

## Signs causes risks and treatment of infection



### Understanding infection in the birth setting

An infection occurs when microorganisms invade body tissues and trigger illness. The organisms may be bacteria, viruses, fungi, or parasites. In maternity care, infections can involve the uterus and membranes, urinary tract, surgical wound, perineal tears, breasts, respiratory tract, bloodstream, or the newborn. Some infections are mild and localized; others can progress quickly to sepsis, a dysregulated inflammatory response that can injure organs.

Birth creates unique vulnerability because the cervix opens, membranes may rupture, vaginal and perineal tissues can tear, and surgical incisions may be present after cesarean birth. At the same time, normal postpartum changes can mimic infection: lochia has an odor, uterine cramping is expected, breasts may feel warm when milk comes in, and fatigue is nearly universal. The clinical task is to distinguish expected recovery from a pattern that suggests tissue invasion or systemic illness.

Timing offers clues. Infection during labor may present as maternal fever in labor, fetal tachycardia, uterine tenderness, or foul-smelling amniotic fluid. In the first days after birth, endometritis, wound infection, urinary infection, pneumonia, or mastitis may emerge. Later postpartum, mastitis,

abscess, infected perineal repair, or urinary infection may become more prominent. Newborn infection can be subtle, with poor feeding, temperature instability, lethargy, fast breathing, or irritability rather than a clear fever.

## **Common signs and symptoms to recognize**

General infection symptoms include fever, chills, sweats, fatigue, body aches, loss of appetite, swollen lymph nodes, and a sense of being unusually unwell. Local symptoms depend on the source. A urinary tract infection may cause burning with urination, urgency, pelvic discomfort, flank pain, or fever. A respiratory infection may cause cough, sore throat, shortness of breath, or chest discomfort. Gastrointestinal infection may cause diarrhea, vomiting, cramping, or dehydration.

In labor and postpartum recovery, several signs deserve special attention. Maternal fever during labor, especially with uterine tenderness or fetal heart rate changes, may raise concern for intra-amniotic infection. Prolonged rupture of membranes increases exposure time between the vaginal microbiome and the uterine cavity. Green, brown, or foul-smelling amniotic fluid can be concerning, although color alone does not diagnose infection.

After birth, warning signs include worsening lower abdominal or pelvic pain, uterine tenderness, fever, chills, foul-smelling lochia, heavy bleeding with illness, or discharge that becomes purulent. After cesarean birth or perineal repair, increasing redness, warmth, swelling, wound separation, pus, or escalating pain can suggest wound infection. Breast infection may cause a painful, red, wedge-shaped area, fever, and flu-like aches; an abscess may produce a persistent lump or fluctuance.

Newborns do not always show classic infection signs. Concerning features include poor feeding, reduced responsiveness, persistent vomiting, breathing difficulty, abnormal temperature, seizures, jaundice that worsens rapidly, or fewer wet diapers. These signs require urgent pediatric assessment because neonatal infection can progress quickly.

## **Causes and routes of spread**

The cause of infection matters because treatment differs. Bacterial infections may respond to antibiotics when appropriately chosen. Viral infections may require supportive care or, for specific viruses, antivirals. Fungal infections may need antifungal therapy. Parasites are less common in many birth settings but remain relevant depending on geography, travel, exposures, and immune status.

Microorganisms reach tissues through several routes. Ascending infection can occur when bacteria from the vagina or cervix move upward after membrane rupture, cervical examinations, labor, or procedures. Skin organisms can enter through a cesarean incision, intravenous line, injection site, or perineal tear. Urinary bacteria may ascend from the urethra to the bladder or kidneys, particularly when catheterization, dehydration, or urinary retention occurs. Respiratory viruses spread through droplets, aerosols, and close contact. Gastrointestinal pathogens may spread through contaminated food, water, or hands.

Not every exposure causes infection. The outcome depends on the organism, inoculum, tissue barriers, immune response, and local conditions such as devitalized tissue or hematoma. Retained placental fragments can provide a nidus for bacterial growth. A wound with poor drainage or a collection of blood or pus may not improve with oral medication alone and may require procedural evaluation.

Healthcare-associated infection is also part of the picture. Hospitals use sterile technique, hand hygiene, screening, prophylactic antibiotics for selected procedures, and surveillance to reduce risk, but invasive devices and surgery still create potential entry points. At home, careful hand hygiene, wound care, safe food practices, and avoiding close contact with people who are acutely ill can reduce exposure.

### **Risk factors before, during, and after birth**

Risk factors do not mean an infection will occur; they help clinicians decide how closely to monitor and whether preventive measures are needed. Some risks relate to the parent's baseline health. Diabetes, anemia, obesity, malnutrition, HIV or other immune suppression, chronic kidney disease, autoimmune disease requiring immunosuppressive medication, and lack of

vaccination for preventable infections can increase susceptibility or severity. Very young or advanced maternal age may also influence risk through associated medical or obstetric factors.

Labor-related risks include prolonged rupture of membranes, prolonged labor, frequent vaginal examinations after membranes rupture, internal fetal monitoring, intrauterine pressure catheters, meconium-stained amniotic fluid in some contexts, group B streptococcus colonization without adequate intrapartum prophylaxis, and maternal fever during labor. Chorioamnionitis, now often described as intra-amniotic infection or inflammation, may affect both parent and baby and can influence decisions about antibiotics, neonatal evaluation, and delivery management.

Birth mode matters. Cesarean birth carries a higher risk of endometritis and surgical site infection than vaginal birth, especially when performed after labor has begun or after membranes have been ruptured for a long time. Infection after cesarean birth may involve the skin, deeper tissues, uterus, urinary tract, or, rarely, bloodstream. Operative vaginal birth, extensive tearing, episiotomy, or hematoma can increase local tissue vulnerability.

Postpartum risks include urinary retention, catheter use, retained products of conception, severe blood loss, transfusion, delayed wound healing, nipple trauma, milk stasis, and limited access to follow-up care. Newborn risks include prematurity, low birth weight, prolonged rupture of membranes, maternal group B streptococcus colonization, suspected intra-amniotic infection, and the need for invasive procedures after birth.

### **How clinicians evaluate suspected infection**

Diagnosis is not based on one symptom in isolation. Clinicians combine history, examination, vital signs, timing, obstetric details, and targeted testing. They may ask when membranes ruptured, whether fluid had an unusual odor or color, how labor progressed, what procedures occurred, what medications were given, and whether there are urinary, breast, respiratory, wound, or abdominal symptoms.

Examination may include temperature, heart rate, blood pressure, respiratory rate, oxygen saturation, abdominal and uterine tenderness assessment, wound

inspection, breast examination, pelvic examination when appropriate, and newborn assessment. Persistent tachycardia, low blood pressure, confusion, reduced urine output, or rapid breathing can suggest systemic involvement and require urgent evaluation.

Tests are selected according to suspected source and severity. Blood tests may include complete blood count, inflammatory markers, kidney and liver function, lactate when sepsis is a concern, and blood cultures before antibiotics if this can be done without delaying urgent care. Urine testing and culture are common when urinary infection is possible. Wound, vaginal, cervical, or breast milk cultures may be useful in selected cases. Imaging, such as ultrasound or CT, may be considered if retained tissue, abscess, hematoma, deep surgical infection, or pelvic thrombosis is suspected.

For newborns, clinicians may use observation, blood cultures, blood tests, lumbar puncture, chest imaging, or empiric antibiotics depending on gestational age, clinical appearance, maternal risk factors, and local protocols. Parents should not feel they must interpret these decisions alone; the goal is to balance early treatment of serious infection with avoiding unnecessary interventions.

### **Treatment principles and antibiotic stewardship**

Treatment depends on the likely organism, infection site, severity, pregnancy or lactation status, allergies, local resistance patterns, and culture results. Supportive care may include fluids, rest, nutrition, fever management recommended by a clinician, pain relief compatible with postpartum needs, and monitoring. Some viral infections primarily need supportive care, while specific conditions may benefit from antivirals. Bacterial infections often require antibiotics, but the choice and duration should be individualized by a healthcare professional.

Severe infection, suspected sepsis, pyelonephritis, endometritis with systemic symptoms, deep wound infection, or neonatal infection may require hospital care and intravenous antibiotics. Source control is sometimes essential: draining an abscess, opening and cleaning an infected wound, removing infected tissue, or treating retained products. Without source control, medication alone may not be enough.

Breastfeeding often can continue during many infections and treatments, but this should be confirmed with a clinician, especially if high fever, abscess, unusual organisms, or medications with lactation considerations are involved. For mastitis, effective milk removal, pain control, hydration, and antibiotics when bacterial infection is suspected may be part of care. Sudden weaning can worsen milk stasis and discomfort, so individualized guidance is valuable.

Antimicrobial resistance is a major global problem. Unnecessary antibiotics, incomplete courses when a course is prescribed, and using leftover medication can encourage resistant bacteria and make future infections harder to treat. At the same time, delaying antibiotics in serious bacterial infection can be dangerous. The safest approach is prompt assessment, cultures when indicated, appropriate empiric treatment for severe illness, and narrowing or stopping therapy when results and clinical progress support that decision.

### **Prevention and when to seek urgent help**

Prevention begins before birth with vaccination when recommended, screening and treatment for selected infections, management of chronic conditions, nutrition, and smoking cessation support if relevant. During labor, clinicians reduce risk through hand hygiene, sterile technique for procedures, limiting vaginal examinations when appropriate, timely antibiotics for group B streptococcus when indicated, and prophylactic antibiotics for cesarean birth. These measures lower risk but cannot remove it completely.

After birth, practical prevention includes washing hands before wound or newborn care, keeping incisions clean and dry as instructed, changing pads frequently, avoiding insertion of objects into the vagina until cleared, caring for nipples and breast milk drainage, staying hydrated, and attending postpartum follow-up. If symptoms are evolving, photographs of a wound, a written temperature log, and notes about pain, bleeding, discharge, and medications can help clinicians assess trends.

Seek urgent care for urgent maternal warning signs such as fever with shaking chills, feeling faint or confused, shortness of breath, chest pain, severe abdominal pain, rapidly spreading wound redness, pus from an incision, severe headache with visual symptoms, heavy bleeding, or a sense that something is

seriously wrong. For a newborn, urgent assessment is needed for poor feeding, lethargy, breathing difficulty, blue color, fever or low temperature, seizures, or markedly fewer wet diapers.

It is reasonable to call early. Many infections are easier to treat when recognized promptly, and clinicians would rather assess a false alarm than miss a developing emergency. Your concern is valid, especially in the physically and emotionally intense period surrounding birth.