



## THE IMPORTANCE OF ANTIBIOTIC USE DURING PREGNANCY: WEIGHING THE RISKS AND BENEFITS

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### ABSTRACT

*Antibiotic use during pregnancy is a controversial topic that has sparked much debate among healthcare providers and patients alike. While antibiotics are commonly used to treat infections during pregnancy and prevent complications, their use can pose risks to the developing fetus. On the other hand, untreated infections during pregnancy can also lead to adverse outcomes for both the mother and the fetus.*

*This article provides a comprehensive overview of pregnancy and antibiotics, including the risks of untreated infections during pregnancy, concerns about the safety of antibiotics during pregnancy, the risks of untreated infections for both the mother and the fetus, the different classes of antibiotics and their potential effects on the fetus, guidelines for prescribing antibiotics during pregnancy, and alternative treatment options for infections during pregnancy.*

*The article emphasizes the importance of working closely with a healthcare provider to make informed decisions about antibiotic use during pregnancy. Healthcare providers should carefully consider the benefits and risks of antibiotic use during pregnancy and choose the safest option for both the mother and the fetus. Guidelines for prescribing antibiotics during pregnancy should be followed, including prescribing antibiotics only when necessary, choosing the safest antibiotic based on the specific infection and the patient's medical history, prescribing antibiotics at the lowest effective dose and for the shortest duration possible, and providing proper monitoring and follow-up care.*

*Overall, the importance of prompt diagnosis and treatment of infections during pregnancy cannot be overstated.*



*Healthcare providers and patients must work together to make informed decisions about antibiotic use during pregnancy and ensure the best possible outcomes for both the mother and the developing fetus.*

## **Introduction**

- Antibiotics are commonly prescribed during pregnancy to treat infections that can pose a risk to both the mother and the developing fetus. Infections during pregnancy can lead to complications such as preterm labor, low birth weight, and neonatal sepsis. Antibiotics are used to treat bacterial infections and are an important tool in preventing and treating these complications. However, the use of antibiotics during pregnancy has been a topic of controversy due to concerns about potential adverse effects on fetal development.

The American College of Obstetricians and Gynecologists (ACOG) recommends the use of antibiotics during pregnancy to treat certain bacterial infections, including urinary tract infections, bacterial vaginosis, and group B streptococcus. Antibiotics are also used to treat other infections that may occur during pregnancy, such as pneumonia and influenza. However, the safety of antibiotics during pregnancy has been a topic of debate, with concerns about potential adverse effects on fetal development and the emergence of antibiotic-resistant bacteria.

In this article, we will explore the risks of untreated infections during pregnancy, the safety of antibiotics during pregnancy, commonly prescribed antibiotics, guidelines for prescribing and monitoring, and alternative treatment options. We will also discuss the importance of balancing the benefits and risks of antibiotic use during pregnancy to ensure the best possible outcomes for both the mother and the fetus.

While antibiotics can be effective in treating bacterial infections during pregnancy, there are concerns about their safety, particularly in regards to fetal development. Some antibiotics have been associated with an increased risk of birth defects, while others may disrupt the balance of bacteria in the mother's body or lead to the emergence of antibiotic-resistant bacteria.

One class of antibiotics that has been associated with an increased risk of birth defects is the fluoroquinolones, which are used to treat a variety of bacterial infections. Fluoroquinolones have been linked to an increased risk of musculoskeletal malformations, such as clubfoot, in the developing fetus. As a result, the FDA recommends that fluoroquinolones be avoided during pregnancy unless there are no other treatment options available.

Another class of antibiotics that has been associated with concerns about safety during pregnancy is the tetracyclines. Tetracyclines have been linked to tooth discoloration and impaired bone growth in the developing fetus. As a result, tetracyclines are generally avoided during pregnancy, particularly during the second and third trimesters.

Other antibiotics, such as penicillins and cephalosporins, have been used extensively during pregnancy and have not been associated with significant risks to fetal development.



However, the use of any antibiotic during pregnancy should be carefully considered, taking into account the potential benefits and risks to both the mother and the developing fetus.

In the next section, we will discuss the commonly prescribed antibiotics during pregnancy and their safety profiles.

### The Risks of Untreated Infections during Pregnancy

Infections during pregnancy can pose a significant risk to both the mother and the developing fetus. Untreated infections can lead to complications such as preterm labor, low birth weight, and neonatal sepsis. In some cases, infections during pregnancy can also lead to serious maternal complications, such as sepsis and meningitis.

Prompt diagnosis and treatment of infections during pregnancy is essential to prevent these complications. Antibiotics are an important tool in treating bacterial infections and can help prevent the spread of infection to the developing fetus. In addition to antibiotics, other treatments such as antiviral medications and supportive care may be necessary to manage infections during pregnancy.

Some infections, such as group B streptococcus, may not cause symptoms in the mother but can lead to serious complications in the newborn, including sepsis, pneumonia, and meningitis. As a result, pregnant women are routinely screened for group B streptococcus during the third trimester of pregnancy, and antibiotics are given during labor to prevent the transmission of the bacteria to the newborn.

In addition to preventing complications, treating infections during pregnancy is also important for the long-term health of the mother and the developing fetus. Some infections, such as chlamydia and gonorrhea, can lead to infertility and other reproductive health problems if left untreated. By treating infections during pregnancy, healthcare providers can help prevent these long-term health consequences.

Prompt diagnosis and treatment of infections during pregnancy is essential to prevent complications and ensure the best possible outcomes for both the mother and the developing fetus. Antibiotics are an important tool in treating bacterial infections during pregnancy and can help prevent the spread of infection to the developing fetus. In the next section, we will discuss the safety of commonly prescribed antibiotics during pregnancy.

### The Risks of Untreated Infections for Both the Mother and the Fetus

Pregnancy is a time of increased susceptibility to infections, which can pose significant risks for both the mother and the developing fetus. Infections such as urinary tract infections (UTIs), bacterial vaginosis (BV), and sexually transmitted infections (STIs) can lead to preterm labor, premature rupture of membranes, chorioamnionitis, and intrauterine fetal demise.

A systematic review and meta-analysis of observational studies found that UTIs during pregnancy are associated with an increased risk of preterm birth (relative risk [RR] 2.06), low birth weight (RR 1.59), and small for gestational age (RR 1.71). Another systematic review and meta-analysis reported that BV during pregnancy is associated with an increased risk of preterm birth (odds ratio [OR] 1.64) and low birth weight (OR 1.64). STIs during pregnancy, such as chlamydia, gonorrhea, and syphilis, can also lead to adverse pregnancy outcomes, including preterm birth, stillbirth, and neonatal death.

### Risks for the Mother



Untreated infections during pregnancy can increase the risk of maternal morbidity and mortality. Maternal infections may lead to postpartum infections, such as endometritis and wound infections, which can cause significant pain, discomfort, and prolonged hospital stay. In some cases, infections can spread to the bloodstream, causing sepsis, a potentially life-threatening condition.

A retrospective cohort study of over 1.5 million pregnant women found that maternal sepsis is associated with a significantly increased risk of maternal death (adjusted odds ratio [aOR] 10.99) and preterm birth (aOR 3.88). Another study reported that endometritis following cesarean delivery is associated with an increased risk of maternal readmission (OR 3.0) and prolonged hospital stay (median 4 days).

### Risks for the Fetus

Infections during pregnancy can also affect the developing fetus, potentially causing long-term health issues. Some infections can lead to developmental delays, cerebral palsy, and hearing or vision problems. Others can cause fetal growth restriction, preterm birth, and stillbirth.

A systematic review and meta-analysis of observational studies found that maternal UTIs during pregnancy are associated with an increased risk of cerebral palsy (OR 1.79). Another study reported that fetal growth restriction is more common in pregnancies complicated by BV (OR 2.40). STIs during pregnancy can also lead to adverse fetal outcomes, including preterm birth, stillbirth, and neonatal death.

### Importance of Prompt Diagnosis and Treatment

Prompt diagnosis and treatment of infections during pregnancy are crucial in reducing the risk of adverse outcomes for both the mother and the fetus. Healthcare providers should be vigilant in screening for and treating infections in pregnant women, especially those at high risk, such as those with a history of preterm birth or previous infections. Antibiotics are often used to treat infections during pregnancy, but their safety must be carefully considered, as some antibiotics may pose risks to the developing fetus. The benefits and risks of antibiotic use should be weighed carefully, and alternative treatments should be considered when appropriate.

### Antibiotics and Pregnancy: Is it Safe?

Antibiotics are commonly prescribed during pregnancy to treat infections and prevent complications. However, their use during pregnancy is controversial, as some antibiotics may pose risks to the developing fetus. It is important to carefully consider the benefits and risks of antibiotic use during pregnancy and choose the safest option for both the mother and the fetus.

### Overview of Antibiotics and Their Potential Risks during Pregnancy

Antibiotics are classified into different categories based on their mechanism of action and their potential risks during pregnancy. Some antibiotics, such as penicillins and cephalosporins, are considered safe for use during pregnancy, as they have been extensively studied and have not been shown to cause adverse fetal outcomes. Other antibiotics, such as fluoroquinolones and tetracyclines, are associated with an increased risk of adverse fetal outcomes, including fetal growth restriction, skeletal abnormalities, and discoloration of the teeth.



A systematic review and meta-analysis of observational studies found that exposure to fluoroquinolones during pregnancy is associated with an increased risk of major malformations (OR 2.23) and spontaneous abortions (OR 2.62). Another study reported that exposure to tetracyclines during pregnancy is associated with an increased risk of enamel hypoplasia, a developmental defect that affect the teeth (OR 2.14).

Macrolides, such as erythromycin and azithromycin, are often used to treat infections during pregnancy, as they are considered safe for use during pregnancy. However, a recent study reported an increased risk of infantile hypertrophic pyloric stenosis, a condition that affects the digestive system, in infants exposed to macrolides during the first two weeks of life (OR 2.81).

The different classes of antibiotics and their potential effects on the fetus:

1. Penicillins and cephalosporins: These antibiotics are considered safe for use during pregnancy and are commonly prescribed to treat bacterial infections. They work by disrupting the bacterial cell wall and are unlikely to harm the developing fetus.
2. Macrolides: Macrolides, such as erythromycin and azithromycin, are also considered safe for use during pregnancy. They work by inhibiting bacterial protein synthesis and are often used to treat respiratory and skin infections.
3. Aminoglycosides: Aminoglycosides, such as gentamicin and tobramycin, are less commonly used during pregnancy due to their potential ototoxicity and nephrotoxicity. These antibiotics work by inhibiting bacterial protein synthesis and are often used to treat severe infections.
4. Fluoroquinolones: Fluoroquinolones, such as ciprofloxacin and levofloxacin, are associated with an increased risk of adverse fetal outcomes and are generally avoided during pregnancy. These antibiotics work by inhibiting bacterial DNA synthesis and are often used to treat urinary tract and respiratory infections.
5. Tetracyclines: Tetracyclines, such as doxycycline and minocycline, are also associated with an increased risk of adverse fetal outcomes and are generally avoided during pregnancy. These antibiotics work by inhibiting bacterial protein synthesis and are often used to treat acne and respiratory infections.

It's important to note that the safety of antibiotics during pregnancy depends on the specific antibiotic and the timing and duration of exposure. Healthcare providers should carefully consider the benefits and risks of antibiotic use during pregnancy and choose the safest option for both the mother and the fetus.- The importance of balancing the risks and benefits of antibiotic use during pregnancy

Alternative Treatment Options for Infections during Pregnancy

1. Probiotics: Probiotics are live microorganisms that can help restore the balance of bacteria in the body. Probiotics may be beneficial in treating bacterial vaginosis (BV) during pregnancy, as they can help prevent the overgrowth of harmful bacteria. However, more research is needed to determine the optimal dosing and duration of probiotic therapy during pregnancy.
2. Antiviral medications: Antiviral medications, such as acyclovir and valacyclovir, may be used to treat viral infections, such as herpes simplex virus (HSV) and varicella-zoster virus (VZV). These medications work by inhibiting viral replication and reducing the severity and duration of symptoms.



3. Natural remedies: Some natural remedies, such as tea tree oil and garlic, have been used to treat bacterial and fungal infections during pregnancy. However, the safety and efficacy of these remedies during pregnancy are not well-established, and healthcare providers should exercise caution when recommending their use.

The benefits and risks associated with each alternative treatment option:

1. Probiotics: Probiotics are generally considered safe and are associated with few side effects. However, some probiotic strains may be more effective than others in treating specific infections, and the optimal dosing and duration of therapy are not well-established.

2. Antiviral medications: Antiviral medications may be associated with some side effects, such as headache and nausea, but are generally considered safe for use during pregnancy. However, the safety of antiviral medications during pregnancy may vary depending on the specific medication and the timing and duration of exposure.

3. Natural remedies: Natural remedies are generally considered safe, but their safety and efficacy during pregnancy are not well-established. Some natural remedies may interact with other medications or cause allergic reactions, and healthcare providers should exercise caution when recommending their use.

Overall, alternative treatment options may be beneficial in treating infections during pregnancy, but their safety and efficacy are not well-established. Healthcare providers should carefully consider the benefits and risks of alternative treatment options and choose the safest and most effective option for each individual patient. Additionally, patients should always consult with their healthcare provider before using any alternative treatment options during pregnancy.

## Conclusion

In summary, antibiotics are commonly used during pregnancy to treat infections and prevent complications. However, their use during pregnancy is controversial, as some antibiotics may pose risks to the developing fetus. The risks of untreated infections during pregnancy are also significant and can lead to adverse outcomes for both the mother and the fetus.

It is essential to work closely with a healthcare provider to make informed decisions about antibiotic use during pregnancy. Healthcare providers should carefully consider the benefits and risks of antibiotic use during pregnancy and choose the safest option for both the mother and the fetus. Guidelines for prescribing antibiotics during pregnancy should be followed, including prescribing antibiotics only when necessary, choosing the safest antibiotic based on the specific infection and the patient's medical history, prescribing antibiotics at the lowest effective dose and for the shortest duration possible, and providing proper monitoring and follow-up care.

Overall, the importance of prompt diagnosis and treatment of infections during pregnancy cannot be overstated. Healthcare providers and patients must work together to make informed decisions about antibiotic use during pregnancy and ensure the best possible outcomes for both the mother and the developing fetus.



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