risk factors and that for most of these factors, no PTB interventions are supported by evidence.

- Factors in **boldface** are most strongly associated with PTB.\(^2\,10,\,17\)
- Factors in **gray shaded areas** have preventive interventions recommended in this CPM.

<table>
<thead>
<tr>
<th>RISK FACTORS for spontaneous or indicated PTB</th>
<th>RECOMMENDED PREVENTIVE INTERVENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family planning</strong></td>
<td>• In preconception and postpartum contact, counsel on family planning, especially the need for highly effective contraception and the benefits of an interpregnancy interval ≥18 months (page 9).</td>
</tr>
<tr>
<td>Interpregnancy interval &lt;6 months</td>
<td>• For infertility treatment, implement measures to reduce chance of multiple gestation (page 10).</td>
</tr>
<tr>
<td>Maternal age &lt;18 or &gt;40</td>
<td></td>
</tr>
<tr>
<td>Treatment for infertility</td>
<td></td>
</tr>
<tr>
<td><strong>Infection</strong></td>
<td>• At a preconception consult, screen for and treat all genitourinary infections, including STIs.</td>
</tr>
<tr>
<td>Asymptomatic bacteriuria</td>
<td>• In prenatal care:</td>
</tr>
<tr>
<td>Other genitourinary infections, including bacterial vaginosis, other STIs</td>
<td>– Screen all patients for asymptomatic bacteriuria in first trimester (urine culture); treat all cases.</td>
</tr>
<tr>
<td>Pylonephritis</td>
<td>– Screen for bacterial vaginosis in all patients with prior PTB, and treat all cases. BV increases the risk of PTB by almost 300%.(^2)</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>– Treat other infections selectively; most studies show no reduction in PTB with treatment, though it may be recommended to prevent other maternal/fetal complications. Note that you should <strong>not</strong> treat trichomoniasis in pregnancy; treatment increases PTB risk.(^10)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
</tr>
<tr>
<td>Systemic infection</td>
<td></td>
</tr>
<tr>
<td><strong>General maternal health, lifestyle</strong></td>
<td>• At a preconception consult:</td>
</tr>
<tr>
<td>Smoking</td>
<td>– Screen for risk factors such as smoking and substance abuse; treat/refer as needed (page 11).</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>– For patients with IDDM, APS, or other chronic condition, optimize management (may need to consult with other providers to adjust treatment plan).</td>
</tr>
<tr>
<td>Chronic hypertension</td>
<td>• In prenatal care:</td>
</tr>
<tr>
<td>IDDM (insulin-dependent diabetes)</td>
<td>– Provide smoking cessation counseling and referrals; refer for substance abuse counseling (page 11). Cocaine and opioid use are strongly associated with PTB.</td>
</tr>
<tr>
<td>APS (antiphospholipid antibody syndrome)</td>
<td>– Follow care protocols for patients with:</td>
</tr>
<tr>
<td>Poor nutrition, either low or high BMI</td>
<td>› Chronic hypertension: BP monitoring and antihypertensive therapy initiated as needed; possible medication for fetal benefit; fetal surveillance (page 16)</td>
</tr>
<tr>
<td>Periodontal disease</td>
<td>› IDDM: frequent monitoring of BG and BP; optimizing DM control and initiating antihypertensive medication as needed; fetal surveillance; possible medication for fetal benefit (page 17)</td>
</tr>
<tr>
<td>Anemia (but not in 3rd trimester)</td>
<td>› APS: BP monitoring and antihypertensive medication as needed; low-dose ASA; VTE prophylaxis, fetal surveillance (page 19)</td>
</tr>
<tr>
<td>Low socioeconomic status, education</td>
<td></td>
</tr>
<tr>
<td>Inadequate prenatal care</td>
<td></td>
</tr>
<tr>
<td>Anxiety, depression</td>
<td></td>
</tr>
<tr>
<td>Life events (divorce/separation, death)</td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy, reproductive history and health</strong></td>
<td>• In prenatal care:</td>
</tr>
<tr>
<td>Prior preterm delivery</td>
<td>– Screen for short cervical length at time of fetal anatomic survey at 18–20 weeks gestation; if &lt;3 cm, schedule TVU</td>
</tr>
<tr>
<td>Short cervix on transvaginal ultrasound (TVU)</td>
<td>– Follow care protocols for patients with:</td>
</tr>
<tr>
<td>Multiple gestation</td>
<td>› Prior spontaneous PTB: 17P initiated at 16 weeks; possible cerclage; possible antibiotics, tocolysis, possible medication for fetal benefit (page 13)</td>
</tr>
<tr>
<td>Uterine anomaly, leiomyoma</td>
<td>› Prior indicated PTB due to preeclampsia: BP monitoring and antihypertensive therapy initiated as needed; low-dose ASA; possible heparin; possible medication for fetal benefit; fetal surveillance (page 14)</td>
</tr>
<tr>
<td>History of cervical surgery, anomaly</td>
<td>› Short cervix: vaginal progesterone (suppositories or gel); possible inpatient observation; possible cerclage; possible medication for fetal benefit (page 15)</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>› Twins: confirm placenta (TTTS checks twice monthly if mono/di); TVUs; fetal growth assessment; BP monitoring with antihypertensive therapy as needed; possible steroids; fetal surveillance (page 18)</td>
</tr>
<tr>
<td>History of second trimester abortion</td>
<td></td>
</tr>
<tr>
<td>Family history of PTB (first-degree relative)</td>
<td></td>
</tr>
<tr>
<td>Excessive uterine contractility</td>
<td></td>
</tr>
<tr>
<td>Placenta previa or placental abruption</td>
<td></td>
</tr>
<tr>
<td>Vaginal bleeding, esp. after 1st trimester</td>
<td></td>
</tr>
<tr>
<td>Abdominal surgery</td>
<td></td>
</tr>
<tr>
<td>Fetal growth restriction</td>
<td></td>
</tr>
<tr>
<td>Fetal anomaly</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>African-American</td>
</tr>
</tbody>
</table>
Prevention and management of preterm birth

June 2014

©2014 INTERMOUNTAIN HEALTHCARE. ALL RIGHTS RESERVED.

Preventing PTB:
Can it be done? How much does it matter?

One recent Utah-based study of women with a history of PTB demonstrated that targeted, evidence-based care in a PTB prevention clinic can result in:

- Lower rates of recurrent spontaneous PTB (48.6% for those receiving specialty care, vs. 63.4% for usual-care patients).
- Later deliveries (36.1 weeks vs. 34.9 weeks).
- Lower rates of composite major neonatal morbidity (5.7% vs. 16.3%).

Additionally, data show that it is possible to reduce the rate of PTB on a larger scale — and that even a modest reduction has a significant and lasting impact.

- After Utah accepted the challenge of The Association of State and Territorial Health Officials (ASTHO) and the March of Dimes to prevent preterm birth, statewide rate of PTB has decreased from 9.78% to 9.13% between 2009 and 2012.
- This 0.6% reduction in three years represents approximately 1,000 fewer preterm deliveries and a significant decrease in associated morbidity, mortality, and cost.
- Reaching the ASTHO goal of 8.9% PTB rate for Utah would mean an estimated savings of $24 million annually.

Recommended Evaluations After PTB

Prior preterm birth is the greatest risk factor for preterm birth. All patients with this history warrant special care in subsequent pregnancies — and some may also benefit from follow-up evaluation in the weeks after the PTB.

The list below shows the evaluations recommended after a preterm birth in three particular circumstances. Evaluation results may help you identify underlying risk factors, estimate risk of PTB recurrence for subsequent pregnancy, guide management of the patient’s overall health, and indicate need for special care in subsequent pregnancies.

- **Spontaneous PTB at less than 28 weeks gestation**
  - Consider ordering HSG or sonohysterogram after 6 weeks postpartum to check for uterine anomaly or pathology. Up to 20% of women with second trimester losses and/or preterm birth may have uterine cavity anomalies.
  - Recommend preconception consult to set expectation for 17P at 16 weeks gestation, possible cerclage (per care protocol page 13).

- **Indicated PTB at less than 28 weeks gestation due to severe preeclampsia, HELLP**
  - Evaluate for APS. Order test for lupus anticoagulant, anticardiolipin antibodies, and anti-beta_2_ glycoprotein 1 antibodies.
  - Check blood pressure at 6 weeks postpartum; if >140/90 mm Hg, take steps to manage hypertension.
  - Recommend preconception consult to assess risk and to plan management prior to and during next pregnancy (per care protocol page 14).

- **Indicated PTB due to IDDM**
  - Check HbA1C at 6 weeks postpartum visit or as possible.
  - Evaluate renal function as needed. Patients with known renal compromise prior to pregnancy or with history of worsening renal function during pregnancy should have baseline renal function evaluated after pregnancy.
  - Follow-up with endocrinology. Share notes with the provider who regularly oversees patient’s diabetes treatment and agree on goals for blood glucose control in advance of any future pregnancies.
  - Recommend preconception consult to assess adequacy of blood glucose control, to assess risk, and to plan management before and during next pregnancy (per care protocol page 17).

**KEY ACTIONS for providers:**

- In the weeks after a PTB, follow up, evaluate as needed to understand risks, and guide future management.

- In the weeks after a PTB, follow up, evaluate as needed to understand risks, and guide future management.
Estimating PTB Recurrence

A previous PTB is the single greatest risk factor for subsequent PTB. In several studies the recurrence rate ranges from 25% to 40% depending on the number and severity (very early or late preterm) of spontaneous PTBs, the number of term births, and birth order.\(^\text{17,19,20}\) Approximately 15% of all spontaneous PTBs occur in women with a prior spontaneous PTB.\(^\text{21}\)

This CPM recommends estimating — and communicating to the patient — the risk of PTB recurrence. Doing so can powerfully support best-practice interventions in subsequent pregnancies, allowing you to:

• Highlight the importance of early and aggressive intervention
• Estimate the impact of potential interventions
• Emphasize warning signs and need for evaluation

Research suggests that this aspect of care is often overlooked: Among women whose pregnancies had ended in very preterm birth, only 24.3% were aware of their individual PTB risk.\(^\text{22}\) The following sections explain how to estimate a patient’s individual risk based on the figures provided.

About the risk estimate tools

Estimates of PTB recurrence risk use data from several sources depending on the cause of the previous PTB. Most recurrence risks are based on the number and severity of previous PTB and whether or not the patient has had an intervening cause of the previous PTB. Most recurrence risks are based on the number and severity (very early or late preterm) of spontaneous PTBs, the number of term births, and birth order.\(^\text{17,19,20}\) Approximately 15% of all spontaneous PTBs occur in women with a prior spontaneous PTB.\(^\text{21}\)

Points to Ponder

• Estimate the impact of potential interventions
• Emphasize warning signs and need for evaluation

Use Intermountain’s fact worksheet, Preterm Birth Risk Worksheet, to create personalized education for women who have had a previous PTB. The worksheet can help you communicate:

• Individual circumstances and factors in the patient’s PTB
• Her individual risk assessment
• Recommended evaluations or follow-up
• Opportunities to lower PTB risk for future pregnancies: contraception to achieve pregnancy interval greater than 18 months, smoking cessation, etc.
• Expectation of special prenatal care in the future (for example, a patient with IDDM will require extra monitoring during pregnancy)

Give this worksheet along with the general-use fact sheet, Preterm Birth: 10 Steps to Help Prevent It. See page 25 for a list of all related patient and provider resources and instructions for accessing them.
Women with prior PTB may have lower rates of recurrent PTB when prenatal care emphasizes open communication between the patient and her caregivers.9

Spontaneous preterm birth: risk of recurrence

For patients with a history of spontaneous PTB, the number and order of previous deliveries, both term and preterm, may be used to estimate the risk in a subsequent pregnancy. The recurrence risk estimation tool below (Figure 1) uses information gathered on all singleton preterm births in the state of Utah between 1989 and 2002.17

The tool shows the outcomes of a subset of study participants (17,410 women) with three consecutive births.

To use this tool to calculate the risk of spontaneous PTB in the current pregnancy, follow the order of the 2 most recent pregnancies of the patient. For example, a woman with a history of spontaneous PTB in her penultimate (second to last) pregnancy and a term birth in her most recent pregnancy would be estimated to have a risk of 16.1% for spontaneous PTB in the current pregnancy. A woman with two previous spontaneous PTBs would be expected to have a risk of 46.2%.

FIGURE 1. Spontaneous Preterm Birth: Risk of Recurrence17

Proportion of preterm births (<37 weeks) in a woman's first, second, and third birth, excluding women with any indicated preterm inductions (n=17410).
Indicated preterm birth: risk of recurrence

In general, maternal and fetal factors that necessitate preterm delivery also increase the risk of recurrent PTB, both indicated and spontaneous. An indicated PTB is associated with an increased risk for subsequent spontaneous PTB because indicated and spontaneous PTBs often share the same underlying etiologies, such as inflammation or stress.

- Use the tool below (Figure 2) to calculate recurrence risk after an indicated PTB due to preeclampsia.
- To calculate recurrence risk after a PTB due to any other maternal or fetal indication, use the tool (Figure 3) on the following page.

Risk after an indicated PTB due to preeclampsia

An estimate of the risk of recurrence following a PTB due to preeclampsia can be made using information reported in the literature. Investigators found that the rate of recurrence in this situation is influenced by two factors: the gestational age of the most recent PTB and the patient’s BMI. Earlier gestational age and increasing BMI are both associated with an increasing risk of recurrence.

To use the Figure 2 tool to calculate the risk of preeclampsia recurrence, locate the patient’s BMI in the appropriate GA category (categories are gestational age at time of previous PTB due to preeclampsia). For example, a woman with a previous PTB due to preeclampsia at 30 weeks gestation and a BMI of 23.0 would be expected to have a recurrence risk of 29.3%.

**FIGURE 2. Preeclampsia: Risk of Recurrence**

Preeclampsia recurrence risk estimates, based on maternal BMI and gestational age at time of prior indicated PTB due to preeclampsia. Developed from outcome data for singleton births in more than 100,000 women between 1989 and 1997.
Risk after an indicated PTB due to maternal or fetal factors

The recurrence risk estimation tool below (Figure 3) was developed based on outcomes of more than 70,000 women who delivered in the state of Utah between 1989 and 2007.25

To use this tool to calculate the risk of PTB in the current pregnancy, track the outcome(s) beginning with the patient’s first indicated PTB. For example, a woman who experienced an indicated PTB in her first pregnancy has an overall PTB risk of 17.5% (1.3% risk for preterm premature rupture of membranes (pPROM) + 7.2% risk for spontaneous PTB (sPTB) + 9.0% risk of indicated PTB) in her next pregnancy. In addition, if the woman experiences another indicated PTB in her second pregnancy, her overall risk for recurrence of any type of PTB in her third pregnancy is estimated to be 51.3% (4.3% risk for pPROM + 9.4% risk for sPTB + 37.6% risk for indicated PTB).

**FIGURE 3. PTB Recurrence Risk After Indicated Preterm Birth**

Supporting Planned and Healthy Pregnancies

Several of the strongest risk factors for PTB are in the domain of family planning. This section focuses on what providers can do to lower risks of short interpregnancy intervals, unplanned pregnancies, and multiple gestations (in context of fertility treatment).

Pregnancy spacing and planned pregnancies

Multiple studies have demonstrated the value of interpregnancy intervals of 18 months or greater. Providers should therefore actively promote the use of highly effective contraception at every possible patient contact — in the hospital after a birth, in postpartum follow-up, in preconception consultations.

- Educate patient and family to promote an interpregnancy interval of 18 months or greater. Ask about their desired family size and the timing they envision. Consider the talking points in the sidebar at right.
- Make it easy for your patient to begin contraception. Offer contraception early and often. Use the chart shown below, and privilege these options in order:
  - First-line contraception methods: IUD, contraceptive implant (prior to hospital discharge if able, or at 4 week postpartum visit), or if permanent sterilization desired, advise vasectomy or female sterilization and provide referral.
  - Second-line contraception methods: Injectable contraception (prior to hospital discharge, if desired), contraceptive pill, contraceptive patch, or vaginal ring (earliest initiation possible as appropriate for breast feeding status).
  - Third-line contraception methods: condoms, diaphragm/cap. If using these methods, encourage use of two or three methods simultaneously.

### Comparing effectiveness of contraception methods

<table>
<thead>
<tr>
<th>Most Effective</th>
<th>Highly Effective</th>
<th>Effective</th>
<th>Less Effective</th>
<th>Least Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 pregnancy per 100 women in one year</td>
<td>the methods in this row prevent pregnancy more than 99% of the time</td>
<td>the methods in this row prevent pregnancy more than 90% of the time</td>
<td>the methods listed below prevent pregnancy 70% and 90% of the time</td>
<td>about 30 pregnancies per 100 women in one year</td>
</tr>
<tr>
<td>implants (Implanon, Nexplanon)</td>
<td>IUD (Mirena, ParaGard)</td>
<td>female sterilization</td>
<td>vasectomy</td>
<td>male condoms</td>
</tr>
<tr>
<td>injectables (Depo-Provera)</td>
<td>birth control pills</td>
<td>patch</td>
<td>vaginal ring (Nuvaring)</td>
<td></td>
</tr>
</tbody>
</table>

To make the method more effective...
- Vasectomy (male sterilization): Use another method for first 3 months.
- Injectables: Get repeat injections on time. Birth control pills: Take a pill every day. Patch, ring: Keep in place, change on time.
- Condoms, diaphragm: Use correctly every time. Periodic abstinence methods: Use condoms on fertile days (or don’t have sex then). Natural methods such as Standard Days Method or Two Day Method may be easier to use. Spermicides: Use correctly every time you have sex. Combine it with another method (e.g., condom) to increase effectiveness.

### Key Actions for Providers:

- Promote interpregnancy interval ≥18 months.
- Offer highly effective contraception.

### Talking Points: Discussing Birth Control in the Postpartum Period

- Half of all pregnancies are unplanned. You’ll be busy this year, so let’s make sure we have a plan in place now.
- If you don’t want any more children, now may be the best time to ensure that. Here are your options for permanent birth control. …
- If you hope to have another child, it’s best to have at least two years between them. This birth spacing improves your chance for a healthy pregnancy and a healthy baby. It lowers the chance that your baby will be born too early or too small.
- Waiting at least two years also gives your body a chance to recover and strengthen after this pregnancy — and gives you a chance to focus on your new baby.

### Patient Tool: Fact Sheet on Preterm Birth Prevention

Adapted from World Health Organization materials, this contraception chart appears in Intermountain’s fact sheet, Preterm Birth: 10 Steps to Help Prevent It. Use it with patients to support counseling re: highly effective contraception. Additional fact sheets to support contraception counseling are:

- Birth Control Basics
- Birth Control Pills: 5 Things You Need to Know

See page 25 for a list of all related patient and provider resources and instructions for accessing them.
Strategies for reducing risk of multiple gestation

Multiple gestation is a major risk factor for preterm birth; since 1980, there has been a steady increase in the incidence of multiple births. Experts agree that this increase is due to rise of infertility treatment and calculate that:

• 40% of twin births are the result of infertility treatment (21% to 23% from ovulation induction (OI) or superovulation (SO) treatments with medications, 8% to 12% from artificial reproductive technologies such as in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI)).

• 80% of high-order multiple births are the result of infertility treatment (33% to 66% from OI or SO; 13% to 44% from ARTs).

Given the risks of multiple gestation for both mother and babies, responsible obstetric care will aim to reduce the likelihood of occurrence. In particular, this CPM recommends the following care for women seeking treatment for infertility:

• When prescribing fertility medications, start with first-line medications at the lowest effective dose to achieve the desired outcome.
  – The goal of ovulation induction for anovulatory patients is the maturation and ovulation of a single follicle.
  – Oral medications such as clomiphene citrate and letrozole are associated with lower risks of twin and higher order multiple gestations than injectable gonadotropins; for this reason, clomiphene citrate and letrozole are first line for ovulation induction or superovulation for patients with WHO class II anovulation. Note that for patients with hypothalamic dysfunction, oral medications are unlikely to be effective; these patients should be referred to a reproductive endocrinologist to discuss gonadotropin ovulation induction.
  – Do not increase the dose of an oral agent if a patient does not get pregnant in the first month of treatment unless they fail to respond to the initial dose. Do not increase the dose for ovulatory patients.
  – Oral or injectable fertility medications should not be used for fertile patients who only wish to increase the probability of multifetal gestations. Multifetal gestations are an adverse outcome associated with treating infertility. Decline patient requests to use infertility medications when they are not indicated.

• For patients with past pregnancies conceived with the assistance of fertility treatments, don’t immediately assume that the woman will need fertility treatment to conceive again. Circumstances may change and it is prudent to re-evaluate the patient’s fertility potential after each pregnancy to decide if fertility-promoting medications are indicated.

• Consider referring to a reproductive endocrinologist if initial treatments are unsuccessful. Also, consider early referral for specific patient populations listed in the sidebar at left.

• Educate patients about the treatment-associated risks of multiple gestation. Patients may choose less aggressive regimens when they understand the rationale for strategies aimed at avoiding multiple gestation. Explain that every risk of pregnancy is increased in a multiple gestation pregnancy — including the risk of miscarriage and preterm birth.

KEY ACTIONS for providers:
☐ When treating for infertility, implement strategies to lower the risk of multiple gestation.
Substance Use Screening and Intervention

Of the 4.3 million infants born annually in the U.S., between 800,000 and 1 million are born to women who used drugs during pregnancy.32

- 1 in 5 infants are exposed to nicotine
- 1 in 9 infants are exposed to alcohol
- 1 in 20 are exposed to illegal drugs

Because prenatal substance abuse has a host of direct and indirect effects on the risk of preterm birth, we recommend the following:

- Screen every patient at each encounter, or at least once per trimester during pregnancy. This approach reduces subjectivity, discomfort, and bias — and is far more effective than guessing. Ask about tobacco use, and screen for other substances using a validated tool like the 4P’s, shown below.33,34 Also, to identify patients who take prescription pain medication, consider asking this additional screening question: “When you have pain, what do you do for the pain?”

In some cases, signs and symptoms will suggest abuse, even when screening is negative.

The 4P’s

This screening device is often used as a way to begin a discussion about drug or alcohol use. Any “yes” warrants further assessment.

1. Have you ever used drugs or alcohol during this pregnancy?
2. Have you had a problem with drugs or alcohol in the past?
3. Does your partner have a problem with drugs or alcohol?
4. Do you consider one of your parents to be an addict or an alcoholic?

- Educate every patient — regardless of screening results. You can assume that all women have some knowledge of the effects of drugs, alcohol, and cigarettes in pregnancy. Ask patients what they know, then fill in as needed.34 Make sure patients understand that prescription medication — not just “street drugs” — can be misused and present risk. See patient education resources listed on page 25.

- Intervene and refer as needed. For patients at lower risk for substance use, goals should be to increase insight and awareness about their use and to motivate behavior change. Patients at higher risk should be referred to specialty care. See page 24.

KEY ACTIONS for providers:

☐ Screen every patient for substance use or abuse — and educate every patient, regardless of screening results.

SMOKING CESSATION IN PREGNANCY

Pregnant women are uniquely receptive to smoking-cessation programs, especially when physicians recommend them directly and repeatedly. Smoking-cessation programs in pregnancy have been reported to reduce the rate of preterm birth by 16% to 31%.9

FACTS ABOUT OPIOID USE IN PREGNANCY

- Like cocaine use, opioid use is an important risk factor for PTB. Women who use opiates are three times as likely to have preterm birth as those who don’t.35
- Utah is a hot spot for opioid use and abuse. In 2008, Utah’s age-adjusted overdose death rate was 18.4 per 100,000; Idaho’s rate for the same year was almost half that, 9.7.37 Between 1999 and 2007, Utah deaths attributed to poisoning by prescription pain medications increased by over 500%; the Utah Department of Health reports that “the increase was mostly due to increased numbers of deaths from prescription opioid pain medications, including methadone, oxycodone, hydrocodone, and fentanyl.”36
- Opioid use may be particularly problematic for women. Some experts believe that women become dependent on prescription pain medication more easily than men. This is especially concerning given studies showing that, compared to men, women are more likely to have chronic pain, are more likely to be given prescription pain medication, are given higher doses, and use prescription pain medication for longer periods of time.37
- Treatment helps. Pregnant women who receive treatment for substance abuse early in their pregnancy can achieve the same health outcomes as pregnant women with no substance abuse.38
Prevention and management of preterm birth

June 2014

©2014 INTERMOUNTAIN HEALTHCARE. ALL RIGHTS RESERVED.

The sections that follow provide guidance for prenatal care of patients in any of the following high-risk circumstances:

- **Prior spontaneous PTB.** Of the more than 500,000 preterm births in the U.S. each year, about 15% occur in women with a prior preterm birth. Effective interventions — such as those presented on page 15 — could potentially eliminate as many as 35% to 50% of recurrent preterm births.9

- **Prior indicated PTB due to preeclampsia.** Preeclampsia and related hypertensive disorders of pregnancy affect about 6% of all births in the United States.39 See page 14 for the protocol for managing this risk factor in pregnancy.

- **Short cervix during pregnancy.** Short cervical length (CL) on ultrasound has been shown to be one of the best predictors of preterm birth.40 Progesterone therapy and cerclage placement are sometimes indicated to manage this risk factor; see the protocol on page 15 and the discussion on page 20.

- **Chronic hypertension during pregnancy.** Women with chronic hypertension are at increased risk of superimposed preeclampsia; however, even those who don’t develop preeclampsia tend to have poorer perinatal outcomes than other women.41 Evidence-based management is focused on close monitoring and management of blood pressure and increased fetal surveillance.42 See the protocol on page 16.

- **Insulin-dependent diabetes mellitus (IDDM).** Diabetes is a risk factor for the development of preeclampsia.11 Studies show that good glycemic control prior to conception and in early pregnancy is associated with significant reductions in adverse pregnancy outcome (malformation, stillbirth, and neonatal death) and very premature delivery.43,44 See page 17 for the protocol.

- **Twins.** Nearly 60% of twins are born preterm.45 Care during multiple gestation pregnancies should include increased fetal surveillance and close monitoring of blood pressure. Note that although the ACOG Committee Opinion (number 560, April 2013) suggests that mono-di twins be delivered “between 34 weeks and 6 days and 37 weeks and 6 days,” data recently published by Sullivan et al support waiting until at least 37 weeks to deliver in otherwise-uncomplicated cases of mono-di twins. See page 18 for guidance.46,47

- **Antiphospholipid antibody syndrome (APS).** Approximately one-third of women with APS will develop preeclampsia during pregnancy. APS is also associated with numerous other obstetric complications, including recurrent miscarriage, oligohydramnios, prematurity, intrauterine growth restriction, fetal distress, arterial or venous thrombosis and placental insufficiency.48,49 Management of APS in pregnancy involves medication to prevent thrombosis, increased fetal surveillance, and close monitoring and management of hypertension; see page 19.

The risk-specific care protocols in this CPM represent best practice based on evidence and expert opinion. The protocols are meant to serve as a guidelines; modify care as needed to meet an individual patient’s clinical scenario.

**Risk-specific Protocols for Care in Pregnancy**

**About these care protocols**

The protocols on pages 13 to 19 aim to provide consistent, evidence-based care and education to those women at highest risk for preterm birth. In a recent pilot study using the protocols for prior spontaneous PTB and short cervix, case-control comparisons showed the following results:

- 28% reduction in spontaneous PTB <37 weeks gestation
- Pregnancy prolongation >1 week on average
- Reduction in the rate of neonatal morbidity

The risk-specific care protocols in this CPM represent best practice based on evidence and expert opinion. The protocols are meant to serve as a guidelines; modify care as needed to meet an individual patient’s clinical scenario.
# CARE PROTOCOL: Prior Spontaneous PTB

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Evaluation</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| <20 weeks gestation | • Detailed obstetric history with personalized risk assessment (see pages 5 to 8).  
• Urine culture.  
• Vaginal wet mount.  
• Transvaginal ultrasound (TVU) to measure cervical length (CL) at 16–18 weeks. | • Initiate 17P at 16 weeks. See progesterone discussion, page 20.  
• Treat bacteriuria or bacterial vaginosis with antibiotics if test results positive.  
• Consider prophylactic cerclage, if indicated by CL on TVU. See the Care Protocol: Short Cervix on page 15, cerclage discussion on page 20. |
| 20–26 weeks gestation | • Review signs and symptoms of labor.  
• Urinalysis with culture if indicated by symptoms or urine dipstick findings.  
• Vaginal wet mount.  
• TVU CL at 20–23 weeks.  
• Assess compliance with progesterone therapy. | • Treat bacteriuria or bacterial vaginosis with antibiotics if test results positive.  
• If TVU reveals short cervix:  
  – Offer ultrasound-induced cerclage if CL <2.5 cm and no multiple gestation. See the Care Protocol: Short Cervix on page 15, cerclage discussion on page 20.  
  – Consider vaginal progesterone in addition to or in place of 17P. See the Care Protocol: Short Cervix on page 15, cerclage discussion on page 20.  
  – Monitor for uterine contractions. If documented uterine contractions and patient is >23 weeks gestation, consider management per the PTL Assessment and Management Algorithm on page 22:  
    → Consider tocolysis. See PTL/PTB Medication Table on page 23.  
    → Consider steroids. See PTL/PTB Medication Table on page 23.  
    → Consider magnesium sulfate. See PTL/PTB Medication Table on page 23. |
| 27–30 weeks gestation | • Review signs and symptoms of labor.  
• Urinalysis with culture if indicated.  
• Vaginal wet mount.  
• TVU CL at 26–30 weeks.  
• Assess compliance with progesterone therapy. | • Treat bacteriuria or bacterial vaginosis with antibiotics if test results positive.  
• If TVU reveals short cervix, monitor for uterine contractions. If documented uterine contractions and patient is >23 weeks gestation, consider management per the PTL Assessment and Management Algorithm on page 22:  
    → Consider tocolysis. See PTL/PTB Medication Table on page 23.  
    → Consider steroids. See PTL/PTB Medication Table on page 23.  
    → Consider magnesium sulfate. See PTL/PTB Medication Table on page 23. |

## PATIENT EDUCATION MATERIALS

Intermountain fact sheets supporting this risk-specific protocol:  
• 17P for Preventing Preterm Birth  
• Cervical Cerclage

Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

### KEY ACTIONS for providers:

- Initiate 17P before 20 weeks gestation.
- Obtain serial cervical length measurements as indicated in the protocol.
## CARE PROTOCOL: Previous Indicated PTB due to Preeclampsia

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended Intervention</th>
</tr>
</thead>
</table>
| **<20 weeks gestation** | - Confirm GA/EDC.  
- Check blood pressure (BP) and determine need for treatment; if BP >160/100 mm Hg, initiate antihypertensive therapy:  
  - Labetalol — first-line medication choice.  
  - Nifedipine — second-line medication choice.  
- Obtain baseline results for:  
  - 24-hour urine for total protein and serum creatinine.  
  - Liver function (AST/ALT).  
  - Platelet count.  
- Initiate low-dose aspirin therapy as early as possible in pregnancy.  
- Initiate home BP monitoring and establish BP review every 2–4 weeks; instruct patient to call if readings are consistently >160/100.  
- Review signs and symptoms of preeclampsia. |

| **20–28 weeks gestation** | - Review BP.  
  - If BP consistently >160/100, initiate or increase antihypertensive medication; see first- and second-line medication choices in row above.  
- Perform ultrasound for fetal growth and AFI at 28–30 weeks gestation in any of these circumstances:  
  - If BP is elevated (>140/90).  
  - If BP is normal but patient is on antihypertensive therapy.  
  - If clinical suspicion of growth restriction.  
- Consider admission to hospital and Maternal-Fetal Medicine consult; treat with magnesium sulfate (if not already receiving for seizure prophylaxis) and steroids in any of the circumstances listed below; see PTB Medication Table on page 23:  
  - If BP >160/100.  
  - If evidence of placental dysfunction (IUGR, oligohydramnios, or elevated umbilical artery Doppler velocimetry).  
  - If significant concern for preeclampsia. |

| **29–32 weeks gestation** | - Review BP.  
  - If BP consistently >160/100, initiate or increase antihypertensive medication; see first- and second-line medication choices in first row of this table.  
- Consider admission to hospital and Maternal-Fetal Medicine consult and treat with magnesium sulfate (if not already receiving for seizure prophylaxis) and steroids in any of the circumstances listed below; see PTB Medication Table on page 23:  
  - If BP >160/100.  
  - If evidence of placental dysfunction (IUGR, oligohydramnios, or elevated umbilical artery Doppler velocimetry).  
  - If significant concern for preeclampsia.  
- Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile) per schedule below:  
  - No hypertension, IUGR, or oligohydramnios: consider weekly testing beginning at 32 weeks gestation.  
  - Mild hypertension (>140/90) or preeclampsia: test twice a week beginning at 32 weeks or at diagnosis.  
  - Severe preeclampsia: test twice a week beginning at 28 weeks or at diagnosis. |

| **Delivery timing** | - Preterm delivery is generally accepted if any of the following are present:  
  - Eclampsia.  
  - Blood pressure of 160 mm Hg systolic or higher, or 110 mm Hg diastolic or higher on at least two occasions while the patient is at rest and which does not respond to antihypertensive treatment.  
  - Oliguria of less than 500 mL in 24 hours.  
  - Cerebral or visual disturbances.  
  - Pulmonary edema.  
  - Epigastric or right upper-quadrant abdominal pain.  
  - Impaired liver function as demonstrated by elevated liver enzymes (AST >100).  
  - Thrombocytopenia (platelet count <100,000).  
  - Fetal growth restriction or oligohydramnios (in the setting of preeclampsia). |

| **KEY ACTIONS for providers:** | - Initiate ASA therapy before 12 weeks gestation.  
- Initiate home BP measuring and review log every 2–4 weeks.  
- Follow delivery timing guidelines in this protocol. |

### PATIENT EDUCATION MATERIALS
- Intermountain fact sheets supporting this risk-specific protocol:  
  - **24-hour Urine Specimen**  
  - **Preeclampsia**  
  - **How to Monitor Your Blood Pressure**  
  - **BP Tracker**  
  - **Fetal Testing (nonstress test, amniotic fluid assessment, and biophysical profile)**  

Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.
# CARE PROTOCOL: Short Cervix

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>PREVIOUS PTB</th>
<th>NO previous PTB</th>
</tr>
</thead>
</table>
| 23–28 weeks gestation | If cervical length (CL) 1.50 cm–2.50 cm on transvaginal ultrasound (TVU):  
  - Refer for Maternal-Fetal Medicine consult; patient should be seen within one week (ideally within 1 or 2 days).  
  - Start or adjust progesterone therapy; note that for patients with both short cervix and prior PTB, evidence re: the best form of progesterone is unclear (see progesterone discussion page 20). Give ANY ONE of the following acceptable options:  
    - Vaginal progesterone: either crinone gel (8% - 90 mg progesterone daily), OR natural progesterone vaginal suppositories (200 mg nightly).  
    - 17P injections, per prior PTB protocol (see page 13).  
    - BOTH 17P injections and vaginal progesterone (gel or suppository).  
  If CL <1.50 cm on TVU:  
    - Refer immediately to labor and delivery for further assessment.  
    - Admit patient for a minimum 23-hour observation period to assess for active labor and/or intra-amniotic infection (IAI). The CL will be reassessed via sterile digital examination and/or TVU at the discretion of the attending physician.  
    - If evidence of active labor and/or IAI at <24.0 weeks gestation, counsel the patient regarding risks of maternal morbidity with attempted continuation of pregnancy.  
    - If no evidence of active labor or IAI, offer an ultrasound-indicated cerclage placement (unless multiple gestation; see cerclage discussion page 21). Consider amniocentesis prior to cerclage placement.  
    - Start or adjust progesterone therapy; note that for patients with both short cervix and prior PTB, evidence re: the best form of progesterone is unclear (see discussion page 20). Give ANY ONE of the following acceptable options:  
      - Vaginal progesterone: either crinone gel (8% - 90 mg progesterone daily) OR natural progesterone vaginal suppositories (200 mg nightly).  
      - 17P injections, per prior PTB protocol on page 13.  
      - BOTH 17P injections and vaginal progesterone (gel or suppository).  
  If CL <2.5 cm:  
    - Refer immediately to labor and delivery for further assessment.  
    - Admit patient for a minimum 23-hour observation period if contractions are noted.  
    - Give steroids. See PTL/PTB Medication Table on page 23.  
    - Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB Medication Table on page 23.  
| 23–28 weeks gestation | If CL <2.5 cm:  
  - Refer immediately to labor and delivery for further assessment.  
  - Admit patient for a minimum 23-hour observation period if contractions are noted.  
  - Give steroids. See PTL/PTB Medication Table on page 23.  
  - Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
  - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB Medication Table on page 23.  
| If cervical length (CL) 1.50 cm–2.50 cm on transvaginal ultrasound (TVU):  
  - Refer for Maternal-Fetal Medicine consult; patient should be seen within one week (ideally within 1 or 2 days).  
  - Start vaginal progesterone therapy, either crinone gel (8% - 90 mg progesterone daily), OR natural progesterone vaginal suppositories (200 mg nightly).  
  If CL <1.50 cm on TVU:  
    - Refer immediately to labor and delivery for further assessment.  
    - Admit patient for a minimum 23-hour observation period if contractions are noted. The CL will be reassessed via sterile speculum examination and/or TVU at the discretion of the attending physician.  
    - If evidence of active labor and/or IAI at <24.0 weeks gestation, counsel the patient regarding risks of maternal morbidity with attempted continuation of pregnancy.  
    - If no evidence of active labor or IAI AND membranes visible on sterile digital exam, offer an ultrasound-indicated cerclage placement (unless multiple gestation; see discussion page 21). Consider amniocentesis prior to cerclage placement.  
    - Start vaginal progesterone therapy, either crinone gel (8% - 90 mg progesterone daily), or natural progesterone vaginal suppositories (200 mg nightly).  
  If CL <1.5 cm:  
    - Refer immediately to labor and delivery for further assessment.  
    - Admit patient for a minimum 23-hour observation period if contractions are noted.  
    - Give steroids. See PTL/PTB Medication Table on page 23.  
    - Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB Medication Table on page 23.  

### PATIENT EDUCATION MATERIALS

Intermountain fact sheets supporting this risk-specific protocol:  
- **17P for Preventing Preterm Birth**  
- **Cervical Cerclage**

Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

**KEY ACTIONS for providers:**
- Initiate progesterone therapy at diagnosis, and promote adherence to therapy throughout the pregnancy  
- Offer cervical cerclage as/when appropriate.
## CARE PROTOCOL: Chronic Hypertension during Pregnancy

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended Intervention</th>
</tr>
</thead>
</table>
| **<20 weeks gestation** | • Confirm GA/EDC.  
• Check blood pressure (BP) and determine need for treatment; if BP >160/100, initiate antihypertensive therapy:  
  – Labetalol – first-line medication choice.  
  – Nifedipine – second-line medication choice.  
• Obtain baseline results for:  
  – 24-hour urine for total protein and serum creatinine.  
  – Liver function tests.  
  – Platelet count.  
• Initiate home BP monitoring and establish BP review every 2 to 4 weeks; instruct patient to call if readings are consistently >160/100.  
• Review signs and symptoms of preeclampsia. |
| **20–28 weeks gestation** | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.  
• Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia (see schedule in the row below).  
• Repeat 24-hour urine test if evidence of proteinuria on urine dip or concern re: preeclampsia.  
• If indications of superimposed preeclampsia or placental dysfunction:  
  – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTl/PTB Medication Table on page 23.  
  – Give magnesium sulfate (if not already receiving for seizure prophylaxis). See PTl/PTB Medication Table on page 23. |
| **29–32 weeks gestation** | • Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above).  
• If indications of superimposed preeclampsia or placental dysfunction:  
  – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTl/PTB Medication Table on page 23.  
  – Give magnesium sulfate (if not already receiving for seizure prophylaxis). See PTl/PTB Medication Table on page 23.  
• Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile) per schedule below:  
  – No hypertension, IUGR, or oligohydramnios: consider weekly testing beginning at 32 weeks gestation.  
  – Mild hypertension (>140/90) or preeclampsia: test twice a week beginning at 32 weeks or at diagnosis.  
  – Severe preeclampsia: test twice a week beginning at 28 weeks or at diagnosis. |
| Delivery timing | Delivery will occur at >37 weeks GA unless one of the following occurs:  
• Severe preeclampsia.  
• Nonreassuring fetal status noted on antenatal surveillance. |

### PATIENT EDUCATION MATERIALS

Intermountain fact sheets supporting this risk-specific protocol:  
• How to Monitor Your Blood Pressure  
• BP Tracker  
• Fetal Testing (nonstress test, amniotic fluid assessment, and biophysical profile)  

Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

### KEY ACTIONS for providers:

- Initiate home BP measuring and review log every 2–4 weeks.  
- Follow delivery timing guidelines in this protocol.
## CARE PROTOCOL: Insulin-dependent Diabetes Mellitus (IDDM)

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended intervention</th>
</tr>
</thead>
</table>
| **<20 weeks gestation** | • As early as possible in pregnancy, contact the provider who normally oversees the patient’s diabetes treatment to establish goals and a plan for caring for the patient in pregnancy.  
• Confirm GA/EDC.  
• Evaluate blood glucose (BG) control:  
  – Check HbA1C.  
  – Review BG records and document adequacy of BG control; adequate control is >75% of BG values in these target ranges:  
    › Fasting value <95 mg/dl.  
    › 1-hour postprandial value <140 mg/dl.  
    › 2-hour postprandial value <130 mg/dl.  
• Check blood pressure (BP) and determine need for treatment; if BP >160/100, initiate antihypertensive therapy:  
  1. Labetalol – first-line medication choice.  
• Obtain baseline results:  
  – 24-hour urine for total protein and serum creatinine.  
  – Liver function (AST/ALT).  
  – Platelet count.  
• Refer for diabetes education/dietitian consult (see resources page 24).  
• Refer to ophthalmologist for retinal exam.  
• Refer for fetal echocardiogram for any of the following findings:  
  – HbA1c >7%.  
  – Inadequate views of cardiac and outflow tracts on targeted ultrasound.  
  – Suspicious cardiac findings on targeted ultrasound.  
• Establish BG review every 1 to 2 weeks; instruct patient to call if readings are consistently outside target ranges above.  

| 20–28 weeks gestation | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks GA.  
• Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia (see schedule in the row below).  
• Repeat 24-hour urine test if evidence of proteinuria on urine dip or concern re: preeclampsia.  
• Evaluate blood glucose (BG) control:  
  – Check HbA1C.  
  – Review patient’s BG records and adjust insulin therapy if >25% BG values are out of target range (see row above for targets).  
• If indications of preeclampsia, IUGR, or PTL:  
  – Admit for evaluation of preeclampsia, insulin drip, and hourly BG assessment; transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTL/PTB Medication Table on page 23.  
  – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
  – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23.  

| 29–32 weeks gestation | • Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in first row).  
• If indications of preeclampsia, IUGR, or PTL:  
  – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTL/PTB Medication Table on page 23.  
  – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
  – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23.  
• Evaluate blood glucose (BG) control:  
  – Check HbA1C.  
  – Review patient’s BG records and adjust insulin therapy if >50% BG values are out of target range (see row above for targets).  
• Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile) per schedule below:  
  – Twice weekly at 32 weeks gestation.  
  – Mild hypertension or preeclampsia – twice weekly at 32 weeks or at diagnosis.  
  – Severe hypertension – twice weekly beginning at 28 weeks.  

| Delivery timing | Delivery will occur at >37 weeks GA unless one of the following occurs:  
• Severe preeclampsia.  
• Nonreassuring results noted on antenatal surveillance.  
• Severe IUGR (<10%) and oligohydramnios (AFI <5 cm).  

### PATIENT EDUCATION MATERIALS
Intermountain fact sheets supporting this risk-specific protocol:  
• Diabetes Care Before and During Pregnancy  
• BG Tracker  
Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

### KEY ACTIONS for providers:
- Initiate home BG monitoring and review log every 1–2 weeks.  
- Follow delivery timing guidelines in this protocol.
### CARE PROTOCOL: Twins

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Mono-Di Twins</th>
<th>Di-Di Twins</th>
</tr>
</thead>
</table>
| **<23 weeks gestation** | • Confirm GA/EDC.  
  • Confirm placentation.  
  • Review risks and signs and symptoms of preterm labor, pPROM.  
  • Initiate checks for twin-to-twin transfusion syndrome (TTTS) every 2 weeks (may be performed in clinic).  
  • Measure cervical length (CL) with transvaginal ultrasound (TVU) at 20–24 weeks gestation; if CL <2.5 cm refer to short cervix protocol on page 15 for guidance. | • Confirm GA/EDC.  
  • Confirm placentation.  
  • Review risks and signs and symptoms of preterm labor, pPROM.  
  • Measure cervical length (CL) with transvaginal ultrasound (TVU) at 20–24 weeks gestation; if CL <2.5 cm refer to short cervix protocol on page 15 for guidance. |
| **23–28 weeks gestation** | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.  
  • Check BP and determine need for treatment; if BP >160/100, initiate antihypertensive therapy:  
    – Labetalol – first-line medication choice.  
    – Nifedipine – second-line medication choice.  
  • Perform glucose tolerance testing at 26–28 weeks.  
  • If indications of preeclampsia, IUGR, fetal distress, or documented preterm labor:  
    – Admit for evaluation of maternal/fetal condition.  
    – Transfer to tertiary care center if appropriate NICU services are not available.  
    – Give steroids. See PTL/PTB Medication Table on page 23.  
    – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23. | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.  
  • Check BP and determine need for treatment; if BP >160/100, initiate antihypertensive therapy:  
    – Labetalol – first-line medication choice.  
    – Nifedipine – second-line medication choice.  
  • Perform glucose tolerance testing at 26–28 weeks.  
  • If indications of preeclampsia, IUGR, fetal distress, or documented preterm labor:  
    – Admit for evaluation of maternal/fetal condition.  
    – Transfer to tertiary care center if appropriate NICU services are not available.  
    – Give steroids. See PTL/PTB Medication Table on page 23.  
    – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23. |
| **29–32 weeks gestation** | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.  
  • Check BP and determine need for treatment; if BP >160/100, initiate antihypertensive therapy. See medication choices in row above.  
  • Initiate antenatal surveillance: twice weekly NST/AFI beginning at 32 weeks gestation.  
  • If indications of preeclampsia, IUGR, fetal distress, or documented preterm labor:  
    – Admit for evaluation of maternal/fetal condition.  
    – Transfer to tertiary care center if appropriate NICU services are not available.  
    – Give steroids. See PTL/PTB Medication Table on page 23.  
    – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23. | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.  
  • Check BP and determine need for treatment; if BP >160/100, initiate antihypertensive therapy. See medication choices in row above.  
  • Initiate antenatal surveillance: twice weekly NST/AFI beginning at 32 weeks gestation.  
  • If indications of preeclampsia, IUGR, fetal distress, or documented preterm labor:  
    – Admit for evaluation of maternal/fetal condition.  
    – Transfer to tertiary care center if appropriate NICU services are not available.  
    – Give steroids. See PTL/PTB Medication Table on page 23.  
    – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23. |

### Delivery Timing

**Mono-Di Twins**

- Delivery will occur at 20–24 weeks gestation; if CL <2.5 cm refer to short cervix protocol on page 15 for guidance.

**Di-Di Twins**

- Delivery will occur at 20–24 weeks gestation; if CL <2.5 cm refer to short cervix protocol on page 15 for guidance.

### Patient Education Materials

- Intermountain fact sheets supporting this risk-specific protocol:
  - Fetal Testing (nonstress test, amniotic fluid assessment, and biophysical profile)
  - Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

### Key Actions for Providers:

- Initiate twice weekly NST/AFI surveillance beginning at 32 weeks.
- Follow delivery timing guidelines in this protocol.
### Gestational age | Recommended intervention
--- | ---
**<20 weeks gestation** | • Obtain consult with Maternal-Fetal Medicine.  
• Confirm GA/EDC.  
• Check blood pressure (BP) and determine need for treatment; if BP >140/90, initiate antihypertensive therapy:  
  – Labetalol – first-line medication choice.  
  – Nifedipine – second-line medication choice.  
• Obtain baseline results for:  
  – 24-hour urine for total protein and serum creatinine.  
  – Liver function tests (AST/ALT).  
  – Platelet count.  
• Initiate low-dose aspirin therapy as early as possible in pregnancy.  
• Initiate heparin prophylaxis with appropriate monitoring:  
  – If NO history of VTE,  
    › Give either: heparin 7,500 units subcutaneous twice a day, or Lovenox 40 mg subcutaneous once a day.  
    › Follow platelet count every 3 days x 2 weeks to rule out heparin-induced thrombocytopenia (HIT).  
  – If HISTORY of VTE,  
    › Initiate Lovenox 1 mg/kg subcutaneous twice a day.  
    › Follow platelet count every 3 days x 2 weeks to rule out heparin-induced thrombocytopenia (HIT).  
    › Adjust dose of Lovenox to achieve serial Anti-Factor Xa levels in the upper half of therapeutic range.  
• Initiate home BP monitoring and establish BP review every 2 to 4 weeks; instruct patient to call if readings are consistently >140/90 mm Hg.  
• Review signs and symptoms of preeclampsia with the patient.

**20–28 weeks gestation** | • Perform ultrasound to assess fetal growth and AFI at 28–30 weeks GA.  
• Review BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia develops (see schedule in the row below).  
• If indications of preeclampsia, IUGR or fetal distress:  
  – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTl/PTB Medication Table on page 23.  
  – Give magnesium sulfate. See PTl/PTB Medication Table on page 23.

**29–32 weeks gestation** | • Review BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in first row above).  
• Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile) per schedule below:  
  – No hypertension, IUGR, or oligohydramnios – weekly at 32 weeks gestation.  
  – Mild hypertension or preeclampsia – twice weekly at 32 weeks or at diagnosis.  
  – Severe hypertension – twice weekly beginning at 28 weeks or at diagnosis.  
• If indications of preeclampsia, IUGR or fetal distress:  
  – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  – Give steroids. See PTl/PTB Medication Table on page 23.  
  – Give magnesium sulfate. See PTl/PTB Medication Table on page 23.

**Delivery timing** | • Delivery will occur at >37 weeks GA unless one of the following occurs:  
  – Severe preeclampsia.  
  – Nonreassuring results noted on antenatal surveillance abnormal NST, positive CST, BPP <6 or abnormal UA Doppler.  
  – Severe IUGR (<10%) with oligohydramnios (AFI <5 cm).

**PATIENT EDUCATION MATERIALS** | Intermountain fact sheets supporting this risk-specific protocol:  
• Anticoagulant Injections  
• Preeclampsia  
• How to Monitor Your Blood Pressure  
• BP Tracker  
• Fetal Testing (nonstress test, amniotic fluid assessment, and biophysical profile)
  Fact sheets available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

### KEY ACTIONS for providers:
- Initiate ASA therapy before 12 weeks gestation.
- Initiate heparin prophylaxis before 12 weeks gestation.
- Follow delivery timing guidelines in this protocol.
Cervical Cerclage: This fact sheet explains indications for cervical cerclage and summarizes its risks, potential benefits and alternatives. Use to support informed consent for this intervention.

Available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.

Discussions: Cerclage and Progesterone

Cervical Cerclage

Indications for cerclage

Cerclage is indicated on the basis of patient history, ultrasound finding of short cervix, and exam. The list below provides notes on each indication.

- History-indicated cerclage:
  - Women with a clear history of cervical insufficiency (painless cervical dilation at 24 weeks or less in a previous pregnancy) may be offered prophylactic cerclage at 12 to 14 weeks gestation. There are no data suggesting whether a McDonald or Shirodkar cerclage is associated with better outcomes in this setting.
  - For a patient with a history of cervical insufficiency and significant cervical shortening or a short cervix following LEEP or cervical surgery, the Shirodkar approach may be best; this patient may also be offered the alternative plan of expectant management with serial cervical length assessment with transvaginal ultrasound between 16 and 24 weeks gestation.

- Ultrasound-indicated:
  - Women with history of spontaneous preterm birth and with cervical shortening (CL <2.5 cm) prior to 24 weeks gestation are candidates for ultrasound-indicated cerclage.
  - Women without a history of spontaneous preterm birth found to have a short cervix (without membranes visible) prior to 24 weeks gestation have not been shown to benefit from cerclage; offer these women vaginal progesterone therapy.

- Exam-indicated:
  - Women with amniotic membranes visible at the external os of the cervix on speculum exam are candidates for an exam-indicated (or “rescue”) cerclage.
  - Exam-indicated cerclage should only be placed in women who are less than 24 weeks pregnant.

Cerclage removal

- In most cases, the cerclage should be removed when delivery is anticipated — usually at 36 or 37 weeks in asymptomatic patients. This timing maximizes the chance of fetal maturity while minimizing the chance of cervical injury due to the onset of labor.
- Women who have threatened preterm birth associated with vaginal pain or bleeding should have the cerclage removed if attempts at tocolysis are not successful.
- There is some controversy about the timing of cerclage removal after preterm premature rupture of the membranes. Some literature suggests that the latency will be prolonged if the cerclage is left in place. However, other studies suggest that there is an increased risk of infection if the cerclage is left in place. Among maternal-fetal medicine providers at Intermountain, practice is generally as follows:
  - For women who are greater than 32 weeks gestation, the cerclage is removed at the time of diagnosis of PROM.
  - For women with preterm PROM at less than 32 weeks gestation, decisions are made on a case-by-case basis; it's possible that women at very early gestation may benefit more from leaving the cerclage in place to help prolong pregnancy.
Cerclage in multiple gestation pregnancies
The role of cerclage in twin pregnancy is unclear. Only a few studies have examined the use of cerclage for short cervix in twins. Despite the limited information, it appears that maternal and neonatal outcomes are worse with cerclage for the twin patient with a short cervix found on transvaginal ultrasound. Thus, cerclage is not recommended in a twin pregnancy — unless the patient has a prior diagnosis of cervical insufficiency, in which case she should be offered a prophylactic cerclage.

Progesterone in multiple gestation pregnancies
In twin pregnancies with no history of preterm delivery, 17P does not appear to help prevent preterm birth. However, when the patient has a history of preterm delivery, 17P may be helpful.

Vaginal progesterone has not been well studied in the context of multiple gestation pregnancies. In the case of cervical shortening in twins, the benefits of the use of vaginal progesterone may outweigh the risks.

17P for Preventing Preterm Birth:
This fact sheet explains the indications for 17P injections and includes space for provider to write specific instructions for this therapy.

Available in English and Spanish. See page 25 for a list of all related resources, instructions for accessing them.
**ALGORITHM: PTL ASSESSMENT AND MANAGEMENT**

**Pregnant patient with SYMPTOMS consistent with preterm labor (a)**

**ADMISSION, INITIAL ASSESSMENT**
- Determine presence/frequency of contractions (palpation and external monitor), other signs and symptoms of PTL (a).
- Determine whether there is uterine bleeding (suggesting placental abruption, placenta previa).
- Check fetal well-being with electronic fetal monitor (EFM).
- Send urine for urinalysis (UA) with reflex to urine culture if positive.
- Perform sterile speculum exam. visually inspect for PROM, cervicitis, umbilical cord prolapse, or fetal prolapse; assess cervical dilation and effacement; obtain and hold fetal fibronectin (fFN) and GBS culture before digital exam (if penicillin allergic, request sensitivities at time of culture).

**TRIAGE**
- **Do TVU**
- Triage based on CERVICAL LENGTH (CL) on TVU

- **LOW RISK OF PTB**
  - CL ≥ 3 cm
  - Discard fFN
  - DisCHARGE HOME. Follow-up. (b)

- **MEDIUM RISK OF PTB**
  - CL 2–3 cm
  - Send fFN
  - DISCHARGE HOME. Follow-up. (b)

- **HIGH RISK OF PTB**
  - CL < 2 cm
  - Discard fFN
  - Send fFN

**Inpatient care**
1. Admit for inpatient management (transfer to tertiary care center as per leveling criteria)
2. Consult Maternal-Fetal Medicine and Neonatology
3. Give IVF hydration
4. Send GBS culture and CBC

**Medication (c)**
- Give medication as appropriate for:
  - fetal benefit
  - tocolysis
  - GBS prophylaxis

**Delivery**
- At delivery:
  - If <30 weeks milk umbilical cord (three times, from close to the base of the placental cord insertion toward the neonate with 1–2 second pause between. Total milking time ≈10–15 seconds)
  - Obtain cord gas

Newborn/NICU and postpartum care for infant and mother

**TRIAGE**
- **Do digital exam**
- Triage based on cervical DILATION

- ≥ 3 cm DILATED
  - Monitor
  - Check for cervical change with serial digital exams every 1–2 hours
  - Depending on clinical concern, either:
    - negative fFN
    - positive fFN

- < 3 cm DILATED
  - Send fFN

**Assess further**
- **Do TVU when available**
- Triage based on CERVICAL LENGTH (CL) on TVU

- Cervical LENGTH < 2.5 cm
  - Notify perinatal care manager, then DISCHARGE HOME. Follow-up. (b)

- Cervical LENGTH ≥ 2.5 cm
  - Follow-up.

**MEASURES**
As appropriate for threatened PTB:
- Admit/transfer to appropriate facility per leveling criteria
- Administer steroids to lower RDS risk
- Administer magnesium sulfate for fetal neuroprotection

At delivery:
- Milk umbilical cord of all infants <30 weeks gestation

©2014 INTERMOUNTAIN HEALTHCARE. ALL RIGHTS RESERVED.
ALGORITHM NOTES

Identifying women with preterm contractions who will deliver early is an inexact process. In one review, about 30% of preterm labors resolved spontaneously. Others have reported that 50% of patients hospitalized for PTL go on to deliver at term. This algorithm presents a practical and evidence-based approach to assessing and managing women with symptoms of preterm labor.

(a) Signs and symptoms of PTL
- Menstrual-like cramping, low back pain
- Uterine contractions (should be confirmed/documentated via palpation and external monitoring)
- Vaginal discharge

Cervical change, effacement, and/or dilation are included in PTL diagnostic criteria; the algorithm indicates how cervix should be assessed.

(b) Follow-up after evaluation and discharge for PTL
- Instruct patient to call if additional signs and symptoms of PTL (give Preterm Labor Discharge Instructions)
- Schedule a visit within 1 to 2 weeks

(c) PTL/PTB Medication Table

The use of these medications is generally reserved for pregnancies between ≅ 22 and 34 weeks gestation. For pregnancies at 24 or fewer weeks, consult with neonatologists and counsel patient and family to determine choices for care and resuscitation. For pregnancies at 34 weeks gestation, consider allowing labor to progress to delivery without use of tocolytics; medication for fetal benefit is not indicated at this gestational age. Note that per risk-specific protocols, some high-risk patients may already be receiving medication for fetal benefit and tocolysis.

<table>
<thead>
<tr>
<th>Use in PTB</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>FETAL BENEFIT</td>
<td>To lower risk of RDS, give a corticosteroid to all patients 23 to 34 weeks gestation:</td>
</tr>
<tr>
<td></td>
<td>☐ 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.</td>
</tr>
<tr>
<td></td>
<td>For neuroprotection at ≤31 weeks gestation, give:</td>
</tr>
<tr>
<td></td>
<td>☐ MAGNESIUM SULFATE, IV: Bolus 6 grams over 40 minutes, then infuse 2 grams/hour maintenance dose from premixed 20 gram/500 mL bag until delivery or until 12 hours of therapy. (If preterm delivery seems unlikely after 12 hours of therapy, discontinue therapy.) If magnesium is used for neuroprotection and patient continues to have contractions, magnesium may be combined with another medication for tocolysis.¹ (see row below.)</td>
</tr>
<tr>
<td>TOCOLYSIS</td>
<td>For short-term prolongation of pregnancy (to allow time for transfer of patient, administration of medications for fetal benefit), give a tocolytic for up to 48 hours:</td>
</tr>
<tr>
<td>If &lt;32 weeks gestation, give:</td>
<td>Notes: Tocolysis is contraindicated when risks of use outweigh potential benefits; e.g., in case of nonreassuring fetal status, severe preeclampsia or eclampsia, maternal bleeding with hemodynamic instability, chorioamnionitis, preterm PROM, or agent-specific maternal contradictions. In multiple gestation pregnancies, use tocolytics judiciously; in these pregnancies, tocolytics have not been shown to improve outcomes and are associated with a greater risk of maternal complications such as pulmonary edema.¹</td>
</tr>
<tr>
<td>☐ as first choice, INDOMETHacin: 50 mg PO x 1, then 25 mg PO every 6 hours up to 48 hours</td>
<td></td>
</tr>
<tr>
<td>☐ as second choice, NIFEdIPINE: 10 mg PO, may repeat every 15 minutes x 4 doses, then 20 mg PO every 6 hours up to 48 hours (maximum dose 160 mg in 24 hours)</td>
<td></td>
</tr>
<tr>
<td>If 32 to 34 weeks gestation, give:</td>
<td></td>
</tr>
<tr>
<td>☐ NIFEdIPINE: 10 mg PO, may repeat every 15 minutes x 4 doses, then 20 mg PO every 6 hours up to 48 hours (maximum dose 160 mg in 24 hours)</td>
<td></td>
</tr>
<tr>
<td>GBS PROPHYLAXIS (if the patient is penicillin allergic, request sensitivities at time of culture)</td>
<td>Follow Intermountain’s Prevention of Perinatal GBS algorithm. For all patients, as needed give EITHER:</td>
</tr>
<tr>
<td>☐ PENiciLLIN G: 5 million units IV initial dose, then 2.5–3.0 million units every 4 hours until delivery</td>
<td></td>
</tr>
<tr>
<td>☐ AMPiCILLIN: 2 grams IV initial dose, then 1 gram every 4 hours until delivery or the threat of PTB is low</td>
<td></td>
</tr>
<tr>
<td>If penicillin allergy, low risk (e.g., isolated maculopapular rash without urticaria or pruritus):</td>
<td></td>
</tr>
<tr>
<td>☐ CEFaZOLIN: 2 grams IV initial dose, then 1 gram every 8 hours until delivery</td>
<td></td>
</tr>
<tr>
<td>If penicillin allergy, high risk (e.g., anaphylaxis, angioedema, respiratory distress, urticaria):</td>
<td></td>
</tr>
<tr>
<td>☐ CLINDAMYCIN: 900 mg IV every 8 hours until delivery</td>
<td></td>
</tr>
</tbody>
</table>
SUMMARY OF INTERMOUNTAIN RESOURCES

Provider education and tools

For Intermountain tools related to this topic, go to www.intermountainphysician.org/clinicalprograms and select “Preterm Labor” from the topic list on the right side of the screen. Resources include:

- CPMs and guidelines on PROM, GBS prophylaxis, and magnesium sulfate for neuroprophylaxis
- Forms and order sets to support preterm admission and discharge
- Patient education (see next page)

Consults and referrals

- Diabetes education and medical nutrition therapy. These services are covered by most commercial insurance providers and by Medicaid. For help locating diabetes educators in the area of your practice, call Intermountain’s Primary Care Program at 801-442-2990.

- Care management. SelectHealth and Medicaid patients are eligible to receive one-on-one support, educational materials, and follow-up phone calls to support best practice in prenatal care and high-risk pregnancy management. Call the Healthy Beginnings care management intake number at 801-442-5052.

- Referrals for substance abuse and mental health. For opioid dependence in pregnancy, refer patient to medication-assisted therapy (MAT) with methadone (first line) or buprenorphine. Also consider mental health referral and cessation support groups (such as 12-step organizations). Use the Substance Abuse and Mental Health Services Administration (SAMHSA) website to locate providers: www.findtreatment.samhsa.gov.

- Maternal-fetal medicine specialists. For a consultation or referral, contact one of these Intermountain clinics:
  - McKay-Dee Maternal Fetal Medicine
    4401 Harrison Blvd, #4600
    Ogden, UT 84403
    801-387-4647
  - Maternal Fetal Medicine Specialists
    5121 Cottonwood St, Ste 100
    Murray, UT 84107
    801-507-7400
    801-507-7493
  - Utah Valley Maternal Fetal Medicine
    1034 N 500 W
    Provo, UT 84604
    801-357-7706
    801-442-0745
  - Dixie Maternal Fetal Medicine
    544 S 400 E
    St. George, UT 84770
    435-688-4770
    435-688-4835

Web Resources

- March of Dimes
  Prematurity Campaign
  marchofdimes.org
- Association of Women’s Health, Obstetric, and Neonatal Nurses’ (AWHONN)
  Prematurity Resource Center
  awhonn.org
Patient education material

Patient education materials are available at www.i-printstore.com.

- Choose Patient and Provider Education Materials. Then search for items or use the Category menu to browse.
- Click any item to see a description, then click View PDF to open the file or click Add to Cart to order copies.

Note that four fact sheets directly support the preventive recommendations in this care process model:

- **Preterm Birth Risk Worksheet**: Use with patients after a spontaneous or indicated preterm birth to explain the circumstances of the PTB, document the patient’s recurrence risk, and promote appropriate follow-up evaluations and preventive measures.

- **Preterm Birth: 10 Steps to Help Prevent It**: Use with all patients to explain key measures to lower their risk for preterm delivery. Includes general recommendations (e.g., use of highly effective contraception to ensure safe interpregnancy interval) and those for women at increased risk (17P, cerclage).

- **17P for Preventing Preterm Birth**: Use with select patients to support informed consent for this therapy.

- **Cervical Cerclage**: Use with select patients to support informed consent for this intervention.

All fact sheets are available in English and Spanish; see the list below for fact sheets related to this topic.

Fact sheets in English and Spanish:

- Anticoagulant Injections
- Birth Control Basics
- Birth Control Pills
- Cervical Cerclage
- Hysteroscopy
- Sterilization
- Trichomoniasis
- Vaginal Infections: Yeast and Bacteria
- 17P for Preventing Preterm Birth
- Diabetes Care Before and During Your Pregnancy
- Fetal Movement Counting
- Fetal Testing (nonstress test, amniotic fluid assessment, biophysical profile)
- Preeclampsia
- Preterm Birth: 10 Steps to Help Prevent It
- Preterm Birth Risk Worksheet
- 24-Hour Urine Specimen
- Substance Use in Pregnancy
- Prescription Pain Medication in Pregnancy
- Newborn Withdrawal
- BP Tracker
- BP Basics
- BG Tracker
- Living Well with Diabetes
- Quitting Tobacco: Your Journey to Freedom
- Live Well: The Weigh to Health booklet, Habit Tracker, and other of assessment and behavior modification tools

Smoking Cessation

Blood Glucose Management

Blood Pressure Management

Lifestyle Management
REFERENCES


This CPM presents a model of best care based on the best evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Teri Kiehn, Intermountain Healthcare, Operations Director, Women and Newborns Clinical Program, teri.kiehn@imail.org.