Antepartum Fetal Surveillance

The goal of antepartum fetal surveillance is the reduction of fetal demise or worsening condition in populations at high risk for these complications.

Twice daily kick counts are encouraged in all viable pregnancies, beginning at 32 weeks’ of gestation.

A. Indications for Antepartum Fetal Surveillance Testing:

- Antiphospholipid antibody syndrome/Lupus anticoagulant (also see Thrombophilia protocol)
- Chronic placental abruption syndrome or persistent unexplained third trimester bleeding
- Chronic renal disease with renal insufficiency (creatinine ≥ 1.5 mg %)
- Decreased fetal movement (one-time indication if symptoms resolve)
- Diabetes mellitus (pregestational or GDM requiring medication)
- Hemoglobinopathies (excluding sickle cell trait)
- Chronic hypertension requiring antihypertensive therapy
- Preeclampsia
- Gestational Hypertension
- Uncontrolled thyroid dysfunction
- Intrauterine growth restriction (see IUGR protocol)
- Maternal red cell alloimmunization placing fetus at risk for anemia/need for transfusion
- Maternal cyanotic heart disease
- Maternal pulmonary disease with maternal hypoxia or cyanosis (does not include adequately controlled asthma)
- Monochorionic twin gestation
- Dichorionic twin gestation if growth discordance.
- Oligohydramnios (DVP <2cm and/or AFI < 5cm)
- Polyhydramnios, moderate or severe (AFI ≥ 30cm)
- Gestational age > 41 weeks
- Previous unexplained third trimester fetal demise
- Systemic lupus erythematosus (true diagnosis)
- Maternal age ≥ 40
- Maternal BMI ≥ 40
- Intrahepatic cholestasis of pregnancy
- Abnormal levels of aneuploidy screening markers (see Table A)
- Certain specific fetal anomalies
  - Fetal diaphragmatic hernia
  - Fetal abdominal wall defects
- Fetal arrhythmia (other than infrequent cardiac extrasystoles)
- Twin twin transfusion syndrome
- Trisomy 21 per maternal counseling
Table A

Abnormal levels of aneuploidy screening markers

*These abnormalities have been associated with an increased risk (>2.0 fold) of adverse pregnancy outcomes such as IUGR, severe pre-eclampsia, preterm birth, and/or intrauterine fetal death.

- *The abnormalities listed in the Table are indications for institution of antepartum fetal surveillance.

<table>
<thead>
<tr>
<th>FIRST TRIMESTER</th>
<th>MoM (Multiples of the Median)</th>
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</thead>
<tbody>
<tr>
<td>Marker: A single abnormal value is an indication for testing</td>
<td>Free β-hCG</td>
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<tr>
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<td>SECOND TRIMESTER</td>
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<tr>
<td>A single abnormal value is an indication for testing:</td>
<td>AFP</td>
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<tr>
<td>Any combination of 2 or more of the following abnormal values are an indication for testing:</td>
<td>AFP</td>
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<td>Estriol</td>
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B. Frequency and Timing of Testing (See Table B for Summary):

- For most indications, antepartum fetal surveillance in the outpatient setting is performed at baseline as twice weekly (alternating BPP and NST). However, the following indications have alternate testing:
  - IUGR—refer to IUGR protocol
  - Oligohydramnios or Polyhydramnios—refer to Amniotic Fluid Disorders protocol
  - Frequency and timing can be altered either more or less frequently based on stability of maternal/fetal condition after consultation with maternal fetal medicine

- In most instances, testing is initiated at 32 wks of gestation. Some exceptions which may warrant earlier testing are:
  - IUGR and pre-eclampsia—initiated at time of diagnosis in a potentially viable pregnancy
  - History of unexplained third trimester fetal demise—initiated 2 weeks prior to gestational age of previous demise or at 32 weeks, whichever is earlier

- Other uncommon indications for early fetal surveillance may exist. These should be considered on a case by case basis in consultation with a Maternal-Fetal Medicine specialist.

- Isolated episodic decreased fetal movement in an otherwise low risk patient may be evaluated by a single (one time) NST or a BPP
**Table B: Summarized Indications and Usually Recommended Testing Frequency**

As follows are indications for antenatal testing with recommended frequency of testing:

<table>
<thead>
<tr>
<th>Indication</th>
<th>Frequency</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased fetal movement (one-time indication if symptoms resolve)</td>
<td>Episodic</td>
<td>BPP or NST</td>
</tr>
<tr>
<td>Dichorionic twin gestation with growth discordance</td>
<td>2/wk</td>
<td>BPP</td>
</tr>
<tr>
<td>Monochorionic twin gestation</td>
<td>2/wk</td>
<td>BPP</td>
</tr>
<tr>
<td>Twin twin transfusion syndrome</td>
<td>2/wk</td>
<td>BPP</td>
</tr>
<tr>
<td>Oligohydramnios (AFI &lt;5 cm) (inpatient- see Amniotic Fluid Disorders Protocol)</td>
<td>Daily (NST)</td>
<td>NST BPP</td>
</tr>
<tr>
<td>Certain specific fetal anomalies</td>
<td>2/wk</td>
<td>Alternating BPP and NST</td>
</tr>
<tr>
<td>Fetal diaphragmatic hernia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal abdominal wall defects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal Care patients unless otherwise specified</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**All following indications: twice per week testing with alternating BPP and NST**

- Chronic renal disease/renal insufficiency (creatinine ≥ 1.5 mg %)
- Diabetes mellitus (pregestational or GDM requiring medication)
- Gestational age ≥41 wks
- Preeclampsia
- Gestational Hypertension
- Abnormal levels of aneuploidy screening markers (see Table A)
- Chronic hypertension requiring antihypertensive therapy
- Chronic placental abruption/third trimester bleeding
- Fetal arrhythmia (other than infrequent cardiac extrasystoles)
- Hemoglobinopathy (excluding sickle cell trait)
- Intrauterine growth restriction (see IUGR protocol)
- Maternal age > 40
- Maternal BMI > 40
- Maternal cyanotic heart disease
- Maternal pulmonary disease with maternal hypoxia or cyanosis (Excluding controlled stable asthma)
- Maternal red cell alloimmunization
- Polyhydramnios (DVP >8cm and/or AFI >24 cm) (see Amniotic Fluid Disorders Protocol)
- Previous unexplained 3rd trimester fetal demise
- Systemic lupus erythematosus/antiphospholipid syndrome
- Trisomy 21 per maternal counseling
- Uncontrolled thyroid dysfunction

*BPP = BPP sans NST unless NST is needed because BPP sans NST is 6/8
BPP with NST = BPP and ultrasound together each testing event
Episodic = one time only
For IUGR, see specific IUGR protocol*
For uniformity in care, testing is recommended as above. However, individual variation may be necessary because of appropriate application of medical judgement – rationale is to be documented as outlined.

C. Testing Modalities

Patient Positioning for NST, BPP and Doppler Testing:
All patients undergoing NST, BPP and or Doppler testing are to be positioned with left lateral positioning (towel roll under the right buttock) so as to reduce the possibility of maternal great vessel compression (with resulting reduction of uteroplacental blood flow)

NST:
- Reactive non-stress test (≥32 0/7 weeks):
  - the presence of two or more accelerations in a 20 minute time window (15 bpm zenith above baseline FHR with a total acceleration duration of > 15 second with or without fetal movement)
- Reactive non-stress test (<32 0/7 weeks):
  - the presence of two or more accelerations in a 20 minute time window (10 bpm zenith above baseline FHR with a total acceleration duration of > 10 second with or without fetal movement)

Biophysical Profile (BPP):
- The standard testing interval is up to 30 minutes.
- Unless specified in Special circumstances, the NST component of the BPP is omitted provided the remaining parameters are all scored as 2 points (“BPP 8/8 sans NST”)

BPP Scoring Scale:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Score</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal Breathing (FBM)</td>
<td>≥ 1 episode of rhythmic fetal breathing of ≥ 30 sec/30 min</td>
<td>2</td>
</tr>
<tr>
<td>Fetal Movement (FM)</td>
<td>≥ 3 discrete body movements and/or limb movements/30 min</td>
<td>2</td>
</tr>
<tr>
<td>Fetal Tone (FT)</td>
<td>≥ 1 episode of flexion/extension of a fetal extremity or open/closure of fetal hand in 30 minutes</td>
<td>2</td>
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<tr>
<td>Amniotic Fluid Volume (AF)</td>
<td>2cm x 2cm pocket of fluid*</td>
<td>2</td>
</tr>
<tr>
<td>NST</td>
<td>reactive</td>
<td>2</td>
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</table>

Score of 8 or 10 (if NST included) = Reassuring
Score of 6 = Equivocal. Necessitates NST evaluation in a timely fashion
Score of 4 or less = Consider delivery dependent on gestational age and maternal/ fetal Condition- with urgent evaluation of fetal status and consultation if not delivered

* Multiple Gestation = Use Deepest Vertical Pocket Modification (DVP > 2.0 cm = 2 points)

Deepest Vertical Pocket (DVP) in Multiple Gestation:

Measurement consists of deepest single vertical pocket of amniotic fluid in each amniotic sac

DVP < 2.0 cm = Oligohydramnios (necessitates additional evaluation)
DVP ≥ 8.0 cm = Polyhydramnios (necessitates additional evaluation)
D. Which Test to Perform? (See Table B for Summary of Recommendations):

Choice of testing modality:
Many tests of fetal well-being are available and none is universally superior to the others. Our approach in the application of fetal surveillance is to implement appropriate testing modalities in a cost effective manner while minimizing complications secondary to false positive results and the possibility of iatrogenic prematurity.

- **Daily fetal movement counting**: All patients undergoing antenatal testing should be encouraged to monitor fetal movement (See Attachment A)
- **Doppler velocimetry**: Not routinely used in the majority of patients (Please see IUGR Doppler Protocol for specific indications)

Special circumstances (See also Table B):
- **Pregestational Diabetes mellitus and Gestational Diabetes mellitus requiring medical treatment** is tested twice per week- alternate BPP and NST so testing is undertaken optimally every 3-4 days
  - However, specific modification in patients with longstanding disease, maternal vascular morbidity or poor compliance may necessitate individual modification of testing regimen
- **Fetal Care patients with fetal anomalies**- Twice weekly testing with alternating BPP and NST
- **Oligohydramnios or Polyhydramnios**
  - Refer to Amniotic Fluid Disorders Protocol for specific management

Intrauterine growth delay (IUGR):
IUGR management is specialized and situation dependent. Please refer to IUGR protocol for specific management. Standard testing for IUGR diagnosis (of appropriate gestational age gestation for testing) consists of alternating BPP and NST testing minimally twice per week. Doppler testing is as per protocol and/or case dependent.

E. Test Interpretation and Follow Up

**BPP:**
- Value of 6/8 necessitates NST performance
  - BPP inclusive of reactive NST of 8/10 = continue current surveillance timing
  - BPP inclusive of nonreactive NST of 6/10 = MD review with specific follow up plan
- Value of < 4/10 indicative of need for ongoing fetal monitoring and expedited MFM consultation for delivery or specifically directed care as clinically appropriate.

**NST:** (If performed to replace one of two twice per week BPP without NST tests)
- Nonreactive NST necessitates performance of BPP (BPP with NST)
  - Score of 8/10 = continue current surveillance
  - Score of 6/10 = MD review with specific follow up plan
- Value of < 4/10 indicative of need for ongoing fetal monitoring and expedites MFM consultation for delivery or specifically directed care as clinically appropriate.
• Nonreactive NST with immediately nonreassuring fetal heart activity pattern necessitates timely follow up as clinically indicated.

Fetal Growth:

• In general, patients undergoing antenatal fetal surveillance should concurrently be monitored for fetal growth abnormalities. Our recommendation is a follow-up fetal growth survey be completed at 4 week intervals in patients undergoing testing for the duration of their pregnancy.

F. Guideline Deviations:

Outpatient testing will be performed for the above indications in the above manner. Deviations from testing regimen are to be documented and handled in the following fashion:

• Testing ordered for non-listed indications or for non-recommended frequency require a faculty (attending) MD note with indication, rationale and duration of testing to be-
  o Faxed with paper orders from Non-EMR provider office
  o Placed in EPIC for applicable patients

• Since testing is ordered on patients at increased risk for adverse events, non-faculty MD providers (Health department clinics; non-faculty [resident or mid-level provider]) wishing to order testing outside of practice guideline need one of the following to order variation in guideline testing:
  o Approval by MFM ultrasound faculty or fellow
  o Approval by MFM OB clinic preceptor (resident based high risk clinics)
  o Approval by MFM on duty in hospital faculty or fellow (504-6099)
  o Attending (non-MFM) MD preceptor (resident based clinics) or practice faculty physician consultant (Health department clinics, mid-level provider clinics, etc)

• MFM faculty may find it necessary to modify testing regimen for individual care of a given patient (substitution of NST for episodic BPP event, recommend testing on a more frequent basis than guideline specifies, etc). If this occurs, MFM faculty (or fellow in conjunction with faculty) is to outline modified regimen and basis of plan modification.

Patients with variant scheduling without above documentation will receive the testing on the initial date of testing. Testing report will be sent to provider with instructions to review the indication and specify testing as appropriate. Patients will be instructed to contact their provider office or clinic for clarification of testing regimen. Subsequent dates of testing will not be performed without provider follow up and affirmation as outlined above. Repeated scheduling of unclear or non-justified variations in care will be handled by having the patient evaluated that day by the ordering provider or covering colleague so testing plan may be clarified for the best timely care of the patient.

G. Inpatient recommendations:

• Default to twice weekly testing (alternating BPP and NST) unless clinical picture dictates otherwise
• On days where formal testing is not performed, recommend twice daily fetal kick counts
• Examples of patients requiring daily testing (NST daily with BPP once per week):
  o Preeclampsia with severe features
  o PPROM
  o Uncontrolled diabetes
- Active lupus
- Placental abruption
- IUGR with abnormal dopplers
- Oligohydramnios
- Other conditions following consultation with Maternal Fetal Medicine
# UC HEALTH MATERNAL-FETAL MEDICINE

## Fetal Kick Count Chart

<table>
<thead>
<tr>
<th>Date</th>
<th>Time Started</th>
<th>Kicks/Movements</th>
<th>Time Completed</th>
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Instructions:
1) Lie on left side in a quiet room at the same time every day
2) Write down the time you are starting
3) Make a mark for every movement, kick or roll
4) Write down the time when you felt the 10th movement
5) Call your doctor or provider or contact labor and delivery (513-584-3999) if:
   a. No marks for movement in an hour
   b. You haven’t marked 10 kicks in 1 hours