1.0 INTRODUCTION:

Newborn infants are at significant risk of morbidity and mortality due to vertical transmission of infectious diseases. Although expectant mothers cannot be screened for all potential infectious diseases, the care giver needs to assess the perinatal risk factors for infectious disease transmission to the fetus while *in utero*, and be vigilant for signs of sepsis in the newborn. Although any organism can produce neonatal sepsis, attention has been focused on the pathogen, Group B streptococcus (GBS) as the leading cause of perinatal infections. Intrapartum maternal chemoprophylaxis is the best strategy to reduce vertical transmission of GBS and prevent early-onset neonatal GBS disease. Treatment based on routine screening or on the basis of risk factors alone is acceptable.

When infants are delivered via **elective cesarean delivery** with no labour and intact membranes, the risk of GBS disease is extremely low. Mothers with planned elective cesarean delivery should still be screened for GBS at 35 to 37 weeks in case they labour spontaneously. Treatment and investigations remain at the discretion of the care provider.

2.0 PURPOSE:

2.1 To reduce the risk of perinatal transmission of Group B Streptococcus to the fetus in utero and infection in the newborn infant.

2.2 To reduce infant morbidity and mortality related to perinatal sepsis from all causes.

3.0 PRACTICE GUIDELINE:

3.1 Identify and manage mothers at risk of GBS infection according to the standards set by the Society of Obstetricians of Canada (The prevention of early onset neonatal Group B Streptococcal disease, September 2004).

3.2 Identify and manage infants at risk of GBS sepsis according to the standards set by Canadian Paediatric Society (Management of the infant at increased risk for sepsis, December 2007).

3.3 Provide appropriate chemoprophylaxis to women with perinatal risk factors for GBS infection.

3.4 Observe and manage all newborn infants with risk factors for perinatal sepsis.

3.5 Provide chemoprophylaxis for infants with risk factors for or signs and symptoms of infection.

4.0 PROCEDURE FOR INTRAPARTUM MANAGEMENT:

4.1 Complete a combined maternal vaginal/anorectal culture for GBS prior to administering antibiotics to the woman during labour, if possible, regardless of the gestational age, unless a culture has been obtained within the preceding 5 weeks. When submitting a rectovaginal swab for GBS screening, **please indicate on the requisition when the patient has a penicillin allergy (at risk for anaphylaxis).** The lab will then undertake sensitivity testing if GBS is isolated.

4.2 4.2.1 Provide maternal intrapartum antibiotic prophylaxis for women meeting **ANY** of the following criteria:

- women with a positive GBS culture at any time in the current pregnancy;
- women with prelabour rupture of membranes who are GBS positive;
- women with an infant previously infected with GBS;

- women with GBS bacteriuria in the current pregnancy;
- women at less than 37 weeks gestation who are GBS unknown, or negative more than 5 weeks prior;
- women with ruptured membranes for greater than 18 hours who are GBS unknown, or negative more than 5 weeks prior.

4.2.2 Women who develop suspected chorioamnionitis in labour should be treated regardless of GBS status with broad spectrum coverage as outlined in section 4.3.

4.3 Provide maternal intrapartum antibiotic prophylaxis in accordance with guidelines below:

4.3.1 Choice of Antibiotic: Please see Appendix A

- Intrapartum antibiotic prophylaxis is administered throughout the course of labour until delivery (or until labour ceases).

Penicillin G
or
If the woman is Penicillin allergic **but not at risk of anaphylaxis** Cefazolin
or
If the woman is Penicillin allergic **and at risk of anaphylaxis** Clindamycin or Erythromycin

- If GBS resistance is demonstrated to Clindamycin or Erythromycin by culture and sensitivity, then give Vancomycin
- If a patient develops a fever intrapartum and **chorioamnionitis** is diagnosed/suspected, treatment must include broad-spectrum antibiotics:
    a. Ampicillin **AND** Gentamicin
    b. Cefoxitin **but NOT Cefazolin (Ancef)** has been proposed as an acceptable alternative to Ampicillin and Gentamicin
    c. **Add** Clindamycin or Metronidazole (Flagyl) if a Cesarean section is performed to cover anaerobes.
    d. In Penicillin allergic patients, substitute Clindamycin for Ampicillin
- Isolated rupture of membranes for greater than 18 hours in a GBS negative mother at 37 completed weeks and greater does not require antibiotic prophylaxis

4.3.2 Preterm Labour That Ceases (no delivery):

- with intact membranes: discontinue antibiotics
- with ruptured membranes: continuation and choice of antibiotics is at the discretion of the health care provider.
- if treatment is continued it should include coverage for GBS with Amoxicillin or Penicillin in non-allergic patients. Erythromycin or clindamycin is an alternative.

4.4 Retreat any patient who is diagnosed as GBS positive when labour starts in spite of previous antibiotic treatment.

4.5 Treatment is considered adequate if first dose is given greater than 4 hours prior to delivery AND all scheduled doses have been given. Delivery occurring very shortly (for example less than 30 minutes) after a missed second dose would still be considered adequate A mother receiving Clindamycin for prophylaxis is considered as *inadequately treated* in relation to further management of the infant *if sensitivity to Clindamycin is not available*.

4.6 Elective cesarean delivery and GBS screening

4.6.1 Intrapartum antibiotic prophylaxis is NOT recommended prior to an elective cesarean delivery with intact membranes and no labour regardless of GBS status.

4.6.2 Spontaneous labour or ruptured membranes prior to a planned elective cesarean delivery should be managed as per 4.2 and 4.3.

4.6.3 **Infants** born via elective cesarean delivery with no labour and intact membranes DO NOT require a CBC or increased vital sign frequency, regardless of maternal GBS status, unless they develop other indications (see 5.0).

5.0 PROCEDURE FOR MANAGEMENT OF SYMPTOMATIC INFANTS:

5.1 Treat **symptomatic** infants regardless of GBS status or adequacy of intrapartum antibiotic prophylaxis. Consider the influence of intrapartum risk factors such as prolonged rupture of the membranes, maternal temperature or chorioamnionitis in the decision to investigate and treat. Signs and symptoms of infection in the neonate are often non-specific and may include but are not

limited to:
- respiratory distress;
- hypotension or metabolic acidosis or poor perfusion;
- need for extensive or prolonged resuscitation at delivery;
- lethargy;
- seizures;
- poor feeding;
- abdominal distention;
- temperature instability.

5.2 Perform septic work up, including:
- Complete blood count (if not already done);
- Blood culture;
- Lumbar puncture (at discretion of healthcare provider);
- Chest radiograph (if respiratory symptoms).

NOTE: A suprapubic aspiration is no longer recommended as part of a septic work-up for ruling out sepsis at the time of delivery, unless a urinary tract infection is suspected.

5.3 Provide Ampicillin and Gentamicin IV or IM. Dosages are calculated according to infant weight and gestational age as per WRHA Pediatric Parenteral Drug Manual.

5.4 Determine choice and duration of antibiotics based on:
- Evolution of signs and symptoms;
- Culture results;
- Review of chest radiograph.

6.0 PROCEDURE FOR MANAGEMENT OF ASYMPTOMATIC (WELL) INFANTS:

6.1 Refer to the Appendix B 'Management of the well asymptomatic infant' to determine which investigations are required.
- The concept of 'adequate' and 'inadequate' antibiotic coverage applies to the prevention of GBS sepsis only. Maternal antibiotic administration for the prevention of sepsis due to other organisms has not been studied.

6.2 Perform a Complete Blood Count (CBC) with differential if indicated in Appendix B. Draw at 4-12 hours of age. Results are considered abnormal if:
- total WBC is less than 5.0 $x10^9$/L.

If WBC is less than 5.0 $x10^9$/L manage the infant as symptomatic as per section 5.0
- other abnormalities of the CBC may require physician notification, but are not necessarily associated with infection, correlation with clinical condition is required (see Appendix C).

6.3 Make sure any infant at increased risk for infection has a minimum hospital stay of 24 hours AND is observed for signs or symptoms of infection every 4 hours for a minimum of 24 hours. Observation includes assessment for any symptoms in section 5.1 as well as heart rate, respiratory rate and temperature. Infants at increased risk for infection include:
- infants whose mother had a temperature of 38° C or greater during labour (regardless of antibiotic treatment);
- infants with inadequate treatment for maternal GBS colonization;
- infants born to mothers **whose GBS status is unknown** and who have ruptured membranes greater than 18 hours and are inadequately treated;
- spontaneous labour at a gestational age less than 37 completed weeks, regardless of antibiotic treatment.

6.4 Consider a 48 hour hospital stay for infants with any of the above risk factors who reside in remote communities with limited access to physician follow up, or any situation where close follow up cannot be ensured.

6.5 Infants who are initially well and then develop symptoms of infection should receive prompt investigation and treatment as per section 5.

6.6 This is a guideline only. Individual assessment of each infant and septic risk factors is required. If in the opinion of the health care provider sufficient risk factors for sepsis are present in an otherwise well infant a septic workup and antibiotics may be initiated.

7.0 REFERENCES:

7.1 Original guideline prepared for HSC and Manitoba College of Physicians and Surgeons by: Drs. MMK Seshia, O. Casiro, A. Chiu, and J. Embree, Children's Hospital and Dept. of Pediatrics and Child Health, Faculty of Medicine, University of Manitoba, October 1994 (Revised Nov. 95 and May 99).

7.2 Allardice, J.G., Baskett, T.F., Seshia, M.M.K., et al. (1982). Perinatal group B streptococcal colonization and infection. Am J Obstet Gynecol, 142:617-20. (still relevant)

7.3 Apantaku, O. & Mulik, V. (2007).Maternal intra-partum fever. Journal of Obstet and Gynaecology, 27(1):12-15.

7.4 Canadian Pediatric Society 'Management of the Infant at increased risk for Sepsis http://www.cps.ca/english/statements/FN/fn07-03.htm December 2007

7.5 Society of Obstetricians and Gynecologists of Canada 'The Prevention of Early Onset Neonatal Group B Streptococcal Disease http://www.sogc.org/guidelines/public/149E-CPG-September2004.pdf September 2004

7.6 Snyder, M., Crawford, P., Jamieson, B., & Neher, J.O. (2007). Clinical inquiries: What treatment approach to intrapartum maternal fever has the best fetal outcomes? J Family Practice, 56(5):401-402.

8.0 RESOURCES:

8.1 Chelsea A Ruth, MD FRCPC, Assistant Medical Director, Intermediate Care Nursery.

8.2 Neonatal Patient Care Team, Health Sciences Centre

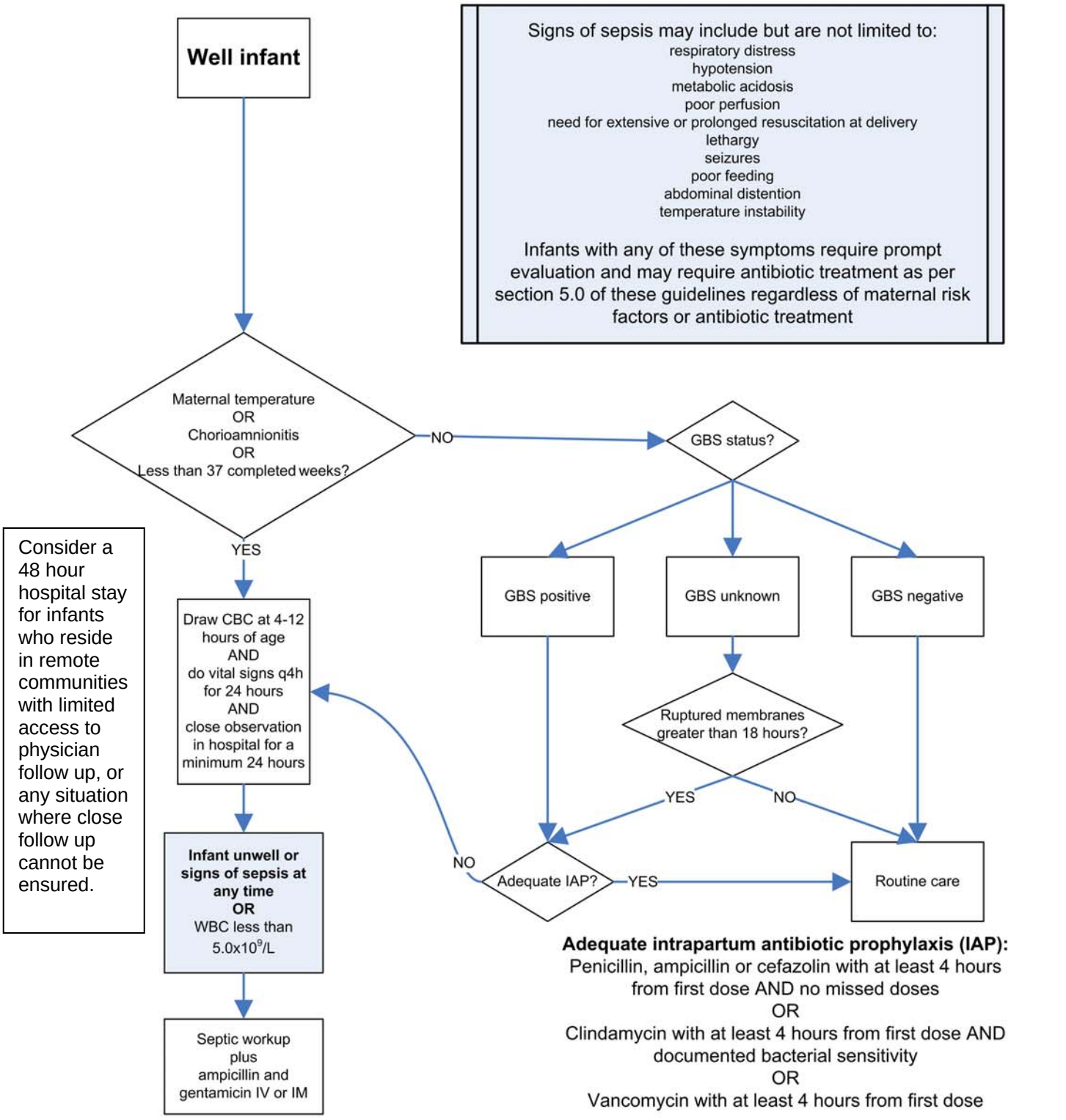
Appendix A: Maternal Antibiotic Coverage

To be continued until delivery or cessation of labour, dosages as per current WRHA Adult Parenteral Drug Manual

Indication	***Medication***
Antibiotic of choice for GBS prevention	Penicillin G
Penicillin allergy (not anaphylaxis)	Cefazolin
Penicillin/cefazolin allergy (anaphylaxis, no bacterial sensitivities available OR bacteria sensitive to Clindamycin)	Clindamycin
Penicillin/cefazolin allergy (anaphylaxis, bacteria resistant to Clindamycin)	Vancomycin

Ampicillin, if given for another indication, would be considered adequate for GBS prevention

Appendix B: Management of the Well Asymptomatic Infant



Septic Risk Factors: Maternal temperature greater than 38°C orally not secondary to dehydration, suspected maternal chorioamnionitis, spontaneous labor at less than 37 completed weeks or ruptured membranes greater than 18 hours

GBS bacteruria at any point in pregnancy is equivalent to a positive GBS swab

Close observation: observation for signs of sepsis plus vital signs Q4H including temperature, RR and HR for a minimum of 24 hours in hospital

Note the concept of '**adequate' antibiotic coverage applies to GBS prophylaxis only**, not other causes of sepsis or other risk factors

Septic Workup: blood culture, CXR if respiratory symptoms, LP at discretion of healthcare provider

This is a guideline only. Individual assessment of each infant and perinatal history is required. A septic workup and antibiotic treatment may be initiated by the healthcare provider in an otherwise well infant if they feel there are sufficient septic risk factors.

Appendix C: Abnormalities of the CBC requiring urgent physician notification

Any of these abnormalities should be communicated to the attending paediatrician/midwife or responsible healthcare professional at the time of result.

- WBC less than 5.0 $x10^9$ or greater than 40.0 $x10^9$
- Haemoglobin less than 100 g/L
- Hematocrit greater than 0.7
- Platelet count less than 80 x 10^9

If the first CBC is clotted, it should be redrawn. If subsequent CBCs are unsuccessful consider drawing venous CBC or notify the attending paediatrician/midwife or responsible healthcare provider.