

Preterm Labor

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THE STORY IN ONE SENTENCE

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“Preterm labor is when your uterus squeezes regularly and your cervix starts to change before week 37 of pregnancy, threatening to deliver the baby too early.”

Normal anatomy — the body's job

During pregnancy, the uterus (the muscular womb) stays relaxed and the cervix (the firm, tube-shaped doorway at the bottom of the uterus) stays long, thick, and tightly closed to hold the baby inside until around 37 weeks. At term, rising levels of oxytocin (the hormone that tells the uterus to squeeze) and prostaglandins (chemical messengers that soften the cervix) trigger coordinated contractions and cervical ripening so labor begins when the baby's lungs and brain are ready.

BODY'S JOB

The uterus provides a safe, stretchy space for the baby to grow, while the cervix acts like a strong, sealed gate that keeps the baby in place and protects the sterile environment inside the amniotic sac from bacteria and the outside world.

1. The thick muscle wall of the uterus stays soft and quiet, not squeezing, so the baby has room to grow without being pushed out.
2. The cervix remains firm, about 3 to 4 centimeters long, and closed tight — like a corked bottle — creating a barrier between the vagina (which has normal bacteria) and the sterile amniotic fluid around the baby.
3. Progesterone (a hormone made by the placenta) keeps the uterine muscle calm and prevents early contractions by blocking the signals that would cause squeezing.
4. The amniotic sac (water bag) holds clean fluid that cushions the baby, keeps temperature steady, and allows the lungs and muscles to practice movements.

5. At full term (37 weeks or later), the baby's lungs finish making surfactant (the slippery coating that lets air sacs open and close smoothly), the brain matures, and the body signals that it is safe to be born.
6. Oxytocin is released from the pituitary gland (a pea-sized gland at the base of the brain), and prostaglandins are made locally in the uterus and cervix — together they start regular, strong contractions and soften and open the cervix for delivery.

What breaks

The cervix opens or thins too early and the uterus starts squeezing in a regular pattern before 37 weeks, driven by infection, inflammation, stretching, stress, or structural weakness.

CLINICAL TERM

Preterm labor is defined as regular uterine contractions (at least 4 in 20 minutes or 8 in 60 minutes) accompanied by cervical change (effacement or dilation) occurring between 20 weeks 0 days and 36 weeks 6 days of gestation.

How the body compensates

The mother's vital signs often stay normal even as preterm labor progresses, because the main threat is to the baby's development, not the mother's immediate survival — this makes it easy to miss the urgency until the cervix is already dangerously open or the water bag has broken.

1. {'what': 'Early on, contractions may feel like menstrual cramps, back ache, or pelvic pressure and may be irregular or mild.', 'why': 'The uterus is just beginning to squeeze; the cervix has not opened much yet, so pain is often mild and easy to dismiss as normal pregnancy discomfort.'}
2. {'what': '"The mother's blood pressure, heart rate, and oxygen levels stay normal."', 'why': 'Preterm labor itself does not cause shock or respiratory failure in the mother — her body is not in danger, so vital signs look reassuring even though the baby is at serious risk.'}
3. {'what': 'Contractions become more regular, closer together (every 5 to 10 minutes), and stronger.', 'why': 'As oxytocin receptors increase on the uterine muscle and prostaglandins keep being released, the contractions organize into the coordinated, rhythmic pattern that opens the cervix.'}
4. {'what': 'The cervix shortens (effaces) and begins to open (dilate), detected on pelvic exam or ultrasound.', 'why': 'Each contraction pulls the cervix upward and outward like stretching the neck of a balloon — once effacement starts, dilation usually follows unless the process is stopped.'}

5. {'what': 'The danger zone is delivery before 28 weeks without a hospital equipped with a neonatal intensive care unit (NICU), uncontrolled infection that spreads to the mother's bloodstream (sepsis), or acute fetal distress (the baby's heart rate shows the baby is running out of oxygen).', 'why': 'Babies born before 28 weeks have extremely underdeveloped lungs, fragile blood vessels in the brain (high risk of bleeding), and immature immune systems — survival and long-term health depend completely on specialized NICU care with ventilators, surfactant therapy, and intensive monitoring. Maternal infection can become life-threatening sepsis, and fetal distress means the baby is already being harmed inside and may not survive labor.'}
6. {'what': 'A stable exam with few contractions can flip to rapid cervical change in hours.', 'why': 'Once the cervix begins to dilate and efface, the positive feedback loop (contractions open the cervix, which triggers more oxytocin release, which causes stronger contractions) accelerates the process — this is why frequent reassessment and early intervention are critical.'}
7. {'what': 'Look at the trend (Are contractions getting closer together? Is the cervix changing on repeat exams?) rather than one isolated moment.', 'why': 'A single snapshot can be falsely reassuring; a mother with irregular contractions and a closed cervix at 3 cm length who returns 4 hours later with a cervix dilated to 2 cm and 50 percent effaced is in active preterm labor, even if she feels okay.'}
8. {'what': 'A mother who looks and feels fine but has progressive cervical shortening or dilation is not truly stable — she is on a downhill path toward preterm delivery.', 'why': 'The absence of pain or abnormal vital signs does not mean the process has stopped; cervical change is the hard sign that labor is advancing, and every hour of delay in treatment reduces the chance of stopping it and increases the chance the baby will be born too early.'}

Domino effect

1. An upstream trigger (infection, overstretching from twins or too much fluid, placental bleeding or poor blood flow, stress, or a weak cervix) starts the labor cascade before 37 weeks. — Any of these triggers releases prostaglandins (local chemical messengers that soften and ripen the cervix) and increases oxytocin receptors on the uterine muscle, making the uterus sensitive to contraction signals even though the baby is not ready to be born.
2. The uterus begins to contract in a regular pattern — at first mild and irregular, then stronger and every 5 to 10 minutes. — Prostaglandins and oxytocin bind to receptors on the smooth muscle cells of the uterus, causing the muscle fibers to shorten and squeeze in coordinated waves that push the baby downward toward the cervix.

3. The cervix starts to thin out (efface) and open (dilate), detected on physical exam or transvaginal ultrasound. — Each contraction pulls the cervix upward and stretches it outward; as the cervix softens from prostaglandins breaking down its collagen structure, it cannot resist the mechanical force and begins to change shape.
4. The amniotic sac (water bag) may rupture, or vaginal bleeding may appear. — As the cervix opens, the seal between the uterus and the outside world breaks — the membranes can tear under pressure, releasing amniotic fluid (premature rupture of membranes, PROM), or small blood vessels at the edge of the placenta or cervix can bleed as tissues stretch and separate.
5. If labor continues and the baby is born preterm, the lungs are not ready to breathe air on their own. — Surfactant (the slippery coating made by cells in the lung air sacs that keeps them from collapsing) is not produced in full amounts until around 34 to 36 weeks; without it, the tiny alveoli (air sacs) stick together, oxygen cannot cross into the blood, and the baby develops respiratory distress syndrome (RDS), struggling to breathe and turning blue.
6. The premature baby is also at high risk for intraventricular bleeding (hemorrhage) (bleeding in the fluid-filled spaces deep in the brain), necrotizing enterocolitis (part of the intestine dies), infections, feeding problems, and long-term developmental delays. — The brain's blood vessels in the germinal matrix (a fragile area near the fluid-filled ventricles) are delicate and can burst under the stress of birth and breathing; the gut lining is immature and can be damaged by early feedings or low oxygen; the immune system has not received enough protective antibodies from the mother; and the brain and nerves are still forming critical connections for movement, learning, and behavior.
7. Giving the mother corticosteroids (betamethasone or dexamethasone) before delivery speeds up the baby's lung development and reduces the risk of brain bleeding and death. — Steroids cross the placenta and signal the baby's lung cells to start making surfactant faster — the biggest benefit happens if steroids are given at least 24 hours before birth, and the protection lasts about 7 days.
8. Magnesium sulfate given to the mother before very early delivery (before 32 weeks) protects the baby's brain. — Magnesium acts like a shield around the baby's fragile brain cells, reducing inflammation and preventing the tiny blood vessels from breaking — studies show it cuts the risk of cerebral palsy (a permanent movement disorder caused by brain injury) in half.
9. If infection is suspected, antibiotics (often ampicillin plus azithromycin) are started right away. — Antibiotics kill the bacteria driving inflammation and prostaglandin release, potentially stopping the labor trigger at its source and protecting both mother and baby from sepsis — they are especially critical if the water bag has broken, because infection risk skyrockets once the sterile barrier is gone.

- 10.** Tocolytics (medications like nifedipine or indomethacin that relax the uterus) may be used short-term to slow contractions and buy 48 hours for steroids to work. — Tocolytics block calcium entry into uterine muscle cells (nifedipine) or reduce prostaglandin production (indomethacin), weakening contractions temporarily — they do not stop preterm labor permanently, but they create a critical window to give steroids, transfer the mother to a hospital with a NICU, and prepare the team for a high-risk delivery.

Symptoms · what the patient feels, and why

- Regular contractions that come every 5 to 10 minutes or closer: The uterus (the muscular bag holding the baby) starts squeezing in a pattern too early, trying to push the baby out before 37 weeks. The contractions feel like the belly tightening and releasing over and over. They happen because the brain's hypothalamus (the control tower deep inside the brain that sets off labor) and the hormone oxytocin (a chemical messenger that tells the uterus to squeeze) turn on too soon, triggering rhythmic squeezing before the baby is ready to be born.
- The cervix (the opening at the bottom of the uterus) starts to thin out or open up before 37 weeks: When the uterus squeezes regularly, it pulls on the cervix, making it stretch thin and open. Normally the cervix stays thick and closed until close to the due date, acting like a locked door to keep the baby safe inside. In preterm labor, that door starts to unlock too early because the squeezing pressure is strong enough to change the cervix's shape and the hormone prostaglandin (a chemical that softens the cervix) rises too soon.
- Low, dull backache that does not go away: The uterus sits low in the pelvis, and when it starts contracting early, the squeezing pressure pushes against the lower spine and the ligaments (strong bands holding the uterus in place). This creates a constant ache in the lower back that comes in waves with the contractions, different from normal pregnancy backache that shifts with posture.
- Pelvic pressure or a feeling that the baby is pushing down: As the cervix thins and opens, the baby's head or body drops lower into the pelvis. The pressure you feel is the baby's weight pressing down on the pelvic floor (the sling of muscles at the bottom of the pelvis). This happens too early because the cervix is not staying firm and closed the way it should, so gravity pulls the baby down.
- Leaking fluid or a gush of watery fluid from the vagina: The amniotic sac (the bag of fluid cushioning the baby) can break or develop a tear when the cervix opens or the uterus contracts hard. When the sac breaks, the amniotic fluid (the clear or slightly cloudy liquid the baby floats in) leaks or pours out. This is dangerous early because the baby loses the protective cushion and bacteria can climb in, causing infection.

- More vaginal discharge than usual, or discharge that looks different (watery, mucus-like, or streaked with a small amount of blood): As the cervix thins and opens, the thick mucus plug that seals the cervix comes loose and slides out. You see this as extra discharge that may be clear, pink, or streaked with blood. The cervix also releases more moisture when it is changing shape because glands inside the cervix make extra mucus. This is the body's sign that the cervix is preparing to open, which should not happen before 37 weeks.
- Cramping low in the belly that feels like menstrual cramps: The uterus is a muscle, and when it contracts, it squeezes the same way it does during a period, causing cramping pain. The hormone prostaglandin (a chemical messenger that makes the uterus contract and the cervix soften) rises too early in preterm labor, triggering these cramps and telling the uterus to get ready to push the baby out.
- Vaginal bleeding (bright red or dark brown): When the cervix thins or opens, tiny blood vessels in the cervix tear and bleed. Bleeding can also come from the placenta (the organ feeding the baby through the umbilical cord) if it pulls away from the wall of the uterus. Any bleeding before 37 weeks is serious because it can mean the cervix is changing fast or the placenta is separating, which cuts off oxygen and food to the baby.

Focused exam

- Regular contractions every 5–10 minutes before 37 weeks: The uterus is squeezing in a steady pattern — not the random, painless practice squeezes (Braxton-Hicks) that come and go. Regular squeezes mean labor might be starting too early, before the baby's lungs are ready.
- Cervix is dilated (open) or effaced (thinned) on exam before 37 weeks: The cervix is like the locked door to the uterus — it should stay closed and thick until at least 37 weeks. If it is already softening and opening, preterm labor is really happening, not a false alarm.
- Vaginal bleeding or clear fluid leaking: Bleeding can mean the placenta is pulling away from the wall of the uterus (abruption). Clear fluid means the amniotic sac (water bag) broke early. Either one pushes the body into labor before it is supposed to start.
- Fetal heart rate below 110 or above 160 beats per minute on monitoring: The baby's heart should beat steady, between 110 and 160. If it drops or races, the baby is not getting enough oxygen through the placenta — this tells you the baby is stressed and may need to be delivered or labor must be stopped quickly.
- Fever, foul-smelling vaginal discharge, or lower belly tenderness: These are signs of infection inside the uterus (chorioamnionitis). Infection is one of the most common upstream reasons labor starts too early. If infection is causing the contractions, stopping labor will not help — you must treat the infection and often deliver the baby.

- Ultrasound shows too much amniotic fluid (polyhydramnios, fluid pocket > 8 cm or total index > 24 cm): Too much fluid stretches the uterus like an overfilled water balloon. That stretch makes the uterus squeeze early. Finding this tells you one upstream reason labor started.

Diagnostics · every test answers a question

- Sterile speculum exam → Is the cervix dilating or effacing? Is the amniotic sac broken?
- Fetal fibronectin (fFN) swab from vagina or cervix → Is the baby likely to be born in the next 1-2 weeks?
- Transvaginal ultrasound to measure cervical length → Is the cervix staying strong, or is it shortening too early?
- Urine culture → Is there a bladder or kidney infection pushing the body into labor?
- Group B Streptococcus (GBS) vaginal-rectal swab → Is the mother carrying GBS bacteria that could infect the baby during delivery?
- Complete blood count (CBC) → Is there infection causing the early labor?
- Ultrasound for amniotic fluid volume and placental position → Is there too much or too little fluid? Is the placenta in the right place?
- Non-stress test (NST) or biophysical profile (BPP) → Is the baby getting enough oxygen right now?

Treatment logic

- Betamethasone (12 mg IM every 24 hours × 2 doses) or dexamethasone (6 mg IM every 12 hours × 4 doses) between 24 and 34 weeks if delivery expected within 7 days → Steroids tell the baby's lungs to finish maturing faster — they boost surfactant (the slippery coating that keeps air sacs open). This cuts the risk of respiratory distress syndrome, brain bleeding (intraventricular bleeding (hemorrhage)), gut damage (necrotizing enterocolitis), and death in premature babies.
- Nifedipine (20 mg by mouth, then 10-20 mg every 4-6 hours) or indomethacin (50-100 mg rectal or oral, then 25-50 mg every 6 hours for ≤ 48 hours) to stop contractions (tocolysis) → These medicines relax the uterus muscles and pause contractions for about 48 hours — just long enough for the steroid shots to reach the baby's lungs and start working.
- Magnesium sulfate (4-6 g IV load, then 1-2 g/hour infusion) if gestational age < 32 weeks and delivery expected within 24 hours → Magnesium coats the baby's brain cells and protects them from injury during early delivery. It cuts the risk of cerebral palsy and severe brain bleeding (intraventricular bleeding (hemorrhage)) in very premature babies.

- Penicillin G (5 million units IV load, then 2.5–3 million units IV every 4 hours) or ampicillin (2 g IV every 6 hours) during labor if GBS-positive or status unknown → Antibiotics kill Group B Streptococcus bacteria in the birth canal so the baby does not breathe them in or swallow them during delivery. This prevents newborn sepsis, pneumonia, and meningitis.
- Ampicillin (2 g IV every 6 hours) plus azithromycin (1 g oral once, or 500 mg IV daily) for 7 days if preterm premature rupture of membranes (PPROM) before 34 weeks → Antibiotics lower the chance of infection climbing into the uterus (chorioamnionitis) after the water bag breaks. They delay delivery by a few days and reduce newborn infections, giving the baby more time to grow.
- Transfer to a hospital with a Level III or IV neonatal intensive care unit (NICU) before delivery if time allows → A high-level NICU has ventilators, specialist doctors (neonatologists), and equipment to support very premature babies — placing the mother there before delivery (in utero transfer) is safer than moving a fragile newborn after birth. This lowers the baby's risk of death and brain injury.
- Progesterone supplementation (17-hydroxyprogesterone caproate 250 mg IM weekly from 16–36 weeks, or vaginal progesterone 200 mg nightly) in high-risk mothers to prevent recurrence → Progesterone keeps the uterus quiet and the cervix strong in women who had a prior preterm birth or have a short cervix (< 25 mm) found on ultrasound. It cuts the risk of preterm labor happening again by about one-third.

Medications

Betamethasone or Dexamethasone (corticosteroids) · Corticosteroid (a powerful anti-inflammatory hormone that also speeds up organ development)

These steroids are given to the mother between 24 and 34 weeks when birth might happen in the next 7 days. They cross the placenta and reach the baby's lungs, brain, gut, and blood vessels. They tell the baby's lung cells to start making surfactant (the slippery coating that keeps air sacs open so the baby can breathe after birth). They also strengthen the fragile blood vessels in the baby's brain and gut, making them less likely to tear and bleed. This dramatically lowers the risk of respiratory distress syndrome (trouble breathing), intraventricular bleeding (hemorrhage) (bleeding inside the brain), necrotizing enterocolitis (parts of the gut dying), and death in the first weeks of life.

1. The mother receives an injection of betamethasone (two doses 24 hours apart) or dexamethasone (four doses 12 hours apart).
2. The steroid crosses the placenta and enters the baby's bloodstream.
3. In the lungs, it binds to receptors inside the cells that make surfactant and switches on the genes that produce it.

4. In the brain and gut, it strengthens the walls of fragile capillaries (tiny blood vessels) and reduces inflammation that can damage tissue.
5. Peak benefit occurs 24 hours to 7 days after the first dose, so the goal is to give it before delivery if possible.

SAFETY WATCH

A single course (one set of doses) is safe and strongly recommended. Repeated courses (giving steroids again weeks later) are generally avoided because they may slow the baby's growth and brain development. · A single rescue course may be given if more than 14 days have passed since the first course, the mother is still less than 34 weeks, and delivery is likely within 7 days. · Steroids can temporarily raise the mother's blood sugar, so women with diabetes need close glucose monitoring for a few days. · Very rarely, steroids can trigger temporary behavior changes or trouble sleeping in the mother.

Magnesium sulfate · Mineral supplement with neuroprotective (brain-protecting) effects

Magnesium sulfate is given to the mother when delivery is expected before 32 weeks. It travels through the placenta to the baby and acts like a shield around the baby's developing brain. It blocks calcium from flooding into brain cells (too much calcium can kill cells when blood flow is low or unsteady). It also dials down the release of glutamate (an excitatory brain messenger that, in excess, over-stimulates and damages neurons). By calming this chemical storm, magnesium reduces the risk of cerebral palsy (permanent movement and muscle problems caused by brain injury) and other serious brain damage in very premature babies.

1. The mother receives magnesium sulfate through an IV, usually a 4–6 gram loading dose over 20–30 minutes, then a maintenance infusion of 1–2 grams per hour.
2. Magnesium crosses the placenta and reaches the baby's bloodstream.
3. It enters the baby's brain and sits inside the NMDA receptor, blocking glutamate from over-exciting the neuron.
4. It also competes with calcium at cell membrane channels, preventing calcium overload that can trigger cell death.
5. The infusion continues until delivery or for at least 12 hours (some protocols run it for 24 hours or until delivery is no longer imminent).

SAFETY WATCH

The mother may feel flushed, warm, sweaty, or nauseated during the infusion. These symptoms usually fade after the loading dose. · High magnesium levels can weaken the mother's muscles, slow her breathing, and drop her blood pressure. Nurses check reflexes (usually the knee-jerk reflex) and respiratory rate every 1–2 hours. If reflexes disappear or breathing slows, the infusion is stopped. · Very high levels can cause dangerous heart rhythm problems. An antidote (calcium gluconate) is kept at the bedside. · The baby may be a bit floppy (lower muscle tone) and sleepy at birth, but this wears off within hours to a few days. · Magnesium is stopped or dose-adjusted in mothers with kidney problems because the kidneys clear magnesium; poor kidney function can let it build up to toxic levels.

Nifedipine (calcium channel blocker tocolytic) · Calcium channel blocker (a drug that stops calcium from entering muscle cells)

Nifedipine is the first-choice medication to temporarily slow or stop preterm labor contractions. It works by blocking calcium channels in the smooth muscle cells of the uterus. Muscle cells need calcium to squeeze (contract). When nifedipine blocks calcium from entering, the uterine muscle relaxes and contractions slow down or stop. The goal is to buy 48 hours so that corticosteroids have time to work in the baby's lungs and brain. Nifedipine does NOT cure the cause of preterm labor—it just pauses it long enough to give other treatments time to help the baby.

1. The mother takes nifedipine by mouth, usually a 10–20 mg loading dose, then 10–20 mg every 4–6 hours (protocols vary).
2. Nifedipine is absorbed quickly from the stomach and enters the bloodstream.
3. It travels to the uterus and binds to calcium channels on the muscle cell membrane, locking them shut.
4. With calcium blocked, the contractile proteins (actin and myosin) inside the muscle cell cannot slide past each other, so the muscle relaxes.
5. Contractions slow or stop, giving time for steroids to reach peak effect (24–48 hours).

SAFETY WATCH

Nifedipine can lower the mother's blood pressure, causing dizziness, headache, or a fast heartbeat. Blood pressure is monitored regularly. · It should NOT be used with magnesium sulfate at the same time because the combination can cause dangerous drops in blood pressure and breathing problems (though some centers do use them together with very close monitoring). · Nifedipine can cause flushing (feeling hot and red in the face), nausea, or ankle swelling. · It is generally avoided if the mother has low blood pressure, certain heart problems, or is taking other blood pressure medications. · Most guidelines recommend stopping tocolytics after 48 hours because longer use does not improve outcomes and increases side effects.

Indomethacin (NSAID tocolytic) · Nonsteroidal anti-inflammatory drug (NSAID) that blocks prostaglandin production

Indomethacin is a second-choice tocolytic (medicine to slow labor) used before 32 weeks when nifedipine is not working or cannot be used. It works by blocking cyclooxygenase (COX), the enzyme that makes prostaglandins (chemical messengers that trigger inflammation and muscle contraction). The uterus uses prostaglandins to start and strengthen contractions. When indomethacin stops prostaglandin production, contractions weaken and may stop. Like nifedipine, the goal is to delay delivery for 48 hours so steroids can work, not to prevent preterm birth altogether.

1. The mother takes indomethacin by mouth or as a rectal suppository, usually 50–100 mg loading dose, then 25–50 mg every 6 hours for up to 48 hours.
2. Indomethacin is absorbed and enters the bloodstream.
3. It travels to the uterus and blocks COX enzymes, shutting down prostaglandin synthesis.
4. With fewer prostaglandins, the chemical signals that tell the uterus to contract are turned down, and contractions slow or stop.
5. The drug is stopped after 48 hours or at 32 weeks, whichever comes first, to avoid side effects in the baby.

SAFETY WATCH

Indomethacin is ONLY used before 32 weeks and for no more than 48–72 hours because longer or later use can harm the baby. · In the baby, it can cause oligohydramnios (too little amniotic fluid) by reducing urine production in the kidneys, and it can cause premature closure of the ductus arteriosus (a blood vessel in the baby's heart that is supposed to stay open until birth). Both problems reverse when the drug is stopped. · In the mother, it can cause nausea, heartburn, stomach upset, or (rarely) bleeding in the stomach or intestines. · It should NOT be used if the mother has a stomach ulcer, kidney problems, bleeding disorders, or certain heart conditions. · Because of the risks, most centers now prefer nifedipine as the first-line tocolytic and reserve indomethacin for short-term use in very specific situations.

Penicillin or Ampicillin (for Group B Streptococcus prevention (prophylaxis)) · Beta-lactam antibiotic (a drug that kills bacteria by breaking their cell walls)

Group B Streptococcus (GBS) is a common bacterium that lives harmlessly in the vagina or rectum of about 1 in 4 pregnant women. During labor, the baby can swallow or breathe in GBS as it passes through the birth canal, leading to serious infections like pneumonia, meningitis (infection of the brain lining), or sepsis (blood infection) in the first days of life. Penicillin or ampicillin is given through an IV during labor to mothers who are GBS-positive (tested positive earlier in pregnancy) or whose GBS status is unknown and who have risk factors (preterm labor, fever, ruptured membranes for many hours). The antibiotic floods the mother's bloodstream, crosses the placenta, and reaches the baby. It kills GBS bacteria in the birth canal and in the baby's system before they can multiply and cause infection. This is called intrapartum antibiotic prevention (prophylaxis) (IAP).

1. The mother receives penicillin G (5 million units IV loading dose, then 2.5–3 million units every 4 hours) or ampicillin (2 grams IV loading dose, then 1 gram every 4 hours) as soon as labor starts or membranes rupture.
2. The antibiotic enters the bloodstream and travels to the vagina, cervix, and across the placenta to the baby.
3. Penicillin binds to proteins (called penicillin-binding proteins) on the GBS bacteria that are building the cell wall.
4. This stops the bacteria from finishing their cell wall, and without a strong wall, the bacteria burst and die.
5. The antibiotic is continued every 4 hours until the baby is born. At least one dose given 4 or more hours before delivery is considered adequate prevention (prophylaxis).

SAFETY WATCH

Penicillin is very safe for both mother and baby. The most common side effect is mild irritation or pain at the IV site. · Serious allergic reactions (anaphylaxis) are rare but possible. Mothers with a history of severe penicillin allergy (hives, swelling, trouble breathing, or anaphylaxis) should NOT receive penicillin. They are given clindamycin or vancomycin instead (choice depends on local GBS resistance patterns). · Minor penicillin reactions in the past (like a rash without other symptoms) are usually not a contraindication, and penicillin can often still be used safely. · If the mother has a true penicillin allergy and the GBS is resistant to clindamycin, vancomycin is used. · IAP does NOT harm the baby's gut bacteria in a clinically significant way, and the benefits (preventing life-threatening infection) far outweigh any theoretical risks.

Ampicillin PLUS Azithromycin (for preterm premature rupture of membranes, PPRM) · Combination antibiotic therapy (beta-lactam + macrolide)

When the amniotic sac (water bag) breaks too early—before 37 weeks and before labor starts—it is called preterm premature rupture of membranes (PPROM). The broken sac is no longer a sealed barrier, so bacteria from the vagina can climb up into the uterus and reach the baby and amniotic fluid. This can cause chorioamnionitis (infection of the membranes), and infection is a major trigger for preterm labor and can make the baby very sick. Ampicillin kills common bacteria like Group B Streptococcus and *E. coli*. Azithromycin kills other bacteria (like *Ureaplasma* and *Mycoplasma*) that often live in the genital tract and can sneak into the uterus when the membranes are broken. Together, these antibiotics kill a broad range of bacteria, lowering the risk of infection in the mother and baby, delaying the start of labor, and reducing complications like respiratory distress, bleeding in the baby's brain, and necrotizing enterocolitis. Current ACOG guidelines (2024) recommend this combination over the older regimen that included amoxicillin and erythromycin.

1. The mother receives ampicillin 2 grams IV every 6 hours PLUS azithromycin 1 gram by mouth once, then ampicillin alone is continued (some protocols give a 7-day course of oral amoxicillin after the IV course).
2. Ampicillin enters the bloodstream, crosses the placenta, and binds to penicillin-binding proteins on bacteria, breaking their cell walls and killing them.
3. Azithromycin is absorbed from the gut, enters the bloodstream, crosses the placenta, and enters bacteria. It binds to the bacterial ribosome (the protein-making factory) and stops it from working, so the bacteria cannot grow or multiply.
4. By killing bacteria before they cause infection, the antibiotics reduce inflammation in the uterus and delay the onset of labor.
5. Antibiotics are usually given for 7 days total or until delivery, whichever comes first.

SAFETY WATCH

Ampicillin can cause diarrhea, nausea, or a rash. Serious allergic reactions are rare but possible (see penicillin allergy notes above). · Azithromycin can cause nausea, stomach cramps, or diarrhea. It is generally very well tolerated. · Erythromycin (part of the older regimen) is NO LONGER recommended because it increases the risk of necrotizing enterocolitis in the baby. Azithromycin has replaced it in the latest ACOG guidelines (2024). · If the mother is allergic to penicillin, alternative antibiotics (like cefazolin or clindamycin plus azithromycin) are used based on the type and severity of the allergy. · Antibiotics are adjusted or stopped if the mother develops signs of a severe infection (chorioamnionitis with fever, high white blood cell count, uterine tenderness), in which case delivery is usually recommended regardless of gestational age.

Red flags

- Leaking or gushing watery fluid from the vagina (sign the amniotic sac may have broken, raising risk of infection and early delivery)
- Vaginal bleeding that is more than spotting or streaking (can mean the cervix is opening fast or the placenta is pulling away)
- Fever over 100.4°F (38°C) with contractions or leaking fluid (sign of infection inside the uterus, which can harm the baby and mother)
- Contractions that keep coming every few minutes and do not stop with rest or changing position (means labor is progressing and the cervix is likely changing)
- Baby is not moving as much as usual (can mean the baby is not getting enough oxygen or is under stress)

Nursing priorities

1. Place the patient on continuous external fetal monitoring to watch the baby's heart rate and count contractions — We must confirm that contractions are regular and frequent enough to be real labor; monitoring also shows if the baby is tolerating the contractions or becoming stressed from lack of oxygen
2. Start an IV line with normal saline or lactated Ringer solution — Dehydration can trigger contractions so fluids may help stop early labor; an IV also gives us quick access to give tocolytics (contraction-stopping medicines) and steroids if needed
3. Give betamethasone or dexamethasone intramuscular injection if the patient is between 24 and 34 weeks and delivery is expected within 7 days — Corticosteroids (steroids) help the baby's lungs mature faster so the baby can breathe better if born early; steroids also reduce bleeding in the brain and gut problems in preterm babies

4. Administer tocolytic medicine such as nifedipine by mouth or indomethacin by mouth or rectum as ordered to stop contractions — Tocolytics relax the uterus muscle and slow or stop contractions for 48 hours; this buys time for steroids to work and for safe transport to a hospital with a neonatal intensive care unit if needed
5. Start magnesium sulfate IV infusion if the baby is less than 32 weeks gestation — Magnesium sulfate protects the baby's brain and reduces the risk of cerebral palsy (brain damage causing movement problems) if the baby is born very early
6. Give IV antibiotics such as penicillin or ampicillin if the patient is GBS-positive or GBS status is unknown — Group B Streptococcus bacteria can pass to the baby during delivery and cause sepsis (blood infection), pneumonia, or meningitis; antibiotics during labor kill the bacteria before they reach the baby
7. Monitor vital signs every 15 to 30 minutes especially blood pressure and heart rate if the patient is receiving tocolytics or magnesium sulfate — Nifedipine can lower blood pressure and cause fast heart rate; magnesium sulfate can cause dangerous low blood pressure, slow breathing, and loss of reflexes so we must watch closely for toxicity
8. Keep the patient on bedrest in left lateral position and provide a calm quiet environment — Lying on the left side improves blood flow to the uterus and placenta bringing more oxygen to the baby; rest and low stress help reduce uterine activity and may slow contractions

Sources

- ACOG Practice Bulletin No. 171: Management of Preterm Labor, 2016 (reaffirmed 2023)
- CDC Preterm Birth Data and Prevention
- Cochrane Review: Interventions for Preventing Preterm Birth
- Society for Maternal-Fetal Medicine (SMFM) Clinical Guidelines

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