Obstetric Care Today

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The content of my material/presentation in this CME activity will include discussion of unapproved or investigational uses of products or devices as indicated:

- Misoprostol will be discussed as a medical uterotonic agent for the prevention and treatment of postpartum hemorrhage. Misoprostol is not U.S. FDA approved for this use.

Learning Objectives

1. Develop collaborative care plans with patients regarding healthy diet and lifestyle modifications to improve pregnancy outcomes.
2. Perform routine prenatal visits to determine when pregnancy complications may arise due to family history and risk factors.
3. Evaluate high-risk women for complications as necessary throughout pregnancy into the third trimester and whether to perform antenatal screening using serum markers and ultrasound.
4. Evaluate current scientific literature on obstetric care, for relevant practice application.

Audience Engagement System

Step 1

Step 2

Step 3

FMX Faculty Medicine Experience (FMX) is the official learner engagement system for the American Academy of Family Physicians (AAFP). It is designed to help physicians stay up-to-date with the latest in family medicine and improve their practice. FMX provides a range of interactive and collaborative tools to enhance learning and engagement. By using FMX, physicians can access a variety of resources, including articles, case studies, and assessments, to support their continuous professional development.

FMX is also used for the Family Medicine Update (FMU) and Family Medicine Faculty Development (FMFD) programs. These programs provide comprehensive review courses and continuing medical education opportunities for physicians to stay current in the field of family medicine. Through FMX, physicians can participate in virtual courses, access course materials, and track their progress towards completion.

FMX is designed to facilitate a more personalized and interactive learning experience. It enables physicians to engage in discussions, collaborate with peers, and receive feedback on their performance. The system is continually updated with new content and resources to keep pace with the evolving landscape of family medicine.

FMX is a valuable tool for physicians looking to enhance their clinical skills, stay informed about the latest research, and improve patient care. By utilizing FMX, physicians can access a wealth of resources and tools that support their professional growth and development.
Health Care Inequities (Learning Objectives 1,2)

- Rates of adverse reproductive health outcomes are higher among low-income and minority women.
- Unintended pregnancy rates are highest among those least able to afford contraception and have increased substantially over the past decade.
- The unintended pregnancy rate for poor women is more than 5x the rate for women in the highest income bracket.


Health Care Inequities

- Low-income minority women have higher rates of nonuse of contraceptives and are more likely to use less effective reversible methods such as condoms
- Additionally, low-income women face health system barriers to contraceptive access because they are more likely to be uninsured, a major risk factor for nonuse of prescription contraceptives


Future of Funding?

- Publicly funded programs that support family planning services, including Title X and Medicaid, are increasingly underfunded and cannot bridge the gap in access for vulnerable women

Hypertensive Disorders of Pregnancy 1,2,3,4

- Preeclampsia-eclampsia
- Chronic hypertension
- Chronic hypertension with superimposed preeclampsia
- Gestational hypertension

Classification

- Gestational Elevated BP
  - \( \geq 140 \text{ mm Hg systolic or } \geq 90 \text{ mm Hg diastolic on two occasions at least 4 hours apart} \)
  - \( \geq 160 \text{ mm Hg systolic or } \geq 110 \text{ mm Hg diastolic} \)
  - Hypertension can be confirmed within minutes to facilitate timely antihypertensive therapy
**Epidemiology**

- Hypertension in pregnancy is the most common medical complication of pregnancy occurring in 5-10% of all cases
- 6th leading cause of maternal mortality
- US 2006-2009, 9.9% of maternal death (CDC)

<table>
<thead>
<tr>
<th>Condition</th>
<th>By the numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Hypertension</td>
<td>1-5% of pregnancies</td>
</tr>
<tr>
<td>Superimposed Preeclampsia on Chronic Hypertension</td>
<td>25% of chronic HTN</td>
</tr>
<tr>
<td>Gestational Hypertension</td>
<td>3-6% of all pregnancies</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>3-5% of all pregnancies</td>
</tr>
<tr>
<td>Severe Preeclampsia</td>
<td>0.05%-0.2% of all pregnancies</td>
</tr>
<tr>
<td>Eclampsia</td>
<td></td>
</tr>
</tbody>
</table>

**Preeclampsia**

- **Diagnostic Criteria for Preeclampsia**
  - Blood Pressure: Systolic Blood Pressure elevation after 20 weeks of gestation in a woman with previously normal BP
  - Proteinuria: 0.3 g protein in a 24-hour urine specimen
  - When proteinuria is used among other diagnostic criteria for preeclampsia, a protein:creatinine ratio of at least 0.3 is sufficient
  - In the absence of proteinuria, one must hypertension with the rise of any of the following severe features:
    - Blood pressure: Systolic BP > 160 mm Hg; Diastolic BP > 110 mm Hg on two occasions at least 4 hours apart while the patient is on bed rest (unless antihypertensive therapy is initiated before this time)
    - Thrombocytopenia: Platelet count < 100,000/microliter
    - Progressive renal insufficiency: Serum Cr > 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease
    - Impaired liver function: Abnormally elevated transaminases (> twice normal)
    - Severe persistent RUQ pain or epigastric pain unresponsive to medication and not accounted for by alternative diagnosis, or both
    - Pulmonary edema
    - Cerebral or visual disturbance: New-onset cerebral or visual disturbances

**Prevention of Preeclampsia**

- **ACOG - 2013**
  - NOT recommended for primary prevention of preeclampsia
    - Bed rest/restriction of physical activity (not for treatment of POL either)
    - Vitamin C or E administration
    - Dietary salt restriction
  - Calcium may be useful to reduce the severity of preeclampsia in populations with low calcium intake; this finding is NOT relevant to a population with adequate calcium intake, e.g. United States

- **Prevention of Preeclampsia**
  - Everyone agrees on Aspirin
    - ACOG
    - USPSTF
    - AHA
  - Women with histories of preeclampsia that is recurrent or has previously developed prior to 34 weeks SHOULD be offered daily low-dose aspirin (60-80 mg) commencing at the end of the first trimester.
Summary of Recommendation and Evidence

Low-Dose Aspirin for Prevention of Preeclampsia – September 2014

USPSTF

• Recommends the use of low-dose aspirin (81 mg/d) as preventive medication after 12 weeks of gestation in women who are at high risk for preeclampsia. (Grade: B recommendation)

• Concludes with moderate certainty that there is a substantial net benefit of daily low-dose aspirin use to reduce the risk for preeclampsia, preterm birth, and IUGR in women at high risk for preeclampsia.

Clinical Risk Assessment for Preeclampsia - USPSTF

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Risk Factor(s)</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>History of preeclampsia, especially when accompanied by an adverse outcome, Multifetal gestation, Chronic hypertension, Type 1 or 2 diabetes, Renal disease, Autoimmune disease (e.g., systemic lupus erythematosus, the antiphospholipid syndrome)</td>
<td>Low-dose aspirin if the patient has &gt;1 of these risk factors</td>
</tr>
<tr>
<td>Moderate</td>
<td>Nulliparity, Glucose daily mean index (if diabetic), Blood pressure measurement (either as clinic or ambulatory), Anthropometric characteristics (African American race, low socioeconomic status), Age ≥ 35 y, Medical history factors (e.g., low birthweight or small for gestational age, previous adverse pregnancy outcome, ≥1 prior pregnancy interval)</td>
<td>Consider low-dose aspirin if the patient has several of these moderate-risk factors</td>
</tr>
<tr>
<td>Low</td>
<td>Previous uncomplicated term delivery, No low-dose aspirin</td>
<td></td>
</tr>
</tbody>
</table>

Prevention of Stroke

AHA/ACC

• Hypertensive disorders of pregnancy and other complications (preterm birth, SGA, first trimester bleeding) are associated with increased risk of stroke during pregnancy, immediately after delivery, and years after delivery.

• Insufficient evidence exists to inform any recommendation for screening, prevention, or treatment [of CVD] in women with a history of pregnancy complications or adverse pregnancy outcomes.

• What can we say...

Prevention of Stroke in Women With a History of Preeclampsia

AHA/ACC - 2014

• Prevention of Preeclampsia

• Treatment of Hypertension in Pregnancy and Postpartum

• Prevention of Stroke in Women With a History of Preeclampsia

Preeclampsia and Pregnancy Outcomes: Recommendations

AHA/ACC - 2014

• Prevention of Preeclampsia

• Treatment of Hypertension in Pregnancy and Postpartum

• Prevention of Stroke in Women With a History of Preeclampsia

Prevention of Preeclampsia

ACC/AHA

• Women with chronic primary or secondary hypertension or previous pregnancy-related hypertension should take low-dose aspirin from the 12th week of gestation until delivery (Level A)

• Calcium supplementation (of > 1g/d, orally) should be considered for women with low dietary intake of calcium (<600 mg/d) to prevent preeclampsia (Level A)

Prevention of Stroke in Women With a History of Preeclampsia

ACC/AHA

• Increased risk of future hypertension and stroke 1 to 30 years after delivery in women with a history of preeclampsia (Level B)

• Consider:
  – Evaluating all women starting 6 months to 1 year postpartum, as well as those who are past childbearing age, for a history of preeclampsia/eclampsia as a risk factor (Level C)
  – Evaluate and treat for CV risk factors including hypertension, obesity, smoking, and dyslipidemia (Level C)
### Preeclampsia Clinical Recommendation

- Low-dose aspirin (75-81 mg daily) has small to moderate benefits for prevention of preeclampsia (NNT=72), preterm delivery and fetal death in women at risk for developing preeclampsia (SOR B)
- For women at greater risk of developing preeclampsia, the NNT=19 (SOR B)

### Timing of Delivery

- Women with gestational hypertension or preeclampsia without severe features should have planned delivery at 37 weeks' gestational age. (SOR B)

### HYPITAT RCT

- Decision to bring about delivery by induction or cesarean section involves balancing prematurity-related risks with the risk of worsening preeclampsia.
- This trial looked at induction vs. expectant management.
- A secondary analysis showed greater benefit for labor induction on preventing high-risk maternal situations and reducing the cesarean delivery rate in women with an unfavorable cervical exam presumably because these women were more remote from spontaneous labor.

### Cost

- Economic analysis of HYPITAT demonstrated cost saving from labor induction as compared to expectant management

### Gestational Diabetes

- Condition is increasing as obesity and older age at pregnancy become more common.
- Increased risk:
  - Gestational hypertension
  - Preeclampsia
  - Cesarean delivery
  - 7-fold increased risk of developing diabetes later in life

### Why All the Fuss … Adverse Outcomes

#### Maternal
- Increased frequency
  - Maternal hypertensive disorders
  - Cesarean delivery
- Increased risk of intrauterine fetal death during last 4-8 weeks of gestation
  - Fasting hyperglycemia (> 105 mg/dL)

#### Fetal
- Excessive fetal growth (macrosomia)
  - Increased risk for operative delivery
  - Shoulder dystocia
  - Birth trauma
- Neonatal morbidity
  - Hypoglycemia
  - Hypocalcemia
  - Hyperbilirubinemia
  - Polycythemia

### Sources

- Maternal Fetal
  - Excessive fetal growth (macrosomia)
  - Increased risk for operative delivery
  - Shoulder dystocia
  - Birth trauma
- Neonatal morbidity
  - Hypoglycemia
  - Hypocalcemia
  - Hyperbilirubinemia
  - Polycythemia

The most common cause of neonatal death in children of mothers known to have DM before pregnancy is congenital anomalies.
Detection of GDM

<table>
<thead>
<tr>
<th>Organization</th>
<th>Recommendation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACOG (2013)</td>
<td>Use a 2-step method at 24-28 weeks (Level B). Screen for undiagnosed type 2 diabetes at first prenatal visit in those with risk factors.</td>
<td>Use a blood glucose level of either 135 or 140 mg/dL, with factors such as community prevalence rates of GD determining the cutoff.</td>
</tr>
<tr>
<td>USPSTF (2014)</td>
<td>Screen asymptomatic women after 24 weeks (Grade B). Current evidence is insufficient to assess the balance of benefits and harms of screening for GD in asymptomatic pregnant women before 24 weeks of gestation (Grade I).</td>
<td>Goal was not to look at the performance or whether one method was better than another for screening. Found treating can significantly reduce the risk of preeclampsia, macrosomia, shoulder dystocia. Goal was not to look at the performance or whether one method was better than another for screening. Found treating can significantly reduce the risk of preeclampsia, macrosomia, shoulder dystocia.</td>
</tr>
<tr>
<td>ADA (2014)</td>
<td>Screen for undiagnosed type 2 diabetes at the first prenatal visit in those with risk factors. Screen at 24-28 weeks if not previously known to have diabetes. Use either: 1. 1-step method (75-g, 2-hour OGTT; &gt;200 mg/dL) 2. 2-step method (50-g, 1-hour glucose challenge followed by fasting 100-g, 3-hour OGTT)</td>
<td>Use a blood glucose level of either 135 or 140 mg/dL, with factors such as community prevalence rates of GD determining the cutoff.</td>
</tr>
</tbody>
</table>

GD Treatment

ACOG 2017

- Initial management (Level A)
  - Nutritional counseling by registered dietician
  - Advice on moderate exercise program (if possible); minimum of 150 minutes per week
- No conclusive evidence for the threshold value at which clinicians should start pharmacologic therapy
- Pharmacologic treatment
  - Insulin is considered first-line treatment in pregnancy (Level A)
  - Glyburide treatment should NOT be recommended as a first-line pharmacologic treatment because, in most studies, it DOES NOT yield equivalent outcomes to insulin (Level B)
  - In women who decline insulin therapy or if unable to safely administer, metformin is a reasonable second-line choice (Level B)

Gestational Diabetes

Maternal Surveillance – Glucose Monitoring

- Optimal frequency in GD not established
  - Fasting whole blood glucose
    - < 95 mg/dL (< 105 plasma)
  - 2 hour postprandial BG < 120 mg/dL (1 hour < 140)
  - 1-2 times per week versus daily
- Human insulin therapy (if on more than 3 occasions)
  - > 95 mg/dL fasting whole blood glucose or
  - > 120 mg/dL 2 h postprandial
  - Daily glucose monitoring

Gestational DM

What happens after delivery?

- Timing of delivery in women with GD that is controlled with only diet and exercise (A1GDM) should NOT be before 39 weeks’ gestation, unless otherwise indicated. Expectant management up to 40 6/7 weeks of gestation in the setting of indicated antepartum testing is generally appropriate (Level C)
- GDM well controlled by medications (A2GDM), delivery is recommended at 39 0/7 to 39 6/7 weeks of gestation (Level C)
- Counsel regarding option of scheduled cesarean delivery when EFW > 4500 g (Level B)

Long-Term Considerations

- Increased risk for recurrence of GD
  - 33%-50% likelihood
- Increased risk for development of diabetes after pregnancy
  - Up to 1/3 will have diabetes or impaired glucose metabolism at postpartum screening
  - 35% of women 5-10 years after parturition
  - Usually type 2
- Offspring – increased risk
  - Obesity
  - Glucose intolerance
  - Diabetes in late adolescence and young adulthood

Postpartum

- Reclassification of maternal glycemic status at least 4 weeks after delivery (4-12 weeks, ACOG) [Level C]
  - FPG or 2-hr OGTT
- Reassessment of glycemia every one (USPSTF) to three years (ADA) [SOR:C], if above normal; yearly assessment (ADA) if impaired fasting glucose or impaired glucose tolerance at 4-12 weeks
Management of Postpartum Screening Results

- **Gestational diabetes**
  - FPG or 75 g, 2 hr OGTT at 4-12 weeks postpartum
  - FPG > 125 mg/dL or 2-hr glucose > 199 mg/dL

- **Diabetes mellitus**
  - FPG 100-125 mg/dL or 2-hr glucose 140-199 mg/dL
  - FPG < 100 mg/dL or 2-hr glucose <140 mg/dL

- **Impaired fasting glucose or IGT or both**
- **Normal**

- Refer for diabetes management
- Consider referral for management: Weight loss and physical activity counseling as needed.
- Consider metformin if combined impaired fasting glucose and IGT.
- Medical nutrition therapy.
- Yearly assessment of glycemic status.

Preterm Birth

- Preterm birth is the leading cause of neonatal mortality in the US
- Preterm labor precedes approximately 50% of preterm births

Preterm Birth

**MMWR 2016**

- Rates of births to teens and preterm births declined in the US from 2007-2014.
  - Preterm births are more common among the youngest and oldest mothers.
- Overall decline 10.41% to 9.54% of live births.
  - The contribution of fewer births to teens and to women aged 20-24 years to the overall decline was offset by increases in births to older mothers.


Prevention of Preterm Delivery

Risk Factors for Preterm Labor

- Prior preterm birth
  - Recurrence risk of 17%-37%
- Multiple gestation
- Short cervical length on endovaginal US
  - < 25 mm at 18-25 weeks
- Non-hispanic black race
- Interpregnancy interval < 6 months
- Tobacco use
- Infection
  - Bacterial vaginosis
  - Bacteriuria
  - Urinary tract infection
Preterm Labor
Symptomatic Management

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed rest</td>
<td>Not effective for the prevention of preterm birth and should NOT be routinely recommended (Level B)</td>
</tr>
<tr>
<td>Hydration</td>
<td>Not effective for the prevention of preterm birth and should NOT be routinely recommended (Level B)</td>
</tr>
<tr>
<td>Tocolytic agents</td>
<td>First line: Beta-adrenergic agonist, calcium channel blockers, NSAID for short-term prolongation of pregnancy; maintenance therapy is INEFFECTIVE for preventing preterm birth and improving neonatal outcomes (Level A)</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>Single course between 24 and 34 weeks who are at risk of preterm delivery within 7 days (Level A) (Betamethasone 12 mg q 24hX2 OR Dexamethasone 6 mg q 12hX4)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Should NOT be used to prolong gestation or improve neonatal outcomes in women with POL and INTACT membranes (Level A)</td>
</tr>
<tr>
<td>Magnesium sulfate</td>
<td>Reduces the severity and risk of CP in surviving infants if administered when birth is anticipated before 32 weeks of gestation (Level A)</td>
</tr>
</tbody>
</table>

Prevention of Preterm Labor

**• 17-hydroxyprogesterone caproate (IM)**
- Trade name: Makena
- 250mg IM weekly from 16-20 weeks through 36 weeks

**• Only one indication**
- Pregnant women with a history of at least one spontaneous preterm birth

**Indication**

- IM 17P is proven and medically necessary for prevention of spontaneous preterm birth when all of the following criteria are met: (Level A)
  - Current singleton pregnancy; and
  - History of prior spontaneous preterm birth of a singleton pregnancy; and
  - Treatment is initiated between 16 weeks, 0 days of gestation and 20 weeks, 6 days of gestation; and
  - Administration is to continue weekly until week 37 (through 36 weeks, 6 days) of gestation or delivery, whichever occurs first.

**Prevention of Preterm Delivery**

- In addition to 17P
  - Check cervical length via U/S every 2 weeks from 16-22 weeks
  - Consider cerclage for cervical length < 25 mm
- Benefit of 17P for women with history of preterm delivery
  - 0.31 RR of birth < 34 weeks [CI=0.14-0.69]
  - 0.50 RR of neonatal mortality [CI=0.33-0.75]

Vaginal Progesterone

**Short cervix but without history of preterm birth**

- Recommended as a management option to reduce the risk of preterm birth in asymptomatic women with a singleton gestation without a prior preterm birth, but with an incidentally identified very short cervical length less than or equal to 20 mm BEFORE or at 24 weeks of gestation (Level A)
  - 44% decrease in spontaneous preterm birth at less than 34 weeks

**Short Cervix Identified With Transvaginal Ultrasonography (< 25 mm)**

- Singleton gestation
- Multiple gestation

- No prior spontaneous preterm birth
- Vaginal progesterone supplementation should be offered if cervical length is 20 mm or less before or at 24 weeks of gestation (Level A)
- Prior spontaneous preterm birth and receiving progesterone supplementation since 16 weeks of gestation
- Cerclage should be considered if cervical length < 25 mm before 24 weeks EGA and prior preterm birth occurred at < 34 weeks EGA
- No intervention has been shown to improve outcomes
- 30% reduction in risk of preterm birth at < 35 weeks and 36% reduction in composite perinatal M&M
Screening Strategies?  
*Just say NO!*

- **Fetal fibronectin**  
  - Can be used to risk-stratify patients with threatened preterm labor
- **Bacterial vaginosis testing**
- **Home uterine activity monitoring**

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**Barriers**

- **Recognize woman is eligible**  
  - As straightforward as this may seem, it can be difficult if her medical records are not available from her previous delivery or deliveries
- **Providers unsure of eligibility requirements or unconvinced of its efficacy**
- **Considerable variation among insurance companies around requirements for prescribing**  
  - Formulation (proprietary or compounded)
  - Who can write the prescription
  - Gestational age it can be started
  - Medical benefit or pharmacy benefit?
  - Must require preauthorization
- **Once prescribed, a woman must accept the intervention and adhere to its weekly injection**

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**Postpartum Hemorrhage 1,2**

**Definition**

- Traditionally defined as the loss of >500 mL of blood following vaginal delivery or >1000 mL following a cesarean delivery*  
  - Severe: > 1000 mL after vaginal delivery or symptoms of hemodynamic instability
- **Early (or primary): First 24 hours after delivery**
- **Late (or secondary): After 24 hours but before 6 weeks after delivery**

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**Medications for Prevention of PPH**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Contraindications/ Cautions</th>
<th>Mechanism of Action</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Line Agent</strong></td>
<td></td>
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</tr>
</tbody>
</table>
| Oxytocin          | 10 IU IM or 5-10 IU IV bolus | Overdose or prolonged use can cause water intoxication  
Possible hypotension with IV use following cesarean section | Stimulates the upper segment of the myometrium to contract rhythmically, constricting spiral arteries, decreasing blood flow through the uterus | Rare                                             |
| **Second Line Agent** |                 |                                                                                          |                                      |                                                  |
| Misoprostol*      | 600 mcg oral; use ONLY when oxytocin is NOT available | Caution in patients with CV disease | Generalized smooth muscle contraction | Nausea, vomiting, diarrhea, pyrexia               |
| Prostaglandin E1 analog |             |                                                                                          |                                      |                                                  |

*Misoprostol is NOT approved by the U.S. FDA for use in prevention or treatment of PPH.

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**Postpartum Hemorrhage**

**Prevention**

- Correct anemia
- Avoid routine episiotomy
- Infant to breast
- Routine use of medications after delivery of the placenta

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Third Stage of Labor Management

**Expectant**
- Await separation
- Leave cord uncut
- Spontaneous placental delivery
- Oxytocin/breast after placental separation

**Active**
- Oxytocin with shoulder delivery
- Cord clamped and cut early (2-3 minutes)
- Controlled cord traction

Recommendations (SOR A)
- Active management of the third stage of labor should be utilized to decrease the risk of PPH, postpartum maternal hgb < 9 mg/dL, and the need for manual removal of the placenta.
- Delayed cord clamping (one to three minutes) decreases neonatal risk of anemia and does not increase risk of PPH.
- Oxytocin remains first choice for prevention of PPH because it is as, or more, effective than ergot alkaloids or prostaglandins and has fewer side effects.
- Misoprostol is less effective for prevention of postpartum hemorrhage than oxytocin and has more side effects.

Where are we?
- Rate of labor induction in the US more than doubled between 1990 and 2012 – rising from 9.5 to 23.3%, respectively, (roughly 1 out of every 5) of all pregnant women had their labor induced.

Indications for Induction of Labor
- Not absolute
- Take into account
  - Maternal and fetal conditions
  - Gestational age
  - Cervical status
  - Other factors…

Confirmation of Term Gestation
- Ultrasound measurement at less than 20 weeks of gestation supports gestational age of 39 weeks or greater.
- Fetal heart tones have been documented as present for 30 weeks by Doppler ultrasonography.
- It has been 36 weeks since a positive serum or urine human chorionic gonadotropin pregnancy test result.
Appropriate evaluation and counseling

- **Indications for induction**
  - Inductions should only be used for true medical indications; suspected “big baby” is NOT a valid medical indication
- **Agents and methods of labor stimulation**
- **Possible need for repeat induction or cesarean delivery**
- **Prospective studies are limited in evaluating benefits of elective induction**
  - Nulliparous women undergoing induction with unfavorable cervixes should be counselled about a two-fold increased risk of cesarean delivery
- **Labor progression differs**
  - Allowing at least 12-18 hours of latent labor before diagnosing a failed induction may reduce the risk of cesarean delivery


Keep in mind…

- Before 28 weeks EGA, vaginal misoprostol appears to be the most efficient method of labor induction regardless of Bishop score.
- Approximately 25 mcg of misoprostol should be considered as the initial dose for cervical ripening and labor induction. Frequency of administration should not be more than every 3-6 hours.

Who is involved?

- **Choosing Wisely** is an initiative of the ABIM Foundation in partnership with Consumer Reports that seeks to advance a national dialogue on avoiding wasteful or unnecessary medical tests, treatments and procedures.

- **Who is involved?**
  - AAFP and more than 70 societies comprising over one million clinicians are now partners of the Choosing Wisely campaign
  - Specific, evidence-based recommendations clinicians and patients should discuss

Choosing Wisely® is an initiative of the ABIM Foundation. http://www.choosingwisely.org

Who is involved?

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Fetal Aneuploidy

• Aneuploidy is the inheritance of one or more extra chromosomes, typically resulting in trisomy or loss of a chromosome, monosomy. Prenatal screening for fetal aneuploidy has been available clinically for nearly 30 years.

• Chromosomal abnormalities affect approximately 0.4% of births (1/250) according to population-based registries that include live births, fetal deaths, and pregnancy terminations.

• Trisomy 21 accounts for more than 50% of cases, trisomy 18 for 15%, and trisomy 13 for 5%.

• Approximately 12% are sex chromosome abnormalities such as 45, X, and 47, XXX, XXY, and XYY.

• Remainder, roughly 18% of chromosomal abnormalities, are either not aneuploidy per se—polyploidy, mosaicism, and structural rearrangements—or are not currently identified through maternal serum screening.

Earlier Diagnosis of Aneuploidy

• First trimester
• Triple screen
• Quad screen
• Integrated
• Sequential stepwise
• Contingent
• Serum integrated
• Cell-free DNA
• Nuchal translucency

Prevalence of trisomies 21, 18, and 13 per 10,000 live births according to maternal age at delivery

![Graph showing prevalence of trisomies 21, 18, and 13 per 10,000 live births according to maternal age at delivery.]

Screening Test Approximate Gestational Age Range (Weeks) Detection Rate for Down Syndrome (%) Screen (+) Rate (%)*

First Trimester 10-13 6/7 82-87 5
Triple Screen 15-22 69 5
Quad Screen 15-22 81 5
Integrated 15-13 6/7, then 15-22 96 5
Sequenat Stepmwise 10-13 6/7, then 15-22 95 5
Contingent Screening 38-94 5
Serum Integrated 15-13 6/7, then 15-22 88 5
Cell-free DNA 10 to term 99 (in patients who receive a result) 0.5
Nuchal Translucency 10-13 6/7 84-70 5

* A screen positive test result includes all positive test results: the true positives and false positives

First Trimester Screening for Fetal Aneuploidy

• Association between chromosomal abnormalities and US finding of increased nuchal translucency (NT) between 10 and 13 6/7 weeks
  - An echo-free area at the back of the fetal neck
• First trimester screening protocol
  - Maternal age
  - 2 biochemical markers (free B-hCG, and pregnancy-associated plasma protein-A [PAPP-A])
  - Ultrasound measurement of fetal nuchal translucency is at least as accurate as standard second trimester screening. (LOE = 1b)

First Trimester Screening for Fetal Aneuploidy (cont.)

• Conclusions
  - Sufficient evidence to support first-trimester Down syndrome risk assessment in obstetric practice in the US
  - Requirements
    • Training and quality control standards for first-trimester nuchal translucency and laboratory assays (PAPP-A, hCG)
    • Access to chorionic villus sampling
    • Appropriate counseling regarding options

Screening for Chromosomal Abnormalities

- First-trimester screening using both nuchal translucency measurement and biochemical markers is an effective screening test for Down syndrome.
- Women found to have an increased risk of aneuploidy with first-trimester screening should be offered genetic counseling and the option of CVS or second-trimester amniocentesis.
- Integrated first- and second-trimester screening is more sensitive with lower false(+) rates than first-trimester screening alone. (SOR: B)

First Plus Second Trimester Screening

- **Integrated**
  - First Trimester (11-14 w)
    - Ultrasound
    - Nuchal Translucency
    - Biochemical – Maternal Serum Analytes
      - PAPP-A
      - free ß-hCG
    - Second Trimester
      - Quad Screen
  - Results reported only after both first and second trimester screening tests completed

- **Sequential**
  - Stepwise
  - Contingent

Note: After first-trimester screening, subsequent second trimester screening for Trisomy 21 is NOT indicated unless it is being performed as a component of the integrated test, stepwise sequential, or contingent sequential test.

First Plus Second Trimester Sequential

- **Stepwise**
  - First-trimester test result:
    - Positive: diagnostic test offered
    - Negative: second trimester test offered
    - Final: risk assessment incorporates first and second results

- **Contingent**
  - First-trimester test result:
    - Positive: diagnostic test offered
    - Negative: no further testing
    - Intermediate*: second trimester test offered
    - Final: risk assessment incorporates first and second results

  * The contingent model classifies pregnancy risk as high, intermediate, or low on the basis of the first-trimester screen results.

Cell-Free DNA

- Evaluates short segments of DNA in maternal blood
  - Can be used to screen for a variety of fetal conditions
    - Aneuploidy
    - Rh status
    - Fetal sex
    - Some paternally derived autosomal dominant genetic abnormalities
  - Fetal component of cell-free DNA is released into the maternal circulation primarily from placental cells undergoing apoptosis
  - Comprises approximately 3-13% of the total cell-free DNA in maternal blood

Significance

- Several molecular methods have been developed to analyze cell-free DNA for the purpose of aneuploidy screening
  - All have similar detection and false-positive rates
  - Screening as early as 10 weeks of gestation until term

Since it can be done “until term…”

- Some women who receive a positive test result from traditional screening may prefer to have cell-free DNA screening rather than undergo definitive testing
- This approach may delay definitive diagnosis and management and may fail to identify some fetuses with aneuploidy
Cell-Free DNA

- **Advantages**
  - Highest detection rate for Trisomy 21
  - More than 98% detection with positive screening rates of less than 0.5% among women with a reportable result
  - Detection rate lower for Trisomy 13 and 18

Note:

- Published studies have excluded those who have no reportable result, and these women are at increased risk of fetal aneuploidy.
- Inclusion of these women in the calculations would yield lower sensitivity for fetal aneuploidy.
- In addition, managing women with no reportable result as screen positive will decrease the specificity and increase the positive screening rate for this testing.

Limitations

- **Positive Predictive Value**
  - Trisomy 21 93%
  - Trisomy 18 64%
  - Trisomy 13 44%

- In some laboratories, cell-free DNA fractions less than 4% are considered too low to report a result, often referred to as a “no call” result. Recent studies have demonstrated that low fetal fractions indicate a high risk of aneuploidy.

Because the test usually cannot distinguish fetal DNA from maternal DNA, a positive screening test result could represent confined placental mosaicism, a resorbing twin, or, in rare instances, a maternal malignancy or maternal aneuploidy.

Comparison of Traditional and Cell-Free Screening Tests

<table>
<thead>
<tr>
<th>Traditional Aneuploidy Screening</th>
<th>Cell-Free DNA Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended for primary screening</strong></td>
<td>Primary or secondary screening modality</td>
</tr>
<tr>
<td>• ACOG and SMFM recommend as first-time screening for low-risk pregnancies</td>
<td>• As primary screening, may be more appropriate for high-risk pregnancies</td>
</tr>
<tr>
<td>• Should not be performed concurrently with, or after, cell-free DNA screening</td>
<td>• May be offered as a secondary screening test if traditional screening is abnormal</td>
</tr>
<tr>
<td>Detection rate 80% for trisomy 21 and trisomy 18 with EITHER first- or second-trimester screening</td>
<td>Detection rate 99% for trisomy 21, 96% for trisomy 18, and approximately 90% for trisomy 13 and monosomy X.</td>
</tr>
<tr>
<td>Detection rate about 94% for trisomy 21 and 93% for trisomy 18 with integrated screening.</td>
<td>Gestational age is not used to calculate results. Screening may be performed at any point beyond 9–10 wk of gestation.</td>
</tr>
<tr>
<td>Accurate GA assessment is essential for calculating the screening result, and screening must be performed within specific GA.</td>
<td>Ultrasound minor markers (soft signs) are often used to modify the aneuploidy risk.</td>
</tr>
</tbody>
</table>

No call test...

- Women whose cell-free DNA screening test results are not reported, are indeterminate, or are uninterpretable (a no call test result) should receive further genetic counseling and be offered comprehensive ultrasound evaluation and diagnostic testing because of an increased risk of aneuploidy.
Intimate Partner Violence

- Nearly 31% of women experience some form of IPV in their lifetime (probably underreported).
- IPV is associated with unintended pregnancy, preterm birth, low birth weight, and decreased gestational age.


Some of the Presentations of an Abused Pregnant Woman:

- Any injury
- Unwanted pregnancy
- Late entry into prenatal care, missed appointments
- Substance abuse/use
- Poor weight gain and nutrition
- Multiple, repeated somatic complaints without diagnosis
- Angry, controlling, coercive partner/companion

Intimate Partner Violence in Pregnancy

- None of the above situations is a definitive indicator of domestic violence, but the presence of one or more should raise the clinician's suspicions in this regard. (Level II evidence)
- Some suggest that pregnancy is a risk factor itself regardless of ethnicity, education, or socioeconomic level.
- It is recommended that screening should be incorporated into preconceptional and prenatal care. (SOR B)

Intimate Partner Violence

- Risk assessment during pregnancy should universally include identification of women who are victims of domestic violence
- May involve threatened or actual
  - Physical
  - Sexual
  - Verbal
  - Psychologic

Screening Questions

- Within the last year, have you been hit, slapped, kicked, or otherwise physically hurt by someone?
- Since you have been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by someone?
- Within the last year, has anyone forced you to have sexual activities?

If the screen is (+), follow appropriate medical/legal mandates for reporting requirements for state/branch of service.
Intimate Partner Violence

USPSTF - January 2013

• Screen all women of childbearing age for intimate partner violence regardless of whether symptoms are present. Grade: B recommendation
  – For women who screen positive, physicians should provide or refer them to intervention services.
  – Note: Men and women with a h/o IPV are at risk for depression. (SOR B)

Recommended Practice Changes

• The USPSTF, ACOG, and AHA recommend the use of low-dose aspirin (81 mg/d) as preventive medication after 12 weeks of gestation in women who are at high risk for preeclampsia.
• In a pregnant woman with gestational diabetes, maternal glycermic status should be evaluated at least 6 weeks postpartum. If assessment is normal, reassessment of glycermic every one (USPSTF) to three years (ADA) [SOR C]; yearly assessment (ADA) if impaired fasting glucose or impaired glucose tolerance at 6-12 weeks.
• In pregnant women with a history of at least one spontaneous preterm birth, a weekly injection of 17-hydroxyprogesterone caproate should be used beginning at 16 weeks EGA to prevent preterm labor.
• Active Management of the third stage of labor prevents postpartum hemorrhage.
• Inductions should only be used for true medical indications; suspected “big baby” is NOT a valid medical indication.

Questions

THANK YOU!