Objective of Prenatal Care
Safe maternal and perinatal outcome
How?
• Establish early gestational age.
• Screen for conditions that increase risk and intervene early if needed.
• Ongoing evaluation of mother and fetus.
• Patient education.

Prenatal Care
Practices to continue
• Underperformed practices
• Practices of questionable value

Where is the Evidence for What We Do?
Michael Policar, MD, MPH @ OB/GYN UCSF

Prenatal Care
Underperformed practices in US:
• Vaccination for influenza: during any trimester
• Smoking cessation:
  – Nicotine replacement therapy, bupropion.
• Screening for GDM:
  – First trimester in addition to late second trimester.

Prenatal Care
Underperformed practices in US:
• Preconception counseling:
  – Folic acid: 50-70% risk reduction for NTD.
  – Control of blood sugars & pressures (Avoid contraindicated medications).
  – Dietary control for women with phenylketonuria.
  – CDC recommended
  – V26.49 (procreative management counseling)

Prenatal Care
Practices of Questionable Value:
• United States Preventive Services Task Force (USPSTF): NO urine dip sticks for protein and glucose; NO screening for genital herpes; NO screening for bacterial vaginosis if at low risk for preterm delivery; if at high risk, evidence inconclusive.
• Institute for Clinical Systems Improvement (ICSI): NO clinical pelvimetry, dipsticks, routine evaluation for edema, or routine testing for cytomegalovirus, parvovirus, or toxoplasmosis; NO routine multivitamins (multivitamins only for women with multiple gestations, smokers, vegetarians, and those with poor diet).
• Royal College of Obstetricians and Gynecologists: NO routine pelvic and breast examinations or screening for chlamydia, Group B streptococcus, or GDM; NO weight measurements during pregnancy; NO assessment of presentation before 36 wk, NO fetal heart tones, unless requested; NO fetal kick counts.
Questionable Value?

Prenatal Care
Practices to continue:
• Blood pressure:
  – R/o chronic hypertension at initial visit
  – Screen for preeclampsia after 20 weeks
• Measurement of fundal height:
  – Starting at 28 wk (r/o IUGR and macrosomia)
• Assessment of fetal position:
  – Start at 34 to 36 wk
  – Determine necessity for external version if breech
• Screening:
  – Initial visit prenatal laboratory examination
  – 2nd and 3rd trimester labs

Prenatal Labs
at First OB visit

Pregnancy Test
• Home-based pregnancy test:
  – 1 day after missed menses: ~50% negative
  – 1 week after missed menses: ~100% positive
• Always confirm a home-based pregnancy test:
  – Diagnostic physical findings:
    • Intrauterine pregnancy by U/S
    • Detection of fetal heart activity
  – In their absence, check human chorionic gonadotropin hormone (hCG) in blood or urine.

Positive serum hCG
Differential diagnosis
• Pregnancy (early intrauterine or ectopic)
• NOT pregnant:
  – 37%: Quiescent GTD
  – 27%: Hypophyseal hCG (peri-ovulatory; perimenopausal)
  – 18%: Heterophilic antibodies
  – 9%: Non-trophoblastic cancer (ovarian germ cell or other cancer)
  – 4%: GTD (complete or partial mole, invasive mole, choriocarcinoma, PSTT)
  – 4%: Familial (mutant) hCG syndrome
  – 0.8%: Munchausen

ACOG prenatal lab panel

<table>
<thead>
<tr>
<th>First Visit Lab</th>
<th>Expected Result</th>
<th>Clinical Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood type</td>
<td>A, B, AB, O</td>
<td>Transfusion</td>
</tr>
<tr>
<td>Rh and Ab screen</td>
<td>Rh+/- negative</td>
<td>Alloimmunization</td>
</tr>
<tr>
<td>H/H</td>
<td>&gt; 11.5 g/dL</td>
<td>Anemia</td>
</tr>
<tr>
<td>MCV</td>
<td>&gt; 80 fL</td>
<td>Hemoglobinopathy</td>
</tr>
<tr>
<td>PAP</td>
<td>Normal cytology</td>
<td>Cervical cancer</td>
</tr>
<tr>
<td>Rubella/Varicella IgG</td>
<td>Immune</td>
<td>Exposure/pp vaccine</td>
</tr>
<tr>
<td>Urine Culture</td>
<td>Negative</td>
<td>Asx Bacteriuria</td>
</tr>
<tr>
<td>Syphilis testing</td>
<td>Negative</td>
<td>Treatment</td>
</tr>
<tr>
<td>HBsAg testing</td>
<td>Negative</td>
<td>Prev transmission</td>
</tr>
<tr>
<td>Chlamydia testing</td>
<td>Negative</td>
<td>Treatment</td>
</tr>
<tr>
<td>HIV testing</td>
<td>Negative</td>
<td>Treatment</td>
</tr>
</tbody>
</table>
Blood Type & Antibody Screen

**ABO blood types**

Clinical importance:
- Immunogenicity
  - Compatibility testing; severe or fatal transfusion reactions
  - Refractoriness to platelet transfusion therapy
- Hemolytic disease of newborn (HDN)
  - ABO incompatibility in 15% of pregnancies
  - Results in HDN in only 0.6%
- Disease associations
  - Subjects with blood groups A, B, or AB have a higher risk of venous thromboembolic disease than those of blood group O (RR = 3.7)

**Rh blood group**

- There are about fifty Rh antigens
- 5 are clinically and laboratory significant:
  - D, C, c, E, e antigens (there is no d antigen)
  - D is the main Rh antigen
- “Rh +” or “Rh –”
- Technically correct nomenclature: Rh(D) positive or Rh(D) negative.

**Rh(D) negative with negative antibody screen**

Test antibody screen 3 times:
- First prenatal visit
- 28 weeks of gestation
- At delivery

Give anti-Rh(D) immunoglobulin

**Anti-Rh(D) immunoglobulin**

- Sterile solution containing IgG anti-D (anti-Rh) manufactured from human plasma (not recombinant).
- Many brand names:
  - HyperRHO®
  - RhoGAM®
  - Rhophylac®
  - WinRho®
- Informed consent should be obtained (it is a blood product).
  - Thimerosal-free in the US
  - Prior to 1980, outbreak of HCV in East Germany
  - There is no evidence it can transmit prions associated with Creutzfeldt-Jakob disease
  - It is Jehovah’s Witness accepted
Anti-Rh(D) immunoglobulin
When & how much?
• Unsensitized Rh(D) negative pts should be offered it at 28 wks.
• Optimum dose regimen in the US is 300 µg.
• A single 300 µg dose suppress the immune response to 15 mL of Rh-positive red blood cells (30 mL Rh(D)-positive fetal whole blood).
• Reduces the incidence of antenatal alloimmunization from 2% to 0.1 %.

Anti-Rh (D) immunoglobulin
Increased risk of Feto-Maternal Hemorrhage (FMH):
• Miscarriage, abortion, ectopic pregnancy, multifetal reduction, amniocentesis, chorionic villus sampling, blunt abdominal trauma, external cephalic version, antepartum bleeding, and fetal death.

What if there is an ongoing risk for FMH?
… such as chronic placental abruption or placenta previa with intermittent vaginal bleeding…

Serial determinations of the maternal indirect Coombs every three weeks with repeat dosing if Coombs negative.

Anti-Rh(D) immunoglobulin
After delivery:
• Administer within 72 hours of delivery of an Rh(D)-positive infant.
• Test for excessive feto-maternal hemorrhage in case additional doses are needed (order a Kleihauer-Betke test).

Anti-Rh(D) immunoglobulin
What if we did not give it within 3 days of birth?
• Administer ASAP after recognition of the omission
  – Partial protection within 13 days of birth.
  – There may be an effect as late as 28 days after birth.

Inadvertent administration to a Rh positive patient is not harmful.
… but it is an incident report

Rh(D) negative with positive antibody screen
Determine fetal Rh status:
• No special monitoring/intervention if fetal Rh type = maternal Rh type.
• **Definitive diagnosis** can be performed on:
  – Cell free fetal DNA in maternal blood
  – Amnioncytes
  – Fetal blood
• Paternal Rh typing and zygosity testing are useful for predicting the fetal Rhesus type.

Cell free fetal DNA in maternal blood
• Cell free fetal DNA can be detected in the maternal blood in the first trimester (> 10 wks)
• Detects paternally inherited fetal alleles that are not present in the maternal genome.
• Allows alloimmunized Rh(D) negative women to avoid unnecessary fetal surveillance
• In unimmunized Rh(D)-negative women allows to avoid unnecessary prenatal use of anti-Rh(D) immunoglobulin.
### cffDNA Sample Collection

<table>
<thead>
<tr>
<th>Lab Brand Name</th>
<th>SeniGene&lt;sup&gt;®&lt;/sup&gt;</th>
<th>MaterniT21&lt;sup&gt;®&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended use</td>
<td>Fetal RhD genotyping</td>
<td>Trisomy 21</td>
</tr>
<tr>
<td>Sample type</td>
<td>Whole blood</td>
<td>Whole blood</td>
</tr>
<tr>
<td>EGA (wks)</td>
<td>&gt; 10 wk</td>
<td>≥ 10 wks</td>
</tr>
<tr>
<td>Collection requirements</td>
<td>2 x 10 mL tubes (EDTA lavender top)</td>
<td>2 x 10 mL tubes (Mottled black/tan top cell-free DNA)</td>
</tr>
<tr>
<td>Storage/shipment</td>
<td>Do not freeze/ ship same day</td>
<td>Do not freeze/ ship same day</td>
</tr>
<tr>
<td>Turnaround time</td>
<td>7 business days</td>
<td>10 business days</td>
</tr>
<tr>
<td>Cost to patient if no full insurance coverage</td>
<td>$25</td>
<td>$235 (commercial PPO) Pre-authorization (others)</td>
</tr>
</tbody>
</table>

### Rh(D) negative with positive antibody screen

**Previous history of an affected fetus?**

**YES:**
- Antibody titers are **NOT** helpful in following the degree of fetal anemia \(\rightarrow\) **Refer to MFM**

**NO**: Check antibody titer:
- Non-critical (≤ 1 in 8): Repeat titer monthly until 24 weeks, then every two weeks until delivery.

---

**Management of Rh(D) negative with positive antibody screen**

- Critical antibody titer (≥ 1 in 16) \(\rightarrow\) refer to MFM
- Check middle cerebral artery peak systolic velocity (MCA-PSV)
- MCA-PSV above 1.5 MoM = predictor of severe anemia

---

**MCA – PSV Doppler**

![MCA PSV Doppler](image)

**MCA PSV MoM Zone Graph**

![MCA PSV MoM Zone Graph](image)
Minor anti-RBC antibodies
• Due to exposure to foreign RBC antigens or
• Due to exposure to bacteria or viruses
• anti-K
• anti-c
• anti-E
• Positive non-Rh antibody screen:
  – Identify antibody.
  – Determine its potential to cause hemolysis.
  – Paternal typing if at risk of hemolysis.
  – Maternal antibody titers to assess risk of fetal anemia.
  – Once critical titer is reached → check fetal MCA-PSV
    (best method for monitoring at-risk fetuses for anemia).

Hemolysis disease of the fetus

Positive non-Rh antibody screen:

– Identify antibody.
– Determine its potential to cause hemolysis.
– Paternal typing if at risk of hemolysis.
– Maternal antibody titers to assess risk of fetal anemia.
– Once critical titer is reached → check fetal MCA-PSV
  (best method for monitoring at-risk fetuses for anemia).

Hemoglobin

Objectives:
• Detect anemia
• Screen for hemoglobinopathies

High Hemoglobin

Differential diagnosis:
• High altitude
• Advanced cardio-pulmonary disease
• Myeloproliferative disorders
• Polycythemia
• Erythropoietin secreting tumor

Low hemoglobin = Anemia

Anemia in pregnancy:
• First and third trimester:
  – Hb levels <11 g/dL and Hct levels <33%
• Second trimester:
  – Hb levels <10.5 g/dL and Hct levels <32%
• In black women lower cutoff by 0.8 g/dL
• Mean Corpuscular Volume (MCV) helps classifying anemias.

Anemia & HIGH MCV

• HIGH MCV (> 100 fL):
  – Megaloblastic anemia:
    • B12 deficiency
    • Folate deficiency
  – Alcoholism
  – Liver disease
  – Hypothyroidism
  – Myelodysplastic syndromes
  – Aplastic anemia
  – Medications (AZT, INH, MTX, Bactrim)
Anemia & low MCV

**LOW MCV: < 80 femtoliters (fL)**
- Iron Deficiency Anemia (IDA)
- Thalassemia
- Hemoglobinopathy
- Anemia of Chronic Disease
- Other: Lead poisoning, G6PD, PNH
- False low MCV: Fragmentation of RBCs

  - **Mentzer Index:**
    - MCV/RBC count < 13 favors thalassemia over IDA
    - Check Ferritin

Ferritin

- Cellular storage protein for iron.
- Correlates well with total-body iron stores.
- Best single test to make dx of IDA: < 12 µg/L
- Differentiates IDA from chronic disease
  - Elevated ferritin:
    - Acute-phase reactant
    - Iron overload states
  - Low ferritin:
    - IDA

IDA - Management

- Oral Iron sulfate: 325 mg/tab (the cheapest):
  - 65 mg elemental iron
  - < 9 g/dL: 325 mg THREE times a day
- Follow H/H each month until corrected; then each trimester.
- Reticulocyte count will peak in 10 days.
- If poor response or non-compliant:
  - Consider IV or IM iron supplementation.
- Reserve transfusion for symptomatic anemia or Hgb ≤ 6 g/dL.

Rx? or w/u (ferritin Hb electroph)?

- low MCV
  - Rx: iron x 1 month

- normal MCV
  - w/u

- < 9
  - w/u & Rx

Anemia & normal MCV

NORMAL MCV (80 - 100 fL):
- It is a large and heterogenous category
- Order additional tests:
  - Peripheral smear
  - Reticulocyte count
  - Direct Coombs
  - Hematology consult; bone marrow exam?
- Differential includes: hemorrhage, infection (acute or chronic), chronic renal failure, kiver disease, malignancy, endocrinopathy, marrow aplasia, etc.

Hemoglobinopathies

- > 800 variants due to mutations in globin.

- Low risk ethnicities: Northern Europeans, Native American, Mexican, Inuit (Eskimo), Japanese, Korean.

- High risk: African, African American, Southeast Asian, and Mediterranean descent.
What if patient is Multiethnic?

- Parent history:
  - History of anemia
  - Previous stillbirth
- Family history:
  - Hemoglobinopathy or thalassemia
  - Consanguineous marriages
- Maternal MCV:
  - MCV <80 fL in the absence of iron deficiency suggests thalassemia
  - Further testing with hemoglobin electrophoresis is indicated.

Hemoglobin Electrophoresis

Identifies 4 groups of patients:

- Hb A2 > 3.5% and normal Iron studies: beta-Thalassemia minor
- Hb A2 ≤ 3.5%:
  - Normal iron studies: possible α-Thalassemia (SE Asian; offer DNA analysis)
  - Low iron studies: Cannot exclude β-Thalassemia minor in high risk ethnic groups. Thus, treat IDA first; then repeat electrophoresis.
- Other hemoglobinopathies: AS, AC, AD, AO, AE, SS, SC, CC, C β thal, EE, SE, SD, SO, S β thal, Eβthal, others

Is the fetus at risk for Hemoglobinopathy?

- If the mother is a carrier: test FOB
  - CBC & MCV
  - Hemoglobin electrophoresis
- If both are carriers → Fetal Risk → Genetic counseling

Couple at-risk of fetal hemoglobinopathy

- Prenatal genetic testing should be made available
- DNA-based testing for hemoglobinopathies can be performed during:
  - First trimester of pregnancy: CVS (Chorionic Villus Sampling; 10 to 13 weeks)
  - Second trimester: Amniocentesis (≥ 16 weeks)

Electrophoresis or solubility test?

- If electrophoresis first:
  - Be aware of uncommon hemoglobins that migrate similar to hemoglobin S but do not sickle (hemoglobins G, D, and Lepore).
  - Needs then → solubility test.
- If solubility first:
  - It only detects hemoglobin S.
  - Needs then → electrophoresis.

Sexually Transmitted Disease Screening
Pregnant Women with STD

<table>
<thead>
<tr>
<th>STD</th>
<th>Estimated Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia</td>
<td>100,000</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>13,200</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>16,000</td>
</tr>
<tr>
<td>HIV</td>
<td>6,400</td>
</tr>
<tr>
<td>Syphilis</td>
<td>&lt; 1,000</td>
</tr>
</tbody>
</table>

Syphilis

CDC’s 2010 STD Surveillance

Syphilis

Warnings:
- Most cases of congenital syphilis occur among infants whose mothers have had some prenatal care.
- Failure of health care providers to adhere to maternal syphilis screening recommendations contributes to the occurrence of congenital syphilis.
- Any woman who delivers a stillborn infant should be tested.

Primary & Secondary Syphilis in women: 1.1 cases per 100,000 females.

Total rate of Congenital Syphilis: 8.7 cases per 100,000 live births.

Testing for Syphilis

- Target groups:
  - Suspected disease (painless genital ulcer/lesion)
  - Screening high-risk populations
  - Routine screening during pregnancy
- Objective:
  - Prevent in utero transmission of asymptomatic infection which can lead to congenital syphilis
Treponema pallidum
- Cannot be cultured in vitro
- Suspicious lesion (chancre or condylomata lata):
  - Darkfield microscopy
  - Direct fluorescent antibody (DFA)
  - NAAT (nucleic acid amplification tests): not widely available

→ Definitive Diagnosis of Syphilis

Serologic test for syphilis (no lesion)
→ Presumptive diagnosis
- Non-treponemal tests: inexpensive and rapid
  - RPR (Rapid Plasma Reagin): if reactive, order liter.
  - VDRL (Venereal Disease Research Lab) higher false-positive rate
- Treponemal tests used for confirmation of positive non-treponemal test
  - Microhemagglutination or indirect hemagglutination assay for antibodies to T. pallidum (MHA-TP, TP-PA)
  - Fluorescent treponemal antibody absorption assay (FTA-Abs): higher rates of false positives than TP-PA
  - IgM antibody detection by enzyme-linked immunosorbent assay (ELISA)
  - IgG antibodies by immunoblot

ACL Laboratories has recently modified its testing strategy for the screening of Syphilis
“Reverse Sequence Screening”

Multiplex Syphilis IgG test
- Simultaneously screens for the 3 most relevant antibodies against T. pallidum antigens.
- A “reactive” test: indicates a treponemal infection has occurred at some point in the past.
- It cannot distinguish treated from untreated infections.
- CDC: “it identifies 3% more patients compared to traditional algorithm”.

→ A reactive result reflexes to RPR.
→ RPR is more likely to produce a “nonreactive” result after treatment and is a reliable indicator of untreated infection.
→ Both treponemal and non-treponemal tests my produce nonreactive results in acute infection:
  20% of 1ry syphilis may test negative
→ Patients with reactive treponemal and non-reactive non-treponemal may have latent syphilis. Consider Rx.
Discordant Results from Reverse Sequence Syphilis Screening

- 57% discordant
- 32% were false

Traditional versus New (Reverse Sequence) Screening?

Lab monitoring after syphilis Rx
- Check RPR titers at 3, 6, and 12 months
- Seroreversion: Non-reactive non-treponemal titer after Rx is consistent with cure.
- Serofast state: Low grade reactivity.
  - Up to 20% of patients
  - Immunodysregulation of antibody production?
  - Generally a titer of 1:8 or lower

Treatment failure after syphilis Rx
- Sustained fourfold or greater increase in non-treponemal titers following an initial response
- Failure of titers to decline by fourfold within 6 months of Rx in 1ry or 2ry syphilis.
HIV screening

**UNIVERSAL** screening with “opt-out” option

- Advantages:
  - Informed decision can be made about continuing the pregnancy
  - Appropriate medical management of the woman herself can be initiated.
  - Counseling for prevention of transmission to or identification of infected partners.
  - Perinatal transmission can be substantially reduced with appropriate intervention.

HIV Vertical Transmission

The risk for perinatal HIV transmission can be reduced from 15-25% to <2% through:

- Universal screening
- Use of antiretroviral regimens (i.e., zidovudine or nevirapine).
- Obstetrical interventions (elective cesarean section at 38 weeks of pregnancy)
- Avoiding breastfeeding

HIV screening: Issues

- Women we need to re-screen in Δ3:
  - Illicit drugs users
  - Have STDs during pregnancy
  - Have multiple sex partners during pregnancy
  - Live in areas with high HIV prevalence
  - Have HIV-infected partners
- If patient declined HIV screening:
  - Continue to encourage testing strongly.
- Undocumented HIV status in L&D:
  - Rapid HIV
  - If positive → Antiretroviral; later confirm.
  - Peds: Check her other kids for HIV.

When to start antiretrovirals?

In antiretroviral naive patient:

- It depends …
  - CD4-cell count
  - HIV RNA levels
  - Hyperemesis in Δ1?

AIDSinfo

Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV Transmission in the United States

Downloaded from [http://aidsinfo.nih.gov/](http://aidsinfo.nih.gov) on 11/8/2012 12:00:00 PM.
Visit the AIDSinfo website for an up-to-date guideline.

What's New in the Guidelines?

(Last updated July 31, 2012; last reviewed July 31, 2012)
HIV Legal Issues:
Check your local laws regarding:
• Patient notification.
• Obtaining signed consent form indicating permission for HIV testing.
• Documentation in medical record of patient's decision to accept or decline testing.

Institute of Medicine
2010 report:
• Most OBs screen for hepatitis B.
• Most OBs advise that newborns of +HBsAg mother receive both hepatitis B vaccine and hepatitis B IV IgG immediately after birth.
• However . . .
  – Only 1/2 -1/3 referred pregnant +HBsAg pt. to specialist for management of Chronic Hepatitis B.
  – Only few follow a systematic approach.

Chronic Hepatitis B (CHB)
• 2 million Americans with chronic hepatitis B.
• Estimated 2,000 – 4,000 deaths per year.
• CHB = + HBsAg for > 6 months.
• ~ 1,000 newborns in US acquire CHB/year.
• CHB → risk for:
  • Cirrhosis
  • Hepatocellular carcinoma

Hepatitis B


<table>
<thead>
<tr>
<th>Group</th>
<th>Estimated 2006 population (in millions)</th>
<th>Estimated HBsAg Prevalence (%)</th>
<th>Estimated Number HBsAg-positive persons</th>
<th>In thousands (range) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.- born non-</td>
<td>254.3</td>
<td>0.14</td>
<td>356</td>
<td>(229-534)</td>
</tr>
<tr>
<td>institutionalized</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign-born</td>
<td>37.5</td>
<td>1.2 - 2.6</td>
<td>375 - 975</td>
<td>(47-70)</td>
</tr>
<tr>
<td>Correctional</td>
<td>2.2</td>
<td>2.0</td>
<td>44</td>
<td>(3-5)</td>
</tr>
<tr>
<td>institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other group</td>
<td>6</td>
<td>0.5</td>
<td>30</td>
<td>(2-3)</td>
</tr>
<tr>
<td>living quarters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>0.3 - 0.5</td>
<td>805 - 1,405</td>
<td></td>
</tr>
</tbody>
</table>

Negative HBsAg

- Risk factors for acquiring HBV during pregnancy:
  - Foreigners (countries where prevalence is > 2%)
  - IV drug users
  - Immunodeficiencies
  - Abnormal LFTs
  - Hemodialysis
  - HIV positive
  - Household members or sexual contact of Hepatitis B virus infected person.
- Consider vaccination (antepartum)

Positive HBsAg

- Avoid misinterpreting a transient positive HBsAg result during the 21 days after vaccination.
- Screen all household and sexual partners.
- Check additional tests:
  - HBeAg, anti-HBe, HBV viral load (DNA), ALT
- If HBeAg positive or HBV DNA > 20,000 IU/mL or ALT is elevated: refer immediately (Rx)
- If HBeAg negative, HBV DNA < 2,000 IU/mL, and ALT is normal: refer postpartum (no active disease).

Positive HBsAg

- Seven antiviral medications are currently FDA-approved for treatment of hepatitis B (5 nucleotide analogues and 2 interferons)
- Recent meta-analysis concluded that lamivudine administered in the Δ3 might prevent HBV transmission.
  - Very high viral load (> 20 million IU/mL)
  - Previous infant infected (vertically) despite adequate newborn prophylaxis

Positive HBsAg

- Inform the pediatrician.
- Newborn needs both hepatitis B vaccine and hepatitis B IV IgG (HBIG); ideally in the delivery room.
- Breastfeeding is not contraindicated.
Chlamydia & Gonorrhea

Chlamydia & Gonorrhea in ♀
- 10-20% of women with chlamydia or gonorrhea may develop PID if they do not receive adequate treatment.
- Among women with PID, tubal scarring can cause:
  - Infertility in 20%
  - Chronic pelvic pain in 18%
  - Ectopic pregnancy in 9%

Chlamydia & Gonorrhea in neonates
- Ophthalmia neonatorum
- Neonatal pneumonia

Thus,
If +: Test of cure in 3 weeks and rescreen in ∆3.
If -: Retest women aged ≤25 years and those at increased risk for chlamydia (e.g., women who have a new or more than one sex partner).

Chlamydia infections in women: 611 cases per 100,000 females.
In pregnant women <25 years: 7.2% (range: 2.7% to 21.2%)

Gonorrhea in women: 107 cases per 100,000 females.
In pregnant women <25 years: 0.9% (range: 0% to 4.2%)

Disease | Antibiotic
---|---
Chancroid | Azithromycin
Granuloma inguinale | Azithromycin
LGV | Erythromycin
SYPHILIS | Penicillin
Chlamydia | Azithromycin
Gonorrhea | Ceftriaxone
HIV | Antiretrovirals
Hepatitis B | Refer to specialist
Bacterial vaginosis | Metronidazole
Trichomoniasis | Metronidazole
Vulvovaginal candidiasis | Topical azoles
Genital warts | N/A
Pediculosis | Permethrin
Scabies | Permethrin
NAAT is now available in Liquid based, thin layer preparations

Cervical Cancer

Cytology Screening

Screening Methods Consensus (Nov 2012)

New guidelines apply to pregnant women:
• < 21 yr of age: NO screening
• 21 to 29 yr of age: Every 3 yr (cytology alone)
• > 30 yr of age: cytology & HPV co-testing q 5 yr or cytology alone q 3 yr (acceptable)

Screening for Cervical Cancer

The incidence of cervical cancer in the United States has decreased more than 70% in the past 30 years because of widespread screening with cervical cytology. In 1975, the rate was 16.6 per 100,000 women. By 2000, it had been reduced to 6.6 per 100,000 women. Mortality from the disease has undergone a similar decrease from 3.25 per 100,000 women in 1975 to 2.38 per 100,000 women in 2000 (1). The American Cancer Society (ACS) estimates that there will be 12,370 new cases of cervical cancer in the United States in 2012, with 4,229 deaths from the disease (2). Cervical cancer is much more common worldwide, particularly in countries without screening programs, with an estimated 530,000 new cases of the disease and 275,000 resultant deaths each year (3, 4). When cervical cancer screening programs have been introduced into communities, mortality rates in cervical cancer incidence have followed (5, 6).

Screening for Cervical Cancer

• Pregnancy is not an indication for a change in the frequency of cervical cancer screening, but management of abnormal test is different.
• Pregnant women with atypical squamous cells of undetermined significance (ASC-US) or low-grade squamous intraepithelial lesion (LSIL):
  – Perform colposcopy
  or
  – Defer until 6 weeks postpartum (preferred).

Algorithms (ASC-US, LSIL, HSIL)

• Working on permission from ASCCP© American Society for Colposcopy and Cervical Pathology to show their algorithms.
Colposcopy for pregnant ASC-US & LSIL?
- Pregnancy does not accelerate cervical lesions.
- Cervical cancer occurs in only 5 of 100,000 pregnancies.
- The rate of CIN 2,3 is only 3.7% on postpartum follow-up for women with prenatal ASC-US or LSIL.
- Postpartum regression is common in women with CIN 1 (36%) and CIN 2,3 (48 to 70%).

HGSIL in Pregnancy
- Pregnant women with HSIL should undergo prenatal colposcopy.
- Because cervical changes in pregnancy can mimic CIN, colposcopy should be performed by experienced colposcopist.
- Biopsy lesion(s) if suspicious for CIN 2,3 or cancer.
- If CIN 2,3 is not found, repeat colposcopy no earlier than 6 weeks postpartum.
- If CIN 2,3 is found, repeat cytology and colposcopy may be performed every 12 weeks with repeat biopsy if the lesion worsens or cytology suggests invasion.
- Endocervical curettage is unacceptable during pregnancy.
- Cancer treatment is unacceptable without confirmation of cancer.

STD screening
What if patient requests anonymous testing?

Urine Tests
Urine Dipstick

- **Proteinuria:**
  - Dipstick is non-reliable
  - Random urine P/C ratio
  - 24 hr urine collection: gold standard
- **Glucosuria ≥ 250 mg/dL** is associated with abnormal GDM screening.
  - All pregnant women need a urine culture.
  - Do not let the lab decide who needs it.

Asymptomatic Bacteriuria

- Treatment is usually started in women with ≥10^5 CFU/mL on a urine culture.
- Short antimicrobial regimens to minimize fetal exposure.
- A follow-up culture for test of cure should be obtained a week after completion of therapy.
- Up to 30% of women fail to clear asymptomatic bacteriuria following short-course therapy and warrant retreatment.

GBBS Bacteriuria

- Symptomatic bacteriuria and **Asymptomatic HIGH colony counts** (≥ 10^5 CFU/mL) → Treat.
- GBS bacteriuria anytime in pregnancy should routinely receive prophylactic intrapartum antibiotics (exception for screening at 35-37 wks).
- Antepartum **LOW colony counts:** < 10^5 CFU/mL:
  - There are inadequate data to guide decisions
  - ACOG (US): Provides no recommendation
  - 77% of "senior" OBs from US training programs treat (Aungst et al. Am Journal Perinatol 2004)
  - CDC (US) and SOCG (Canada): Recommend not to treat.

Immunity to Rubella & Varicella

**Determination of Immunity**

- Healthcare provider's diagnosis
- Verification of history of disease
- Document vaccination
- **Laboratory evidence of immunity** (preferred)
- For varicella if pt reports:
  - Positive history: 2%
  - Negative history: 7% Susceptibility rates
  - Uncertain history: 17%

**If Non-immune (susceptible)**

- Avoid exposure sick individuals
- **Offer vaccination postpartum**
- If exposed to varicella during pregnancy:
  - Candidates for passive immunization:
    - VariZIG
    - IV Ig
  - Close monitoring for signs & symptoms.
  - Institute treatment with Acyclovir if illness occurs.
Postexposure Varicella Prophylaxis

- Prophylaxis with immunoglobulin (VZV-specific antibodies) is recommended compared with watchful waiting.
- In the U.S., VarilZIG® is the only available product with VZV-specific antibodies (it is under an Investigational New Drug application Expanded Access Protocol).
  - Call 1-800-843-7477 (FFF Enterprises, California)
  - It should not be delayed for 10 days* after exposure since efficacy beyond this time point is unknown.
  - No local IRB approval is needed.


MMR Susceptibilities

- Measles: 17%
- Mumps: 16%
- Rubella: 9%
- 33% susceptible to at least one of these viruses
- < 2% susceptible to all 3.

Haas, et al. Obstet Gynecol 2005 (NC Naval Hospital)

Rubella Postpartum Vaccination

Give MMR or MMRV

- Traditionally, it was advised to avoid pregnancy for 3 months post vaccination
- ACIP (CDC) has shortened it to 28 days
- There are no reported/confirmed congenital Rubella syndrome cases in infants born to mothers vaccinated between 2 wk and 6 wk after conception.

CDC

Immunizations

General principles

- When pregnancy occurs within one month of immunization with the live measles, mumps, rubella (MMR) vaccine, varicella vaccine, or yellow fever vaccine, teratogenesis has not been reported. Therefore, termination of pregnancy for this indication is unwarranted.
- It is not necessary to delay conception after administration of toxoids, inactivated virus vaccines, or immunoglobulin preparations.
- MMR and varicella vaccines can be given safely to postpartum women who are breastfeeding and to the children of pregnant women, since the virus is not transmitted through breast milk or casual contact.

Flu shot advertisement

CDC recommends administration influenza vaccine during any trimester
- The shot (inactivated): NOT the nasal spray (attenuated virus)
- Postpartum vaccination: either type, even if breastfeeding

Rule of 5 for FLU in pregnancy:
- 5 times higher morbidity than non-pregnant woman
- Infants less than 5 months have higher hospitalizations for the flu
- Vaccine is not approved for infants 5 months or younger
- If told, pregnant pts are 5x more likely to be vaccinated.

▲ Contraindications:
  - Egg allergy &
  - History of Guillain-Barré
▲ If moderately to severely ill → reschedule.
**Tdap advertisement**

- CDC recommends administration of Tdap during pregnancy to reduce the risk of maternal pertussis, and thus transmission to the infant.
- Pertussis can be lethal or have significant morbidity.
- Tdap is given after 20 wks.

**References:**

US:
- ACOG: www.acog.org

Outside the US: