Esther Healey, CPM, LM
336 East 15th Street #3, Oakland, CA 94606
Esther@MandalaMidwifery.org
www.MandalaMidwifery.org
Work: (510) 479-0905
Fax: (888) 806-9078

Group B Streptococcus (GBS) Informed Decision

We hope this document will help you to understand the nuances of Group B Streptococcus (GBS) and consider the choices you have before you, as well as navigate the difference between the out-of-hospital, midwifery standard of choice and the hospital-based allopathic standard of care.

What is Group B Streptococcus?

GBS is a bacterium normally found in the gut. It can also be found in the vagina and/or rectum of up to 30% of pregnant people.[1,2,3] Similar to E. coli and yeast, the presence of GBS in balance with other organisms and in the places we expect to find it, is not a problem. Babies can be exposed to GBS in utero or during a vaginal birth. GBS becomes problematic when a baby gets sick from exposure. Not all babies get sick from exposure. Therein lies the dilemma.

Types of GBS

There are two types of GBS disease: 1) early-onset disease and 2) late-onset disease. Early-onset disease is most common and occurs within the first week of life. Most newborns with early-onset disease have symptoms the same day they are born. Late-onset disease refers to babies who appear healthy at birth and then develop symptoms after the first week of life. Late-onset disease is less common than early-onset disease. Prophylactic (preventative) IV antibiotics do not reduce the incidence of late-onset disease.[4,5] The remainder of this document will be focusing on early-onset GBS.

Colonization vs. Infection

The vagina and rectum are normally home to an array of bacteria and other organisms, ideally in harmonious balance. Colonization simply means that there are bacteria present in a certain area of the body. Although up to 30% of pregnant people are colonized with GBS, these people are not infected -- meaning that GBS is not causing any symptoms or illness. It is important to understand, however, that GBS can cause infection when present in areas outside of the gut, vagina, and rectum; an example of this is a less-common form of UTI, which is caused by GBS in the urinary tract.

How can a pregnant person "get" GBS?

Just as we expect to find E. coli in the rectum and a healthy amount of yeast in the vagina, GBS is a normally occurring bacterium that we expect to find in the rectum and vagina in up to 30% of pregnant people. GBS is not a sexually transmitted infection, yet it can be transmitted between partners. As is always the case, sexual practices, hygiene and nutritional sources of pre & probiotics are important in keeping bacteria where it belongs and in balance.

How does a baby get GBS?

Babies are exposed to GBS in utero and/or during labor from their colonized mother. The commonly accepted teaching in the medical model is that neonatal infection occurs primarily when the baby comes through the colonized vagina, or when GBS ascends from the vagina to the amniotic fluid after rupture of membranes. The fact that some babies become infected without rupture of membranes and/or when born by C-section, and 61% of

1 Vaginal Infections and Prematurity Study Group. Regan JA, Klebanoff MA, Nugent RP. The epidemiology of group B streptococcal colonization in pregnancy. Obstet Gynecol 1991;77:604--10.

2 The accuracy of late antenatal screening cultures in predicting genital group B streptococcal colonization at delivery. Yancey MK, Schuchat A, Brown LK, Ventura VL, Markenson GR. Obstet Gynecol 1996;88):811--5.

3 Group B streptococcal colonization and serotype-specific immunity in pregnant women at delivery. Campbell JR, Hillier SL, Krohn MA, Ferrieri P, Zaleznik DF, Baker CJ. Obstet Gynecol 2000 Oct;96(4):498--503.

4 www.cdc.gov/groupbstrep/about/prevention.html

5 Jordan HT, Farley MM, Craig A, et al. Revisiting the need for vaccine prevention of late-onset neonatal group B streptococcal disease: a multistate, population-based analysis. Pediat Infect Dis J 2008;27:1057--64.

infected babies are born to women who tested negative for GBS[6] raises questions as to our true understanding of how babies contract this disease.

How can GBS affect my baby?

GBS colonization may have no apparent effects on baby. GBS colonization is the precursor to GBS infection, but the vast majority of babies who are colonized with GBS do not go on to develop GBS infection. Although approximately 50% of newborns born to maternal carriers will be colonized at birth, immunity in the form of maternal antibodies passed from mother to child protect the vast majority of healthy newborns from developing infections.

GBS infection in babies can be very serious. When a baby is infected with GBS we talk about the infection as being systemic. This means that the baby has the bacteria in their blood (sepsis), in the fluid and lining around the brain (meningitis) or in the lungs (pneumonia). An extremely small percentage of babies become infected, and about 2-3% of this small percentage of term infants will die. Babies that survive, particularly those who have meningitis, may have long-term problems such as hearing loss, vision loss or learning disabilities.

How do I understand my baby's risk of acquiring a GBS infection?

While GBS infection is very rare, it is the leading infectious cause of morbidity and mortality among infants in the United States. We do not fully understand why some babies get sick and why some babies don't. What we do know is that preterm babies have a harder time dealing with the GBS bacteria and are at significantly greater risk of morbidity and mortality.

The question has been raised as to whether neonatal GBS infection exclusively correlates to maternal levels of GBS colonization, or if understanding the cause of neonatal GBS infection is more complicated than simply looking at maternal GBS levels. Neonatal GBS infection may in part be due to a baby's constitution, immune system, or other unknown predisposing factors, but these are difficult to measure and thus have not been included in the research.

The CDC states, "As a result of prevention efforts, **incidence of GBS** has declined dramatically over the past 15 years, from 1.7 cases per 1,000 live births in the early 1990's to **0.34-0.37 cases per 1,000 live births** in recent years. On the basis of data from CDC's Active Bacterial Core surveillance (ABCs) system, a network of 10 sites across the United States that conduct active, population-based surveillance, CDC estimates that in recent years, GBS has caused approximately 1,200 cases of early-onset invasive disease per year; approximately 70% of cases are among babies born at term (≥37 weeks' gestation). The case-fatality ratio of early-onset disease has declined from as high as 50% in the 1970's to **4-6% in recent years**, primarily because of advances in neonatal care. Mortality is higher among preterm infants, with case-fatality rates of approximately 20% and as high as 30% among those ≤33 weeks gestation, compared with **2-3% among full-term infants**."

But it is not so simple. The latest Cochrane Review (July 2009) published their systematic review of IV antibiotic treatment in labor for GBS-positive mothers and found that the use of antibiotics in labor for GBS-positive moms reduces the number of babies with early-onset GBS, but does not reduce the number of babies who die from GBS.[7,8] The use of intrapartum antibiotics did not significantly reduce the incidence of 'all cause mortality,' which means mortality from GBS infection plus mortality from infections caused by bacteria other than GBS. The incidence of early GBS infection was reduced with intrapartum antibiotics compared to no treatment. The authors' conclusions: "Intrapartum antibiotic prophylaxis [IAP] appeared to reduce [early-onset GBS], but this result may well be a result

6 Evaluation of Universal Antenatal Screening for Group B Streptococcus; Melissa K. Van Dyke, Ph.D., Christina R. Phares, Ph.D., Ruth Lynfield, M.D., Ann R. Thomas, M.D., Kathryn E. Arnold, M.D., Allen S. Craig, M.D., Janet Mohle-Boetani, M.D., Ken Gershman, M.D., William Schaffner, M.D., Susan Petit, M.P.H., Shelley M. Zansky, Ph.D., Craig A. Morin, M.P.H., Nancy L. Spina, M.P.H., Kathryn Wymore, M.P.H., Lee H. Harrison, M.D., Kathleen A. Shutt, M.S., Joseph Bareta, M.P.H., Sandra N. Bulens, M.P.H., Elizabeth R. Zell, M.Stat., Anne Schuchat, M.D., and Stephanie J. Schrag, D.Phil.; N Engl J Med 2009; 360:2626-2636

7 F. Smaill, "Intrapartum Antibiotics for Group B Streptococcal Colonization," Cochrane Database Syst Rev 2 (2000): CD000115; www.ncbi.nlm.nih.gov/.

8 D. A. Terrone et al., "Neonatal Sepsis and Death Caused by Resistant Escherichia coli: Possible Consequences of Extended Maternal Ampicillin Administration," American Journal of Obstetric Gynecology 180, no. 6, pt. 1 (1999): 1345-1348.

of bias as we found a high risk of bias for one or more key domains in the study methodology and execution. There is a lack of evidence from well designed and conducted trials to recommend IAP to reduce neonatal [early-onset GBS infection]. Ideally the effectiveness of IAP to reduce neonatal GBS infections should be studied in adequately sized double-blind controlled trials."[9]

While we can never fully predict which babies will become infected with GBS, we have some information to help us understand our baby's individual risk of infection *(see information in chart-form on following page*):

1-1.5 in 5000 chance (.02-.03%) of having a baby develop GBS infection if your GBS status is NEGATIVE and no antibiotics are given.

1 in 500 chance (.2%) of having a baby develop GBS infection if your GBS status is UNKNOWN and no antibiotics are given.

1 in 200 chance (.5%) of having a baby develop GBS infection if you are GBS POSITIVE and no antibiotics are given.

1 in 1000 chance (.1%) of having a baby develop GBS infection if you are GBS NEGATIVE, no antibiotics are given and you have any risk factors.*

1 in 20 chance (5%) of having a baby develop GBS infection if you are GBS POSITIVE and no antibiotics are given and you have any risk factors.*

1 in 4000 chance (.025%) of having a baby develop GBS infection if one dose of antibiotics is given in labor.

1 in 20,000 chance (.005%) of having a baby develop GBS infection if 2 doses of antibiotics are given in labor.

Status & Risk Factor	GBS (-); No RF	GBS (-); Yes RF	GBS (+); No RF		GBS (+); Yes RF			Unknown GBS Status	Unknown or GBS (+); may or may not have RF	
Infection	2/10,000	9/10,000	51/10,000		408/10,000					
Antibiotics			No AB	Yes AB	No AB	Yes AB		No AB	Yes AB	
Infection			1/200		1/20	1/4,000	1 dose	1/500	1/4,000	1 dose
						1/20,000	2 doses		1/20,000	2 doses
Death			1/4,000		1/400			1/10,000	1/80,000	1 dose
									1/400,000	2 doses

*A study[7] from the U.K. on Early-onset GBS disease looked at each risk factor independently, offering separate statistics for those with just a premature baby, just broken waters, or just a fever of 100.4 or greater.

	Infection No Antibiotics	Infection Yes Antibiotics	Death No Antibiotics	Death Yes Antibiotics	Infection No Antibiotics Baby well at 12 hours
Fever	1/167	1/1572	1/1572	1/7861	1/1,670
Water's Broken	1/476	1/8351	1/8351	1/41,771	1/4,760
Premature	1/400	1/2186	1/2186	1/10,929	1/4,060
Very Premature	1/286	1/1253	1/1253	1/6,266	1/2,860

According to this study,[10] babies whose moms have *unknown* GBS status **and** did *not* receive intrapartum antibiotic prophylaxis had a:

9 Ohlsson A, Shah VS. Intrapartum antibiotics for known maternal Group B streptococcal colonization. Cochrane Database of Systematic Reviews 2009, Issue 3. Art. No.: CD007467. DOI: 10.1002/14651858.CD007467.pub2

10 www.onmedica.com/NewsArticle.aspx?id=ab31f5dd-4ee3-453f-82a1-cd2162572bde

1 in 286 chance (.3%) of GBS infection if they were *very pre-term* (<35 weeks);

1 in 400 chance (.25%) of GBS infection if they were *pre-term* (<37 weeks);

1 in 167 chance (.6%) of GBS infection if the mother had a *fever* 100.4 or greater during labor;

1 in 476 (.2%) of GBS infection if the mother's *waters were broken* for at least 18 hours.

Symptoms of Infection in Baby

The symptoms of GBS disease can seem like other health problems in newborns and infants. Most newborns with early-onset disease have symptoms on the day of birth. Babies who develop late-onset disease may appear healthy at birth and develop symptoms of Group B Strep disease after the first week of life.[11] Symptoms may include: fever, difficulty breathing, irritability, lethargy (limpness or won't wake), difficulty feeding, or blue-ish color to skin.[11]

What is the current standard of care in hospitals?

U.S. hospital-based care involves what is known as "Universal Screening." This means that all women are screened for GBS between 35-37 weeks of pregnancy. In most hospitals, women who either chose not to be screened or were unable to be screened prior to admission to the hospital are considered GBS-positive.

In the hospital setting, all women who test positive are given prophylactic IV antibiotics during labor to reduce risk of infection for baby. Any woman who tests positive for GBS in her urine at any point during pregnancy is automatically considered 'heavily' colonized and will automatically receive IV antibiotics in labor regardless of testing during 35-37 weeks of pregnancy.

If your baby is transferred to the hospital with signs of infection, your baby may have a higher likelihood of receiving a spinal tap, IV antibiotics, and other invasive interventions if you tested positive for GBS, or you chose not to test. In terms of newborns receiving IV antibiotics: "Attempts to prevent disease by giving antibiotics, to either all babies or those considered to be at high risk, have proved disappointing. Although the available data suggest that infant sepsis with Group B Streptococcus can be reduced with antibiotic prophylaxis given to the baby, such prophylaxis may be accompanied by an increase in sepsis with penicillin-resistant organisms, which may result in a higher rate of deaths from infection in the babies given antibiotic prophylaxis."[12]

Risk-Based Screening

In the U.K. the standard of care is "Risk-Based Screening," and Universal Screening is not advised. It is important to note that the incidence of GBS infection in newborns in the U.K. in the absence of Universal Screening is similar to the incidence in the U.S. with Universal Screening ***and*** intrapartum antibiotic prophylaxis, even though the countries have similar numbers of GBS-positive women.[13]

Risk-Based Screening means that women are not tested for GBS during pregnancy and are only administered IV antibiotics should they: go into labor prior to 37 weeks of pregnancy, develop a fever of 100.4 or greater during labor, or experience prolonged rupture of membranes (>18 hours). Almost two thirds of women whose babies develop early-onset GBS disease have at least one of these risk factors,[12] the least common of the three being prolonged rupture of membranes.[7]

11 www.cdc.gov/groupbstrep/about/symptoms-diagnosis-treatment.html

12 A Guide to Effective Care in Pregnancy and Childbirth, Third Edition, Oxford University Press, 2000. Murray Enkin, Marc J.N.C. Keire, James Neilson, Caroline Criwther, Leila Duley, Ellen Hodnett, Justus Hofmeyr

13 Women's Health Library. Group B Strep online learning package 2011; www.gbs-learning-tool.co.uk/gbs/Pages/AN_GBSAbout4.asp?TopID=9&SubTopID=3&PgId=54

The CDC currently recommends Universal Screening. Risk-Based Screening is recommended in the U.S. only if Universal Screening has not been done. The CDC's current recommendation is based on results from a New England Journal of Medicine (NEJM) study published in 2002, which showed that Universal Screening reduced the rate of newborn GBS infection by 50% compared to Risk-Based Screening.[14] ***However, the rate of newborn GBS infection was very low in both groups***, 0.33 cases per 1,000 live births with Universal Screening and 0.66 cases per 1,000 live births with Risk-Based Screening.

What are my screening options (test or don't test)?
In the midwifery model of care, all clients have the right to choose whether or not they wish to be tested for GBS. As long as you feel that you have a good understanding of the risks and benefits involved, the decision is yours. Should you decide to test for GBS, a vaginal/anal swab is taken between 35-37 weeks of pregnancy. The midwife can collect the sample, or you can collect the sample yourself. Testing is easy and takes about a minute to complete.

As with any test in your pregnancy, there is always a chance of a false-positive or a false-negative result, the degree to which is unknown. It is commonly known that women can test positive at one point in pregnancy and test negative at another, which is known as "transient" colonization. This may be due to the body's natural ability to balance bacteria levels, the natural life-cycle of the bacteria (how long the bacteria live), the (un)reliability of the test itself, and/or your efforts to reduce GBS colonization. ***See Immunotherapy for GBS Handout.***

Potential Risks of Antibiotics
The use of antibiotics is controversial, and the use of prophylactic antibiotics is highly controversial. The routine use of IV antibiotics on approximately 30% of all laboring women in the U.S. (about 1.2 million annually) has resulted in an increase in antibiotic-resistant E. coli. The authors of a Swedish study on GBS had this to say about the CDC's protocol: "Giving prophylactic [antibiotics] to large cohorts of mothers and babies is ecologically hazardous in that bacterial resistance may emerge and the drug may also induce allergic reactions in a few women." A small number of laboring women have a severe allergic reaction to antibiotics with about 1 in 10,000 women experiencing anaphylactic shock, circulatory collapse, and rarely cardiac arrest-- all potentially fatal to mom and/or baby. Additionally, at least 1 in 10 women who are given antibiotics in labor will experience reactions including vaginal yeast infections, long-term disruption of delicate microflora of the gastrointestinal (GI) tract, and yeast infections of the breast (thrush) which can lead to short- or long-term breastfeeding problems.

The complexity of the gut microflora in the GI tract and its role in optimal health is just beginning to be understood by biomedicine. We know that the baby's gut flora is acquired from the mother first from the vaginal canal (in vaginal birth) and then through breastfeeding and skin-to-skin contact with the mother. We are also beginning to understand that healthy gut flora is the foundation of the immune system, essential to the proper functioning of all of our body's systems, and a key component to psychological wellbeing. We know that antibiotics, especially used early in life, play a key role in disruption of the delicate balance of microflora in the human gut. The breadth of this topic is too great for this document, but antibiotic use may have far greater implications than we can understand today.

New Alternative to Prophylactic Antibiotics
If you are GBS positive and do not receive prophylactic IV antibiotics in labor, a simple blood test can be preformed on your baby (cord blood or heel stick) which tests for C-reactive protein, an indicator of an acute infection. This may or may not be an option at your local hospital.

14 A Population-Based Comparison of Strategies to Prevent Early-Onset Group B Streptococcal Disease in Neonates. Stephanie J. Schrag, D.Phil., Elizabeth R. Zell, M.Stat., Ruth Lynfield, M.D., Aaron Roome, Ph.D., Kathryn E. Arnold, M.D., Allen S. Craig, M.D., Lee H. Harrison, M.D., Arthur Reingold, M.D., Karen Stefonek, R.N., M.P.H., Glenda Smith, B.S., Melanie Gamble, M.P.H., and Anne Schuchat, M.D. for the Active Bacterial Core Surveillance Team N Engl J Med 2002; 347:233-239July 25, 2002

No definite answer exists for this issue. There is still much controversy in the medical field as to the best way to handle GBS. There is a lack of proper research. There's no perfect screening program, no perfect action or protocol that can specifically identify and prevent GBS disease, no drug or treatment that is 100% effective, or no treatment without *risks* small/large, known/unknown, and no treatment without *side effects* small/large, known/unknown. But regardless, the decisions are yours. As midwives it is our job to present you the information that we have available.

_____ I have read the information provided about GBS and my questions regarding the matter have been answered to my satisfaction. I believe I can make an informed decision regarding GBS.

_____ I choose the hospital-based standard for screening for GBS (swab and culture).

_____ I choose to NOT screen for GBS.

_____ If I choose to screen and test positive, I choose prophylactic antibiotics in labor.

_____ If I choose to screen and test positive, I do not choose prophylactic antibiotics in labor.

Client (Please Print)	*Signature*	*Date*
Partner (Please Print)	*Signature*	*Date*
Midwife (Please Print)	*Signature*	*Date*