



It's practically impossible to pick up a newspaper or magazine these days without coming across an article on the importance of a healthy microbiome for our overall health. If you've been educating yourself about the microbiome, you've probably learned that antibiotics are one of the things that can have a negative impact on it. You may have also read that when young babies are exposed to antibiotics, it can increase their risk for eczema, allergies, and asthma in childhood, and even obesity and diabetes later in life. So it's understandable that pregnant moms, and even some health care professionals, are concerned about antibiotic overuse, and are questioning the wisdom of universally giving antibiotics preventatively in labor to women found to have GBS colonization during routine pregnancy testing. But as a mom, it's a confusing decision – take the chance on the low likelihood of your baby developing a serious GBS infection if you don't do the antibiotics in labor, or take an antibiotic that can harm baby's microbiome.

This article answers the numerous questions real mommas have sent to me, explains what GBS is, reviews the risks to baby if untreated, and will discuss the validity and safety of some of the common GBS testing "hacks" being used in pregnancy, as well as alternative methods of prevention and treatment.

GBS is a complex issue, and while I can't give you "the answer to what you should do," because in truth, there is no one right answer, and much of what we know about the impact of antibiotics on the infant microbiome is still emerging, my hope is to give you enough information (this is a comprehensive blog!) to make the most educated decision possible that is also within your comfort zone.

What is GBS?

Let's start with the basics in case you're new to this issue. **Group B Streptococcus (Streptococcus agalactiae), or GBS for short, is one of the trillions of organisms that normally inhabit the human intestinal tract.** By migration



from the intestines, it colonizes the rectum, bladder, and vaginal tracts of many women and can thus be identified in cultures of combined rectal and vaginal swab samples. GBS doesn't seem to play a particularly beneficial role in human health, nor, when kept in check by healthy gut flora, does it usually cause harm. Colonization in the mother doesn't mean you actually have an infection; it just means the bacteria are present, which is the case for **about 15% to 30% of pregnant women.**

What's the Big Fuss?

When a pregnant woman is found to be colonized by GBS, as detected on lab tests, the risk goes up that she might pass the bacteria onto her baby. Most healthy babies will just develop their own colonization of the skin and gut as a result of contact with the mother's vaginal flora, however, a small percentage who get exposed will become infected – meaning they get sick, some very sick, from the GBS – and that's what the fuss is about.

In the 1970s GBS was recognized as **a leading cause of serious infections in newborns including pneumonia, sepsis, and meningitis.** Most bacterial transmission to the newborn occurs during birth via passage of the baby through the birth canal, or through bacteria that ascend the birth canal during a labor with ruptured membranes (broken "bag of waters"). Premature babies and babies of women with premature or prolonged rupture of membranes (PROM) are at higher risk of developing GBS infection. GBS can also cross the membranes, so cesarean section is not protective and carries additional surgical risks to the mother. In the pregnant mom, GBS can also cause miscarriage, bladder and uterine infections; it increases the risk of premature labor and premature rupture of membranes (PROM) and stillbirth.

If a pregnant woman carrying GBS is not treated with antibiotics during labor, the baby's risk of becoming colonized with GBS is approximately 50%. **Note that most colonized babies do not develop GBS infection.** The risk of a baby developing a serious, life-threatening GBS infection, according to the Centers for Disease Control and Prevention (CDC), is 1 to 2%.

The mortality rate (number of babies that die) with early onset GBS infection is 2 to 3% for full-term infants (I know that sounds low, but as I always tell my patients, it's 100% if it's your baby), and as high as 20-30% for premature infants (born earlier than 33 weeks gestation). Over 1600 cases of early-onset infections occur in newborns annually, with about 80 deaths per year, despite antibiotic prophylaxis in labor.

GBS infection in the newborn can lead to very long stays in the NICU (Neonatal Intensive Care Unit,) and up to 44% of infants who survive GBS meningitis end up with long-term health problems, including developmental disabilities, paralysis, seizure disorders, hearing loss, and vision loss.

If a GBS positive woman is treated with antibiotics during labor, her infant's risk of developing early onset GBS infection decreases by about 80%. There are no statistics on the percentage of babies exposed to an early antibiotic that will develop short, or long-term consequences such as allergies, asthma, obesity, or diabetes.

How & When Does GBS Infection Occur in the Baby?

Infection is categorized in two ways, either early or late onset GBS infection. Symptoms of early-onset disease occur within a few hours of the birth, and up to a week after. In one large study, as cited by Rebecca Drecker,



PhD of Evidence Based Birth, of 148,000 infants born between 2000 and 2008, nearly all of the 94 infants who developed early GBS infection were diagnosed within an hour after birth – suggesting that early onset GBS infection probably begins even before birth. Antibiotic prophylaxis (preventative treatment) given to the mother during labor is used to prevent early-onset infection.

Late-onset disease develops through contact with hospital nursery personnel and usually manifests in the first 3 months after birth. Up to 45% of health care workers carry the bacteria on their skin, and may transmit the infection to newborns. Meticulous hand-washing practices in the hospital are essential for prevention of infection transmission.

What Women Get GBS? & Which Babies Get GBS Infection?

While any woman can be colonized by GBS, some seem to be more at risk. This includes women under 20 years old, women with multiple sexual partners and regular tampon users. Frequent sex, or sex close to the time you get tested, oral sex (getting it, not giving it), and infrequent hand washing are also associated with a greater likelihood of a positive GBS test. For some reason I cannot explain, African-American women are also more likely to be colonized by GBS. New research coming out on the microbiome does suggest that disrupted gut microflora may play a role in GBS colonization. I discuss this in a minute.

While any baby can develop GBS infection if the mother is colonized, the following factors increase a baby's risk: birth prior to 37 weeks, African-American descent, high temperature in the mom during labor, rupture of membranes before entering labor, a prolonged time between membrane rupture and birth, chorioamnionitis (infection of the membranous sac surrounding the baby), intrauterine monitoring during labor.

What Testing is Recommended & Is It Reliable?

The gold standard test used in screening for GBS is a bacterial culture of a sample collected from a simultaneous vaginal and rectal swab done by your obstetrician, family doctor, or midwife. The best time to test for the presence of the organism is between the 35th and 37th weeks of pregnancy. Testing at this time is as much as 50% more effective at predicting and preventing perinatal disease than screening earlier in pregnancy, although the numbers of organisms in any individual might fluctuate, making detectable levels variable. CDC guidelines published in 2002 recommend universal screening for pregnant mothers between 35 and 37 weeks gestation.

GBS is found in the urine of 2%-7% of pregnant women. A positive urine test for GBS in the first trimester, also a common diagnostic method, is a marker of heavy rectal and vaginal colonization with GBS in the mother, and is a risk factor for early onset GBS in the newborn. Thus it is considered an indication for antibiotic use in labor. Antibiotic treatment of GBS bacteriuria during pregnancy does not eliminate GBS from the genitourinary and gastrointestinal tracts, and recolonization after a course of antibiotics is typical, so this does not offset the recommendation that pregnant women with GBS in their urine receive antibiotics in labor.

The above testing is considered highly reliable when it comes to positive results – in other words, if you test positive, you're colonized. Testing is done at 35-37 weeks of pregnancy, because there is a 5 week window of



Group B Strep (GBS) in Pregnancy: What's a Mom to Do? Aviva Romm, MD © 2015

reliability – if you test positive, you're still likely to be positive for the next five weeks, allowing proper prevention to be done in labor. A negative test, however, does not mean you do not have the infection; it could be what is called a "false negative" meaning that the test missed the infection. You can also become colonized after the test was done, so while your test could have been negative in pregnancy, you could in fact be positive at the time of labor. In fact, a substantial percentage of women who are ultimately GBS positive at the time of birth will not receive antibiotics because the presence of the bacteria was missed in pregnancy.

An FDA approved rapid test can diagnose GBS in pregnant women in about an hour. It is generally recommended for use only in labor when a woman's GBS status is unknown and testing needs to be done rapidly for medical reasons such as premature rupture of membranes (PROM). Some studies have shown the test to be up to 91% sensitive, even more so than the 37-37 week culture, which catches about 69% of cases. Because GBS resistance to specific antibiotics has developed, especially to those used for penicillin-allergic women, culture and sensitivity testing is recommended as part of the testing process.

Should I Just Skip the Test So I Don't Know if I'm Positive?

Skipping the test to avoid a positive result is one strategy many women ask me about and it's something that many of my home birth midwifery clients chose to do. But here's the thing: If you don't know whether you are positive and you're having your baby in the hospital, or have to transport from a home birth to the hospital with any risk factors for GBS including early broken waters, prolonged broken waters (> 18 to 24 hours depending on your midwifery or medical practice), or an elevated temperature, you're still going to be prescribed the antibiotic. On the other hand, if you've been tested and have had a negative test result, then the antibiotic isn't indicated and you're sort of in the clear from the decision. So having a negative test result can actually be an advantage and can put your mind at ease if you're worried about being GBS positive.

Further, if you are positive and know it, you can get educated about your decision, and will likely be more mindful of signs of possible GBS infection in your baby, should you choose to forego the antibiotic. So while I am not saying everyone should get testing, **simply declining the test to avoid knowing the results isn't necessarily more effective for avoiding the antibiotic in labor.** It's sort of the same with gaming the test by using natural treatments for the few weeks before the test to achieve a negative test result – you might have just reduced the colonization so that it was low enough to give you a negative, but you might still be colonized at the time of birth and not know it.

What's the Treatment & Is It Recommended for Me?

As of 2002, the CDC has recommended routine screening for all pregnant women between 35 and 37 weeks gestation, and universal treatment with IV antibiotics (usually penicillin or ampicillin, or an alternative for penicillin-allergic women) throughout labor for women who test positive for GBS during pregnancy.

An alternative treatment to IV antibiotics that has been investigated in Europe and developing countries, but is not employed in the United States other than by homebirth midwives, is the use of chlorhexidine, a topical antiseptic solution that kills GBS. While some studies have shown that chlorhexidine does reduce neonatal colonization and infection compared with conventional antibiotic treatment, other studies have shown only a reduction in



colonization but not in the rates of early onset GBS infection. More investigation of this cost effective, easy to use option is needed to determine whether this is a consistently effective alternative to routine IV prophylaxis for neonatal GBS infection. It is also unlikely to help in the prevention of infection when there is prolonged rupture of membranes, as it can't keep bacteria from ascending. Hibiclens, which contains chlorhexidine, is the form that is typically used by midwives in the US.

Keep in mind that Hibiclens and chlorhexidine will also wipe out healthy vaginal flora, likely for many hours after each application, and not just selectively eliminate the GBS, so while you might avoid the antibiotic, you may be defeating the purpose of avoiding it without a better outcome, which is keeping the vaginal flora healthy so baby gets optimally colonized with mom's flora at birth.

What if I Test Positive But a Later Test Comes Back Negative?

When it comes to GBS infection in pregnancy, once you test positive, even if you later test negative in the same pregnancy, you are still considered to be positive and antibiotic treatment is recommended by the CDC (note if you are negative in this pregnancy, but were positive in a previous pregnancy, you do not require antibiotics, unless your previous baby developed GBS infection, in which case antibiotics are considered appropriate). So while you might use natural approaches to try to reduce your colonization, if you are having your baby in a hospital or birthing center, the standard protocol would still be to administer antibiotics.

Can I Decline Antibiotics & What are the Risks of Doing So?

You do have the right to decline antibiotic prophylaxis in labor. If you decline, while there is an overall very low likelihood (2-3% chance) that your baby will develop early onset GBS infection; the risk is about double than if you did accept the antibiotic.

I have also seen a few situations get legally complicated, including social work being called to assess for negligence and child abuse when parents declined antibiotic prophylaxis in labor, and one case where the parents were forced to let the baby be given the antibiotic after birth, since mom had declined to receive the antibiotic in labor, even though the baby had no signs of infection.. While hopefully you'd not be met by that vitriolic a response by your care provider or hospital risk management team, having the discussion with your obstetrician, family doctor, or midwife at the time of the positive test result, rather than during labor, is strongly advised so you don't face any surprises.

It's important to be fully aware of the risks of GBS before choosing to pass on the antibiotic prophylaxis. There is also no natural substitute for antibiotics in women who are GBS positive, with signs of infection and prolonged rupture of membranes (>24 hours rupture), and all newborns exhibiting signs of GBS infection must receive immediate and aggressive antibiotic therapy. Keep in mind that if you decline in labor, and are GBS positive, you may be pressured to give your baby antibiotics after birth.



Can a Healthy Microbiome Protect Against GBS?

A healthy vaginal flora and healthy gut microbiome can reduce the likelihood of GBS colonization, and as a result, reduce the likelihood of infection transmission to baby. Lactobacillus has been shown to inhibit the attachment of GBS and other harmful bacteria to the vaginal lining. *Lactobacillus reuteri* and *Lactobacillus rhamnosis* are species known to be especially helpful for supporting normal vaginal flora. **I recommend 1-2 capsules of a probiotic daily during pregnancy, and especially in the 3rd trimester,** not just to help prevent GBS, but also because it has been shown to reduce the risk of atopic conditions in kids (allergies, eczema, asthma) when taken by mom in the last third of the pregnancy.

When there is GBS colonization (a positive test), a history of GBS in a previous pregnancy, or a history of frequent urinary tract, yeast, or other vaginal infections, I also recommend use of a vaginal probiotic – simply insert a capsule of probiotic containing the above species, or work with a functional medicine doctor or naturopathic doctor who can help you to get a compounded vaginal gel with these species. Live active culture yogurt can also be inserted vaginally, using your clean fingers, daily. I recommend my patients do this at the start of a shower several times each week starting the third trimester, then simply rinse it off at the end of the shower and put on a panty liner (organic is best!) to catch what drips out. Interestingly, one study found that pads soaked with probiotic helped to reduce vaginal GBS.

Are There Natural Things I Can Do To Test Negative for GBS During

Pregnancy? Can GBS Colonization Be Prevented & Treated Naturally?

Avoiding any risk factors you can, and nurturing a healthy gut microbiome and vaginal flora is your best prevention against GBS in pregnancy. **Herbal suppositories may be beneficial – clinically I have found them to be – but while the suppositories themselves are safe and the herbs have shown in vivo effectiveness against many organisms, including GBS, there is only a sparse amount of scientific evidence supporting their effectiveness in the human body.**

This is the protocol I use in my practice to reduce GBS colonization. It is not, however, meant to be a substitute for medical treatment if you do test positive for GBS in spite of treatment prior to the test, and is not meant to treat GBS in lieu of antibiotics in labor if you had a positive test prior to starting treatment, though it is reasonable to use to attempt to reduce colonization prior to birth.

For women choosing to birth at home, the use of IV antibiotics in labor may not be a realistic option because in many states, home birth midwives do not administer IV medications. Home birth midwives in this situation, therefore, often use a risk-assessment mode, transporting to the hospital for IV antibiotic should indications arise, including rupture of membranes longer than 18-24 hours (length of time varies with the protocol of different medical and midwifery communities) or any signs of infection.



Natural GBS Prevention

These are the steps I take in my practice to help women prevent or reduce GBS colonization.

- Eliminate sugar, most fruit, and all junk food completely from the diet to help normalize the vaginal pH; this improves the growth medium for healthy vaginal flora
- Take a prenatal vitamin to insure that you are getting all the nutrients you need, especially zinc, vitamin D, vitamin A, and vitamin C, to keep your immunity boosted
- Reduce stress through meditation, journaling, getting massage, and other relaxing activities – high stress impairs immunity, gut health, and the microbiome
- Eat lacto-fermented foods (sauerkraut, yogurt if you tolerate dairy), daily
- Use a probiotic as discussed above
- Insert either 1 clove (not a bulb, just a clove!) of carefully peeled garlic into the vagina each night, using your finger to push it in about 2-3 inches (remove with your finger the next day), or if you're adventurous and willing to prepare this, use the following herbal suppository nightly for 3 weeks to reduce local colonization and heal vaginal tissue if there is any inflammation or irritation. **In my practice I alternate as follows: three nights of the suppository, one night of garlic, two nights of probiotic, one night off; repeat for three weeks.**

Healing Vaginal Suppository

To prepare:

Melt ¼ cup of coconut oil and ¼ cup of cocoa butter in a small saucepan.

Turn off the heat and add:

- 2 TBS calendula oil
- 1/2 tsp. of thyme or oregano essential oil
- 2 TBS goldenseal powder
- 1 TBS myrrh powder

Pour the warm, slightly thick liquid into a suppository mold (you can order affordable silicon ones online). Put the whole mold into the fridge and let the suppositories harden for about an hour, then pop them out of the mold and store in the fridge in a container.

Suppository molds can easily be prepared at home by using aluminum foil that has been folded several times lengthwise, and then widthwise, to form a trough approximately 8 inches in length and 1/2 inch in width. This mixture is then poured into the mold, refrigerated to harden, cut into pieces the size of the patient's pinky finger, and inserted as needed.



Wear a light menstrual pad each night to protect underwear and bedding, as the oil and goldenseal powders can stain as the suppository melts. These herbal products can be purchased from Mountain Rose Herbs online.

One Final Word...

While we do need to be concerned about the health of our babies' microbiomes, and it's not ideal to give our babies an antibiotic as part of their welcome to the world, **antibiotics do play a role in preventing serious infections**, and prevention in this case can mean preventing drastic consequences. Unless there is a prolonged course of antibiotics in the newborn, any damage can usually be repaired by giving baby a probiotic for the first 6 months after birth. In babies born by cesarean, where there is also antibiotic exposure through mom, a probiotic given to baby has been shown to prevent atopic conditions.

It's important to make the decision that you are most comfortable living with and that is best for your baby, and not feel swayed by any pressure to avoid an antibiotic because of the desire to go "all natural." There's an appropriate time and place for most things, and while right now the jury is still out on the severity of the implications of giving antibiotics to newborns via mom, or directly, it would not be an inappropriate choice at all to decide to use an antibiotic in labor.

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