

Prenatal care

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Goals of Prenatal Care

- Identify Risk factors
- Improve Pregnancy Outcomes
 - Receiving early and regular prenatal care results in healthier infants
- Reduce Obstetrical Complications
- Educate Patients

Frequency of Visits

- <28 weeks: q 4 weeks
- 28 –36 weeks: q 2 weeks
- >36 weeks: q week

The First Obstetrical Visit

- Confirmation of pregnancy
 - Physical exam: assessment of uterine size
 - Urine hCG
 - Should be done with first void in the am
 - Ultrasound
 - CRL: 7-14weeks
 - Doppler 9-12 weeks
- Planned pregnancy or not
 - May need counseling regarding options and resources

History and Physical

- HPI
- Obstetrical History
- Gyne History
- PMH
- PSH
- Medications
- Allergies
- Social History
- Family History
- Thorough physical exam

Problem List

- Create a problem list based on H&P:
 - Examples of problems
 - h/o Cesarean Section
 - Thyroid Disease, Diabetes, HTN, Epilepsy, etc.
 - Tobacco Use
 - AMA
- Devise a management plan based on the problem list and discuss it with the patient.
- Consider perinatology, genetics consult if needed.

Dating

- **Pregnancy wheel or Naegele's rule**
 - LMP – 3months +7days
 - Both are based on a 28day cycle
- **Ultrasound**
 - 1TUS if >1week discrepancy with LMP
 - 2TUS if >2week discrepancy with LMP

First Trimester Labs

- Blood Type
- Rh
- Antibody screen
- Urinalysis, urine culture
- HIV
- RPR
- Rubella
- CBC (hct, plts)
- Gonorrhea/Chlamydia
- Pap if indicated
- Hepatitis B surface antigen
- Hepatitis C if risk factors
- Hgb electrophoresis
- PPD if high risk
- Cystic Fibrosis Screening
- Early 1hr gtt if risk factors

Gonorrhea and Chlamydia

- May obtain cervical or by urine
- If positive,
 - treat patient and partner
 - promote abstinence during treatment
 - Condoms for rest of pregnancy
- Test of cure at least four weeks after treatment
- These patients are at high risk and should be tested in the third trimester also.

CBC

- Check with initial prenatal labs and can check at 28 weeks
- WBC may be slightly elevated
- Anemia
 - Dilutional can be normal
 - start FeSO₄ Hct <32%
 - If MCV is low
 - Check Ferritin
 - Hgb electrophoresis (thalassemia)
- Thrombocytopenia
 - Gestational usually > 100

Labs

- RPR
 - Check in first and third trimesters
 - If reactive, check FTA-ABS
- Rubella
 - If non-immune, administer vaccine post-partum
- HBsAg
 - Can detect 1 to 12 weeks after exposure
 - HBsAb indicates recovery and immunity from re-infection
 - HBeAg correlates with acute infection, higher titers, and greater infectivity; it may or may not be present in chronic infection
 - Acute infection is diagnosed by IgM HBcAb which is detectable at clinical onset and declines within 6 months
 - Chronic infection is diagnosed by IgG HBcAb but no IgM HBcAb

Tests

- HIV
 - Inform patient that this is part of routine prenatal labs
 - Opt out screening
- Urine Culture
 - Treat if positive, then test of cure
 - If +GBBS, screen all three trimesters and treat in labor.
- Bacterial Vaginosis
 - Not recommended as a routine screen
 - However, if patient has symptoms, check and treat if present

Ultrasound

- First Trimester Ultrasound
 - Measure CRL
 - LMP uncertain
 - Size/date discrepancy
 - First trimester bleeding/threatened abortion
 - High risk patient to confirm gestational age.
 - Documentation of viability (FCA)
 - Document with dot phrase: .1sttrimesterultrasound
- Anatomy: at 18-20 weeks for anatomy screening
 - level I (low risk)
 - level II (high risk)
- Growth ultrasounds
 - Any time FH is $>3\text{cm}$ discrepant from GA in weeks
 - Growth in second/third trimesters if needed
 - Informal US to confirm presentation at 36-7 weeks if needed

Cystic Fibrosis

Counseling Patients about Screening

- Cystic Fibrosis is a progressive, multisystem disease affecting pulmonary, GI, pancreatic, biliary and reproductive organs.
- Median survival is 30 years
- Cause of death usually is respiratory failure.
- Cystic fibrosis is an autosomal recessive genetic condition
 - If both are carriers there is a one-in-four chance an affected child
 - Screen for 23 common mutations and so risk can be reduced, but not eliminated.
 - Carrier status is dependent on ethnicity and family history

Cystic Fibrosis Screening

- Offer screening to all couples regardless of ethnicity
- Offer before conception or early in pregnancy if
 - Caucasian, European, or Ashkenazi Jewish ethnicity.
- Screen patient and if +, then screen partner

If either family history of cystic fibrosis or partner with cystic fibrosis (or congenital bilateral absence of the vas deferens)

- need records indicating the CFTR
- If not identified, screen with an expanded panel or complete analysis of CFTR gene
- Genetic counseling in this situation usually is beneficial.

Table 1. Cystic Fibrosis Detection and Carrier Rates Before and After Testing

Racial or Ethnic Group	Detection Rate	Carrier Rate Before Testing	Carrier Risk After Negative Test Result
Ashkenazi Jewish	94%	1/24	Approximately 1/400
Non-Hispanic Caucasian	88%	1/25	Approximately 1/208
Hispanic American	72%	1/46	Approximately 1/164
African American	65%	1/65	Approximately 1/186
Asian American	49%	1/94	Approximately 1/184

Fragile X Screening

- Most common inherited form of mental retardation.
 - 1 in 3,600 males and 1 in 4,000–6,000 females.
 - Approximately 1 in 250 females carry the premutation
- Genetic Counseling and Fragile X Premutation Carrier Screening
 - Family history of fragile X-related disorders
 - Unexplained mental retardation or developmental delay, autism
 - Premature ovarian insufficiency or elevated FSH < 40 y/o (no known cause),
 - Screen for a FMR1 premutation.
 - Women who request fragile X carrier screening, regardless of family history, should be offered FMR1 DNA mutation

Fragile X

- All identified carriers of a fragile X premutation
 - referred for follow-up genetic counseling
- Known carriers of the fragile X premutation or full mutation.
 - CVS may not adequately determine the methylation status of the FMR1 gene.
 - DNA-based molecular analysis
 - eg, Southern blot analysis and polymerase chain
 - preferred method of diagnosis of fragile X syndrome
 - and of determining FMR1 triplet repeat number (eg, premutations).

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Screening for Chromosomal Anomalies

Level B Evidence:

- All women, regardless of maternal age should be offered aneuploidy screening
- All women regardless of maternal age should be offered invasive diagnostic testing
- If increased risk of aneuploidy with first trimester screening,
 - Genetic counseling and the options of CVS and/or second-trimester amniocentesis.

Aneuploidy Screening

- **1st Trimester Screen – Patient presents in 1st trimester**
- **Quadruplet Test - Patient presents in 2nd trimester**

Aneuploidy Testing

- Cell-free DNA Testing (as early as 9 weeks)
- First Trimester Screen (12-13 weeks)
 - NT + PAPP-A and Hcg
- Quadruple Screen (between 15.0-20 weeks)
 - hCG, AFP, uE3, Inhibin A
- Integrated Screening
 - FTS (NT + serum PAPP-A) + Quad
 - One result, so must wait 3-4w for results
- Serum Integrated Screening
 - Ultrasound dating (unobtainable NT)
 - PAPP-A + Quad
 - One result.
- Sequential = FTS + Quad
 - If FTS Results $>1:25$, then refer for invasive testing.

1st Trimester Screen

- **Ultrasound**
 - Nuchal translucency
- **Down Syndrome Screening (combined test)**
 - Maternal serum markers
 - Pregnancy-associated plasma protein-A (PAPP-A)
 - low is 0.4 MoM
 - Free or total beta human chorionic gonadotropin (beta-hCG)
 - high
 - 1.8 MoM for free
 - 1.4 MoM for total

1st Trimester Screen - Other Aneuploidies

■ Trisomy 18

- very low PAPP-A
 - 0.1 - 0.2 MoM
- very low beta-hCG
 - 0.2 - 0.4 MoM
- increased nuchal translucency 1.8 - 3.7 MoM

■ Trisomy 13

- low to very low PAPP-A
 - 0.36 MoM
- low to very low free beta-hCG
 - 0.41 MoM
- modestly increased nuchal translucency
 - 1.17 MoM, range 0.63 to 4.5

Cell-free Fetal DNA Testing

- Offer to AMA or History of Aneuploidy.
 - Genetic Counseling coordinates
- 9 weeks
- Detects
 - > 99% of all Trisomy 21
 - > 98 % of all Trisomy 18 abo
 - approx 65% of all Trisomy 13

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Level A Recommendations:

- FTS detection rates are comparable to the quad screen.
- If increased risk of aneuploidy with first-trimester screening should offer genetic counseling and the option of CVS or second-trimester amniocentesis.
- Neural tube defect screening should be offered in the second trimester to women who elect only first-trimester screening for aneuploidy.

NTD

Level A

- Maternal serum alpha-fetoprotein evaluation is an effective screening test for NTDs and should be offered to all pregnant women.
- **Periconceptional folic acid supplementation**
 - Reduces occurrence and recurrence of NTDs.
 - Start 3 months prior to conception
- **Low Risk women,**
 - folic acid supplementation of 400 µg per day
 - Higher levels of supplementation should not be achieved by taking excess multivitamins because of the risk of vitamin A toxicity.
- **High risk of NTDs had a previous pregnancy with an NTD**
 - 4 mg per day is recommended.

Counseling

■ Patient Education

- Scope of care provided
- Laboratory studies being performed
- Expected course of pregnancy
- Signs and symptoms that should be reported
 - Vaginal bleeding, ROM, decreased FM
- Schedule of visits
- Group Dynamics (L&D coverage)
- Safety Issues to promote health maintenance
 - Safety belt use
 - Travel precautions
- Educational programs available
- Options for intrapartum care
- Encouraging breastfeeding
- Cord blood banking

Domestic Violence

- Domestic violence
 - Risk assessment
 - Intimate-partner violence
 - Trauma (including trauma from domestic violence) is a major cause of maternal death
 - Prevalance of sexual abuse may be particularly high in adolescent women
 - Violence may begin or escalate in pregnancy
 - Prevalence between 4-8%
 - Presentations of an abused woman:
 - Unwanted pregnancy
 - Late entry into prenatal care or missed appts
 - Substance abuse or use
 - Poor weight gain/nutrition
 - Multiple, repeated somatic complaints

Domestic Violence

- Ask directly in a caring, nonjudgmental manner
- Repeated inquiries give the greatest likelihood of disclosure.
- Screen patients in private

Let patients know that you screen all your patients with the same questions:

- Have you been threatened or actually hit, slapped, kicked or physically hurt within the past year?
- Any abuse since pregnancy began?
- Has anyone forced you into sexual relations when you were not willing?
- Referrals to appropriate counseling, legal and social-service advocacy programs
- Child abuse is always reportable
- Should encourage an “escape” plan with a reliable safe place

Depression Screening

ACOG Committee Opinion 2/2010

- Depression is very common during pregnancy and the postpartum period.
- At this time, there is no recommendation for universal antepartum or postpartum screening.
 - insufficient data to recommend how often screening should be done
- Screening for depression has the potential to benefit a woman and her family and should be strongly considered.

Modalities to Screen Depression

- **Edinburgh Postnatal Depression Scale**
 - 10 items
 - Less than 5 min to complete
 - 59-100% sensitivity and 49-100% specificity
- **Postpartum Depression Screening Scale**
 - 35 items
 - 5-10 min to complete
 - 91-94% sensitivity and 72-98% specificity

Other Tests for Depression Screening

- Patient Health Questionnaire-9
- Beck Depression Inventory-I
- Beck Depression Inventory-II
- Center for Epidemiologic Studies Depression Scale
- Zung Self Rating Depression Scale.

Nutrition in Pregnancy

- Contributes positively to maintain and improve patient's health as well as delivery of healthy newborn of appropriate weight
- Focus on well balanced, varied nutritional plan
- Nutrition consultation should be offered to all obese patients
- Calculation of BMI

ACOG today 08/2009 IOM recommendations for weight gain

BMIs shifted slightly to agree with the World Health Organization's definitions

Category names changed from "low," "normal," "high," and "obese"

Only the "obese" recommendation changed, previously recommending "at least 15 lbs" for obese women, with no maximum weight gain recommended

New IOM Recommendations for Total and Rate of Weight Gain during Pregnancy, by Prepregnancy BMI

Prepregnancy BMI	BMI* (kg/m ²)	Total Weight Gain Range (lbs)	Rates of Weight Gain** 2nd and 3rd Trimester (Mean Range in lbs/wk)
Underweight	<18.5	28-40	1 (1-1.3)
Normal weight	18.5-24.9	25-35	1 (0.8-1)
Overweight	25.0-29.9	15-25	0.6 (0.5-0.7)
Obese (includes all classes)	≥30.0	11-20	0.5 (0.4-0.6)

*To calculate BMI go to www.nhlbisupport.com/bmi

**Calculations assume a 0.5-2 kg (1.1-4.4 lbs) weight gain in the first trimester (based on Siega-Riz et al, 1994; Abrams et al, 1995; Carmichael et al, 1997)

TABLE ADAPTED FROM IOM GUIDELINES

Food Restrictions

- Undercooked meats or eggs
 - Deli meats should be heated until steaming
 - Thoroughly cook meats, eggs, hot dogs
- Unpasteurized dairy products and juice
- Seafood
 - USFDA and US Environmental Protection
 - No more than 12 oz per week of a variety of fish/shellfish low in mercury
 - Most common high mercury fish: shark, swordfish, King mackerel and tile-
 - Most common low mercury fish: shrimp, canned light tuna, salmon, pollock and catfish
 - Should not consume more than 2 6oz cans/week of tuna
 - Light tuna instead of albacore
 - Raw or undercooked – sushi, oysters, lox

Recommended Daily Allowances for Pregnancy

Fat Vitamins

A	750mcg
D	5mcg
E	15mcg
K	75mcg

Water-soluble Vitamins

C	85mg
Thiamin	1.4mg
Riboflavin	1.4mg
Niacin	18mg
B6	1.9mg
Folate	600mcg
B12	2.6mcg

Minerals

Calcium	1,000mg
Phosph	700mg
Iron	27mg
Zinc	12mg
Iodine	220mcg
Selenium	600mcg

Vitamin

- Vitamin A
 - Excessive can be associated with fetal malformations
 - Standard in prenatal vitamins: 4-5,000 IU
 - Considered max recommended dose in pregnancy
 - Well below probable minimum teratogenic range
- Excessive vitamin and mineral intake should be avoided
 - Excess iodine is associated with congenital goiter

Caffeine in Pregnancy

- Moderate caffeine intake is OK
 - < 200mg/day
 - No Evidence of association with IUGR
 - Caffeine does cross placenta, but shows no decrease in umbilical artery blood flow or fetal oxygenation
 - Not a contributing factor to miscarriage or preterm birth with moderate intake

Foods and Beverages

Mg of Caffeine (Average)

Coffee (8 oz)
Brewed, drip
Instant

137

76

Tea (8 oz)
Brewed
Instant

48

26–36

Caffeinated soft drinks (12 oz)

37

Hot cocoa (12 oz)

8–12

Chocolate milk (8 oz)

5–8

Chocolate

Dark (1.45 oz)

30

Milk (1.55 oz)

11

Semi-sweet (1/4 cup)

26–28

Syrup (1 tbsp)

3

**Coffee ice cream or frozen
yogurt**

2

Exercise

At least 30 min of moderate exercise per day

- Avoid sports with an increased risk of falling or abdominal trauma
- Avoid exercising in the supine position as much as possible
- Cross train to avoid injury

Exercise

- If previously inactive, should be evaluated before making recommendations for activity
- Those with major factors for IUGR or PTL should be advised to reduce activity in the second and third trimesters
- Warning signs to terminate pregnancy:
 - Chest pain, vaginal bleeding, headache, dizziness, decreased fetal movement, Amniotic fluid leakage, muscle weakness, calf pain/swelling, preterm labor, regular uterine contractions.

Flu Shot

■ **Barriers to influenza vaccination**

- Lack of awareness of the benefits of vaccination
- Concerns about vaccine safety are common

■ **Pregnant women should receive seasonal influenza vaccine.**

- Influenza is more likely to cause severe illness in pregnant women.
- Risk of premature delivery is increased
- Vaccination during pregnancy has been shown to protect both the mother and her infant (up to 6 months old) from lab-confirmed influenza.
 - Influenza hospitalization rates in infants <6 months of age are more than 10 times that of older children.
- Pregnant women represented 5% of 2009 H1N1 influenza deaths in the U.S

Flu Shot

- **Influenza vaccine is safe.**

- Given to millions of pregnant women over the last decade and have not been shown to cause harm to women or their infants.
- Influenza vaccine can be given to pregnant women **in any trimester**.
- Pregnant women should receive inactivated vaccine (flu shot) but should **NOT** receive the live attenuated vaccine (nasal spray).
- Postpartum women, even if they are breastfeeding, can receive either type of vaccine.

Travel

Committee Opinion

- Occasional air travel during pregnancy is generally safe.
- Most airlines allow flying up to 36 weeks of gestation.
 - Patients need to check with individual carriers.
 - Not recommended if medical or obstetric conditions requiring emergency care.
 - Should inform patients that the most common obstetric emergencies occur in the first and third trimesters.
- For DVT prophylaxis
 - Use of support stockings
 - Periodic movement of the lower extremities
 - Avoidance of restrictive clothing
 - Occasional ambulation
 - Maintenance of adequate hydration

Hot Tubs

- Sauna and Hot Tub

- Hyperthermia is teratogenic

- Usually NTDs from maternal febrile illnesses

- Level C – expert opinion

- Can use either as it is not likely to increase core body temp at short intervals

- Saunas no more than 15 min

- Hot Tubs no more than 10 min and try to avoid full submersion

Acne in Pregnancy

- Treatments Contraindicated – Category X
 - Oral Isotretinoin
 - Topical Tazarotene
- Reasonable Options:
 - Class B
 - Oral or Topical Erythromycin
 - Topical Clindamycin
 - Topical Azelaic Acid
 - Class C
 - Benzoyl Peroxide

Baby Friendly

- Baby Friendly - recognition from WHO and UNICEF that a hospital fully supports breast-feeding
- Dot phrases that correspond to weeks of gestation that guide you through the education to give the patient
- Patient video at office and a booklet.
- Use all these resources.

Baby Friendly

- **Golden Hour**
 - **1st hr baby's life. When mom (or dad) and baby get to know each other.**
 - **Skin to skin contact-provides your baby a warm safe place to adjust to life outside your womb.**
 - **Helps stabilize heart rate, breathing and temperature**
 - **stimulates milk production, promotes bonding.**
- **Breast-feeding within baby's first hour of**
 - **Better breastfeeders: suck better and feed longer.**
- **Rooming in/24-hours**

Baby Friendly

- **Colostrum**
- **Hand/Manual expression- free Video on line:**
<https://www.youtube.com/watch?v=Tuhuekl-3JY>
- **Feeding on Demand**
 - **Feeding cues- Hunger/feeding cues are signs that your baby is hungry. There are different stages. The quiet alert state is the best time to initiate breastfeeding.**
- **Hunger cues:**
 - **Early: Smacking or licking lips, Sucking on hands, fingers, toys, lips, clothing and Opening and closing mouth**
 - **Active: Squirming, Rooting at the chest of whoever is holding the infant, pulling up on the mother's clothes to nurse or by arching back to position himself for nursing**
 - **Late: Crying, Moving head back and forth, Exhaustion, Falls asleep**

Baby friendly

- Latch
 - Things to look for with the latch
- Holds
 - Football
 - Cradle
 - Cross cradle
 - Side-lying.
- Non pharmacologic methods to reduce pain during labor.

Subsequent OB visits

- Inquire about any problems or questions
- Specifically ask about:
 - Fetal movement
 - Contractions
 - LOF
 - VB
- Fundal height
- Fetal heart tones
- Weight
- Blood pressure
- Urine dip

Second Trimester

- Birthing classes
- Preterm labor risks after viability
- Influenza vaccine (if not given already)
- Breastfeeding
- Rhogam at 28 weeks if rh negative
- Cord blood donation

OB Tolerance Test

- 1 hour GTT done at 26-28 weeks
- Screen earlier if risk factors:
 - h/o GDM, family history, obesity, glucouria, previous macrosomic infant
- Repeat CBC at the same time
- If >135 , administer 3 hour GTT
- If >200 , refer for diabetic teaching

3hr GTT

- At least 10 hour fast
- At least 2 values over: 95/180/155/140

Rh neg

Level A:

- Rh D-negative not Rh D-alloimmunized should receive anti-D immune globulin:
 - At approximately 28 weeks of gestation
 - Within 72 hours after the delivery of an Rh D-positive infant
 - After a first-trimester pregnancy loss
 - After invasive procedures, such as chorionic villus sampling, amniocentesis, or fetal blood sampling

Level C:

- Anti-D immune globulin prophylaxis should be considered if :
 - Threatened abortion
 - Second- or third-trimester antenatal bleeding
 - External cephalic version
 - Abdominal trauma

Third Trimester

- Analgesia/anesthesia in labor
- Operative vaginal delivery or Cesarean section
- Travel
- Things to bring to hospital (ie car seat)
- Fetal kick counts
- Labor and Delivery tour
- Influenza Vaccine, Adacel (tdap: tetanus toxoid, diphtheria toxoid, acellular pertussis vaccine)
- Pediatrician
- Discuss pediatrician options
- GBS at 35-37 weeks (and MRSA)
- Signs and symptoms of Labor, SROM, Preeclampsia (if pertinent)
- Circumcision
- Post-partum Contraception
- In the third trimester, discuss plans for post-partum contraception

Working

- Most women can work during their entire pregnancy
- Some may need restrictions or stop working all together:
 - Toxic exposures
 - Vaginal bleeding
 - Short or dilated cervix before 36 weeks
 - Uterine malformation
 - Gestational hypertension
 - Fetal growth restriction
 - Multiple gestation
 - Prior history of preterm birth
 - Polyhydramnios
 - Unstable maternal disease

GBBS

■ Group B Streptococcus

- Screen at 35-36 weeks (good for 5 weeks)
 - If + and >5 weeks, treat and consider +
 - If negative, rescreen if >5 weeks
- If +urine GBBS culture in this pregnancy, consider +
- Collect culture from lower vagina and anus
- If penicillin allergic, ask for sensitivities with culture

Herpes

- ***Level B:***

- Active or recurrent genital offer suppressive viral therapy at 36 weeks.
- Cesarean delivery if active genital lesions or prodromal symptoms

Prior Cesarean

- Obtain documentation of uterine scar if possible
- Discuss risks/benefits of VTOL vs. Repeat Cesarean
 - Assess if patient is a good Candidate
 - Make sure to discuss that a failed VTOL confers higher risks
 - Make sure to document all discussions in the chart.

Bishop score

Table 1. Bishop Scoring System

Score	Factor				
	Dilation (cm)	Position of Cervix	Effacement (%)	Station*	Cervical Consistency
0	Closed	Posterior	0–30	–3	Firm
1	1–2	Midposition	40–50	–2	Medium
2	3–4	Anterior	60–70	–1, 0	Soft
3	5–6	—	80	+1, +2	—

*Station reflects a –3 to +3 scale.

Modified from Bishop EH. Pelvic scoring for elective induction. *Obstet Gynecol* 1964;24:267.

Bishop Score

- An unfavorable cervix generally has been defined as a Bishop score of 6 or less
- more than 8, the probability of vaginal delivery after labor induction is similar to that after spontaneous labor.