Day 2 - Thursday, August 27	
6:55-7:55 am	Breakfast Provided
7:55-8:00 am	Overview/Announcements – *Lee T. Dresang, MD*
8:00-8:45 am	Thyroid Disease in Pregnancy – *Jeffrey D. Quinlan, MD, FAAFP*
8:45-9:30 am	Advanced Fetal Monitoring – *Susanna R. Magee, MD, MPH, FAAFP*
9:30-9:45 am	Q&A 5
9:45-10:00 am	Break
10:00-10:45 am	Lead Screening: Protecting Maternal and Fetal Health – *Allegra M. Ponshock, MD, FAAFP*
10:45-11:30 am	Vaccinations in Pregnancy: It's Worth a Shot! – *Sarah M. Tiggelaar, MD, CLC, FAAFP*
11:30-11:45 am	Q&A 6
11:45 am	Recess
11:45 am-1:00 pm	Lunch on Your Own

Day 2 –Thursday, August 27 – Clinical Procedure Workshop *(separate registration and fee required)*	
1:30 -3:30 pm	**Cesarean Delivery –** *Rebecca L. Benko, MD, FAAFP* (Lead), Assisting: *Cornelius, Magee, Ponshock, Quinlan*
1:30-3:30 pm	**Ultrasound Biometry –** *Lee T. Dresang, MD* (Lead), Assisting: *Cullen, Hemba, B. Huntley, E. Huntley, Keegan-Garrett* *(This CME activity is supported in the form of durable equipment to the AAFP from Clarius Mobile Health GE Healthcare and FUJIFILM Sonosite)*
1:30-3:30 pm	**Management of Breech Presentation –** *Lawrence M. Leeman, MD, MPH* (Lead), Assisting; *Farahi, Guthrie, Iglesias, Tiggelaar*

Day 2 –Thursday, August 27 – Clinical Procedure Workshop *(separate registration and fee required)*	
4:00-6:00 pm	**Cesarean Delivery –** *Rebecca L. Benko, MD, FAAFP* (Lead), Assisting: *Cullen, B. Huntley, E. Huntley, Iglesias, Ponshock*
4:00-6:00 pm	**Prenatal Ultrasound (BPP, Deepest Vertical Pocket, First Trimester Dating) –** *Lee T. Dresang, MD* (Lead), Assisting: *Farahi, Keegan-Garrett, Leeman, Magee, Quinlan, Tiggelaar* *(This CME activity is supported in the form of durable equipment to the AAFP from Clarius Mobile Health, GE Healthcare and FUJIFILM*
4:00-6:00 pm	**Osteopathy in Pregnancy –** *Sarah J. James, DO* (Lead), Assisting: *Cornelius, Guthrie, Hemba*

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Thyroid Disease in Pregnancy

Jeffrey D. Quinlan, MD, FAAFP

Disclosure Statement

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Learning Objectives

1. Identify women at high risk for thyroid disorders and screen them for disease.
2. Appropriately treat and monitor patients in whom thyroid disorders have been identified.
3. Identify and treat women with postpartum thyroiditis.

Background – Thyroid Disease

- Second most common endocrinopathy that occurs to women during their reproductive years (Diabetes is #1!)
- Symptoms may mimic early pregnancy symptoms
- Adverse pregnancy outcomes occur with poor control
- Maternal and fetal wellbeing relies on appropriate treatment

Preconception Counseling - Hypothyroidism

- Hypothyroidism results in:
  - Decreased fertility (Abalovich, 2002)
  - Increased risk of miscarriage (Abalovich, 2002)
- Immediate monitoring is essential when pregnancy is identified
  - Many have an elevated TSH at presentation (Alexander, 2005)
- If euthyroid and on a stable dose of levothyroxine:
  - Increase medication by 2 additional doses per week after missed period or positive pregnancy test (Yassa, 2010)
  - Notify physician

Preconception Counseling - Hyperthyroidism

- Uncontrolled hyperthyroidism in the 1st trimester is associated with congenital malformations (Anderson, 2014)
- Thyrotropin receptor antibodies can cross the placenta and stimulate the fetal thyroid (Zakarija, 1983)
- Adverse fetal effects can occur with antithyroid medication use
  - Congenital abnormalities (Yoshihara, 2012)
  - Neonatal hypothyroidism (Yoshihara, 2012)
- If considering radioactive iodine ablation, recommendation is to wait six months before conception (Alexander, 2017)
- Radioactive ablation and surgery may increase the risk of neonatal goiter and/or hyperthyroidism (Diana, 2019)

ARS Question

Question 1

During pregnancy there is a(n):

A. Decrease in the volume of distribution for thyroid hormone
B. Increase in thyroid hormone requirement
C. Decrease in thyroid binding globulin
D. All of the Above

Physiologic Changes During Pregnancy

- Increased estrogen → increased thyroid binding globulin
  - Up to 150% by the third trimester
- Thyroid hormone volume of distribution increases over 40%
- Thyroid stimulating hormone (TSH) decreases during the first half of pregnancy
  - negative feedback from peripheral T3 and T4
  - hCG stimulation of the thyroid gland
- Placenta metabolizes thyroid hormone
- RESULT: 20-40% increase in thyroid hormone requirement

Thyroid Function Tests in Pregnancy

Maternal Condition	TSH	Free Thyroxine	Free Thyroxine Index	Total Thyroxine	Triiodo-thyroxine	Resin T3 Uptake
Normal Pregnancy	Decrease	No change	No change	Increase	Increase	Decrease
Hypo-thyroidism	Increase	Decrease	Decrease	Decrease	No change or decrease	Decrease
Hyper-thyroidism	Decrease	Increase	Increase	Increase	No change or increase	Increase

Adapted from ACOG Practice Bulletin #223 (June 2020)

Fetal Thyroid Function

- Fetal thyroid functions by 12 weeks gestation (Shepard, 1967)
- Maternal T4 is transferred across placenta throughout pregnancy
  - 30% of T4 in umbilical cord at birth is maternal (Vulsma, 1989)
- Maternal antibodies cross the placenta (Zakarija, 1983)
- Antithyroid medications cross the placenta (Marchant, 1977)

Who Not to Screen?

- All patients (universal screening)
  - RCT failed to show reduction in adverse outcomes (Casey, 2017)
- Asymptomatic patients with thyroid enlargement
  - Thyroid may increase up to 30% in size during pregnancy (Rasmussen, 1989)

Who to Screen?

- Currently treated with thyroid therapy (hypo or hyperthyroidism) (Alexander, 2004)
- Family history of autoimmune thyroid disease (Strieder, 2003)
- Significant goiter (Rasmussen, 1989)
- Personal history of: (Korevaar, 2026)
  - Autoimmune disorder
  - Postpartum thyroid dysfunction
  - Therapy for hyperthyroidism
  - High-dose neck radiation
  - infant with thyroid disease
  - Type 1 diabetes mellitus

ARS Question

Question 2

Which of the following is the most reliable test for following thyroid disease in pregnancy:

A. Free T3
B. Free T4
C. TSH
D. All of the Above

How to Diagnose Thyroid Disease in Pregnancy

- TSH is the most reliable test during pregnancy (Alexander, 2017)
  - Release based on pituitary gland's assessment of thyroid hormone
- If TSH is elevated, assess: (ACOG, 2020)
  - Free T4
  - Total T3 (better test than free T3)
- If TSH is decreased, assess:
  - Free T4 (Casey, 2017)
- If treatment is required free T4 should be monitored (Korevaar, 2026)

Trimester Specific Ranges of Thyroid Tests

Test	Non-pregnant	1st Trimester	2nd Trimester	3rd Trimester
TSH (mIU/L)	0.3 – 4.3	0.1 – 2.5	0.2 – 3.0	0.3 – 3.0
Thyroxine Binding Globulin (mg/dL)	1.3 – 3.0	1.8 – 3.2	2.8 – 4.0	2.6 – 4.2
Free T4 (ng/dL)	0.8 – 1.7	0.8 – 1.2	0.6 – 1.0	0.5 – 0.8
Total T4 (ng/dL)	5.4 – 11.7	6.5 – 10.1	7.5 – 10.3	6.3 – 9.7
Free T3 (pg/mL)	2.4 – 4.2	4.1 – 4.4	4.0 – 4.2	
Total T3 (ng/dL)	77 – 135	97 – 149	117 – 169	123 - 162

Adapted from ACOG Practice Bulletin #223 (June 2020)

Hypothyroidism

- Overt – low free T4 and elevated TSH
- Subclinical – normal free T4 and elevated TSH
- Incidence:
  - Overt hypothyroidism occurs in 0.3 – 0.5% of pregnancies (Klein, 1991)
  - Subclinical hypothyroidism occurs in 2 – 3% of pregnancies (Casey, 2005)
- Causes:
  - Iodine deficiency (most common globally)
  - Autoimmune thyroiditis
  - Iatrogenic hypothyroidism

Hypothyroidism - Symptoms

- Confused with pregnancy symptoms
  - Fatigue
  - Weight gain
  - Decreased exercise capacity
  - Constipation
- Seen in more severe disease
  - Hair loss
  - Dry skin
  - bradycardia

ARS Question

Question 3

Which of the following are fetal or neonatal impacts of prenatal hypothyroidism:

A. Low birth weight
B. Perinatal morbidity and mortality
C. Impaired neuropsychologic development
D. All of the Above

Hypothyroidism - Impact

Maternal

- Anemia
- Gestational Hypertension
- Miscarriage
- Placental abruption
- Preeclampsia
- Preterm birth

Fetal/Neonatal

- Low birth weight
- Perinatal morbidity and mortality
- Impaired neuropsychologic development

Hypothyroidism - Treatment

- Levothyroxine is the primary treatment in the US
  - Typical dose 100 – 150 mcg daily (ACOG, 2020)
- Dose adjustment is based on TSH elevation (Alexander, 2024)
- TSH should be measured: (Alexander, 2024)
  - (+) hCG to 20 weeks - every 4-6 weeks
  - 24-28 weeks
  - 32-34 weeks
- TSH goal = < 2.5 mIU/L (Korevaar, 2026)

Hypothyroidism - Treatment

- Patient initiated increase in levothyroxine is appropriate
- If euthyroid and on a stable dose of levothyroxine:
  - Increase medication by 2 additional doses per week after missed period or positive pregnancy test
  - Notify physician

Yassa, 2010

Hypothyroidism – Levothyroxine Adjustments

TSH (mIU/L)	Levothyroxine Increase (mcg per day)
5 to < 10	25 – 50
10 to 20	50 – 75
>20	75 - 100

Hypothyroidism – Additional Considerations

- Antenatal testing is not indicated if well controlled (ACOG, 2020)
- After delivery: (Korevaar, 2026)
  - Decrease levothyroxine to pre-pregnancy dose over 4 weeks TSH should be checked between 4 and 6 weeks postpartum
- Treatment decreases risks of: (Negro, 2006)
  - Miscarriage
  - Preterm delivery
  - Impaired neuropsychologic development
- Treatment does not appear to impact hypertensive disorders or abruption risk (Casey, 2017)

Hypothyroidism – Additional Considerations

- Controlled Antenatal Thyroid Screening trial demonstrated:
  - No impact of subclinical hypothyroidism on neurocognitive development
- Mixed results about risk for preterm birth, placental abruption, preeclampsia and gestational diabetes
- No evidence that treating subclinical hypothyroidism improves outcomes

Lazarus, 2012; Hales, 2018; Hales, 2020

Hyperthyroidism

- Overt – low TSH and elevated free T4
- Subclinical – low TSH and normal free T4
- Incidence:
  - Overt hyperthyroidism occurs in 0.2% of pregnancies (ACOG, 2020)
  - Subclinical hyperthyroidism occurs in 0.8 – 1.7% of pregnancies (Casey, 2006)
- Causes:
  - Graves disease (95%) – stimulatory antibodies at the TSH receptor
  - Gestational trophoblastic disease
  - Nodular goiter or toxic adenoma
  - Viral thyroiditis
  - Pituitary or ovarian tumors

Hyperthyroidism - Symptoms

- Tachycardia
- Nervousness
- Tremor
- Sweating
- Heat intolerance
- Proximal muscle weakness
- Frequent bowel movements/diarrhea
- Decreased exercise tolerance
- Hypertension

ARS Question

Question 4

Which of the following are maternal impacts of prenatal hyperthyroidism:

A. Heart failure
B. Placental abruption
C. Preeclampsia
D. All of the Above

Hyperthyroidism - Impact

Maternal

- Heart failure
- Placental abruption
- Preeclampsia
- Preterm delivery

Fetal/Neonatal

- Goiter
- Intrauterine growth restriction
- Small for gestational age
- Stillbirth
- Thyroid disfunction

Hyperthyroidism - Treatment

- Propylthiouracil is the preferred agent in the 1st trimester
  - Typical dose 100 - 600 mg divided twice or three times daily (Anderson, 2016)
- Methimazole is the preferred agent after 1st trimester
  - Typical dose 5 – 20 mg twice daily (Bahn, 2011)
- Dose adjustment is based on free T4 level (Mandel, 1993)
- TSH and free T4 should be measured every two weeks until stable (Mandel, 1993)
- Free T4 in upper 1/3 of normal range for trimester (Momotani, 1997)

Hyperthyroidism - Treatment

- Betablockers can be used for symptomatic treatment (palpitations)
- Propranolol is the medication of choice
- Dosing = 10-40 mg three to four times daily
- Once stable can transition to ER dosing

Hyperthyroidism – Antepartum Testing

- Recommended for women with:
  - Antithyroid medication use
  - Poorly controlled hyperthyroidism
  - Elevated thyrotoxin antibodies
- Fetal ultrasonography recommended at 20 weeks to detect:
  - Growth restriction
  - Hydrops
  - Goiter
  - Heart failure
- Antepartum testing at least weekly beginning at 32 weeks

Hyperthyroidism – Additional Considerations

- Subclinical hyperthyroidism does not increase adverse effects
- Methimazole is associated with birth defects when used in 1st trimester:
  - Aplasia cutis
  - Choanal atresia
  - Esophageal atresia
- Propylthiouracil is associated with liver failure

Hyperthyroidism – Additional Considerations

- Thyroid receptor antibodies should be checked in 2nd trimester:
  - Active Graves disease
  - History of radioactive iodine or thyroidectomy for Graves disease
  - Previous infant with Graves disease

Alexander, 2017

Postpartum Thyroid Dysfunction

- Postpartum thyroiditis affects 1.1 – 21.1% of women (Muller, 2021)
- Abnormal TSH within 12 months of delivery (Stagnaro-Green, 2011)
  - No toxic thyroid nodule
  - No thyrotoxin receptor antibodies
- Clinical symptoms mimic: (Pop, 1991)
  - Typical postpartum fatigue
  - Postpartum depression
  - Graves disease
- Radioactive iodine uptake can distinguish between Graves and thyroiditis (Scarabello, 2016)

Postpartum Thyroid Dysfunction

- Presentation:
  - Hypothyroidism – 43%
  - Hyperthyroidism – 32%
  - Hyperthyroidism -> hypothyroidism -> resolution – 25%
- Antithyroid medications typically not beneficial for thyroiditis
- Antithyroid medications are used in Graves disease
- Levothyroxine is indicated for hypothyroidism

Alexander, 2017

Postpartum Thyroid Dysfunction

- Increased risk:
  - Type 1 diabetes mellitus
  - Thyroglobulin autoantibodies (causing hyperthyroidism)
  - Thyroperoxidase autoantibodies (causing hypothyroidism)
- Asymptomatic women should be screened at 3 and 6 months postpartum
- Women with postpartum thyroiditis should be screened annually for hypothyroidism

Alexander, 2017

Practice Recommendations

- Universal screening for hypo and hyperthyroidism in pregnancy is not indicated. (SOR A)
- Thyroid Stimulating Hormone (TSH) is the hormone of choice to determine thyroid status during pregnancy. (SOR A)
- Euthyroid patients on a stable dose of levothyroxine should increase their medication by two doses per week following a missed menstrual period or positive pregnancy test. (SOR B)
- Propylthiouracil is the preferred agent for treatment of hyperthyroidism in the first trimester. (SOR B)
- Methimazole is the preferred agent for treatment of hyperthyroidism after the first trimester. (SOR B)

Answers

1. B
2. C
3. D
4. D

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Questions?
Contact us.

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Thank you

AAFP

Advanced Fetal Monitoring

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Learning Objectives

1. Describe the historical development and clinical utility of fetal monitoring in the US and internationally.
2. Apply NICHD criteria and summarize key guidance from AAFP, ACOG, SMFM, ACNM and AWHONN to determine when continuous fetal monitoring is appropriate.
3. Compare and evaluate alternative fetal monitoring techniques—including wireless modalities and emerging ST-segment evaluation to determine their potential advantages and limitations.
4. Integrate evidence-based frameworks and decision-making tools to analyze and manage complex intrapartum EFM cases in future clinical scenarios.

HISTORY - “They meant well.”

1600

Marsac

First detected fetal heart sounds

Late 1600

Killian

fetal heart sounds and well-being are linked

1833

Marsac and Korgardec

Described HOW to monitor and link to viability

HISTORY

1906

Kremer

Abdominal and Intravaginal Electrodes used to detect FHR

1964

Callagan

Uses Doppler

BENSON !! 1968

Intermittent auscultation not useful!

1972

20% labors using EFM in US

1997-ACOG and AWHONN develop nomenclature

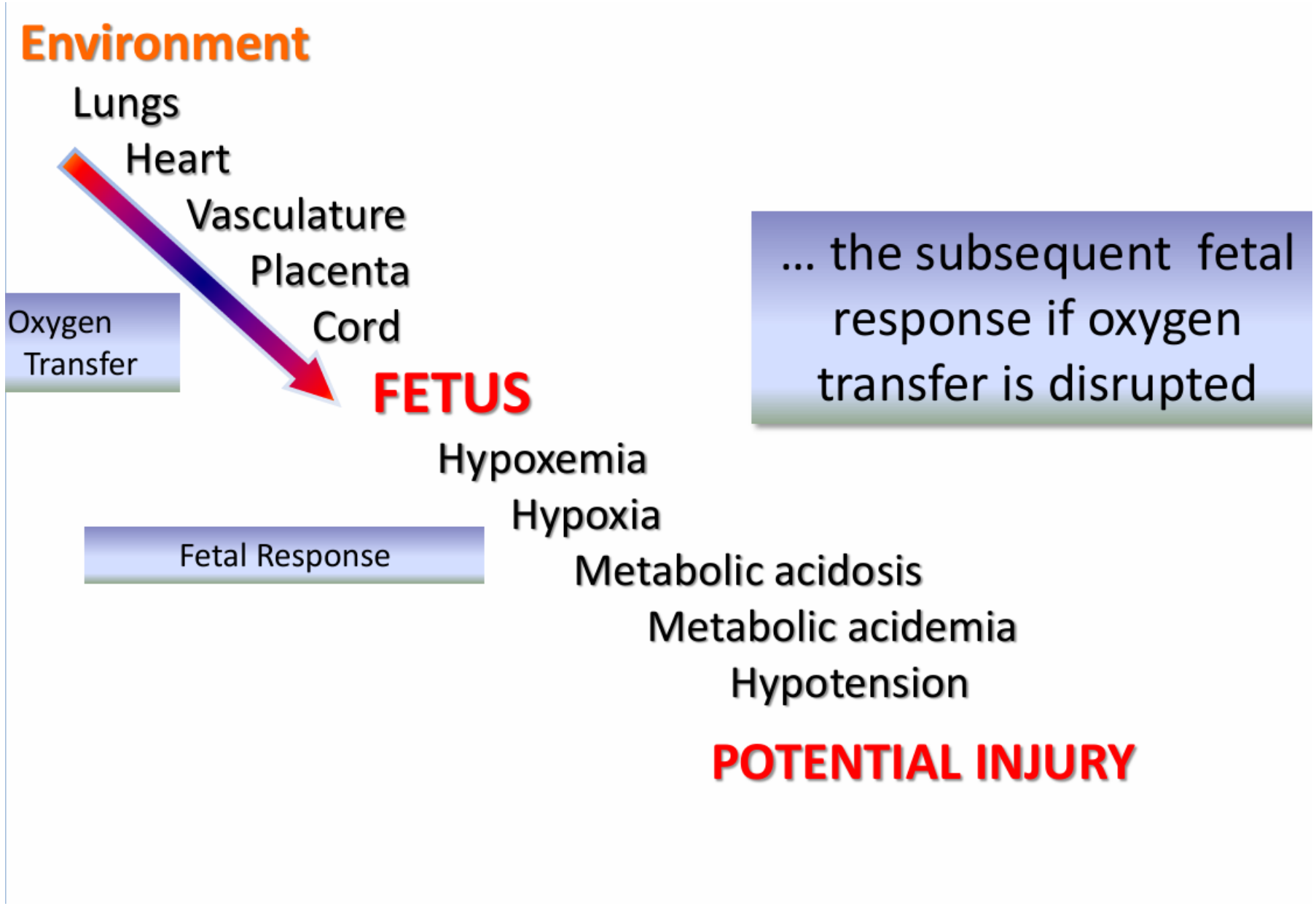
2008-NICHD terminology widely adopted

Why Fetal Monitoring?

- Labor is characterized by regular uterine contractions
  - Repeated intermittent reductions of blood flow to the intervillous spaces
  - Repeated transient interruptions of fetal oxygenation
  - Placental reserve typically allows for effective compensatory mechanisms
    - preexisting uteroplacental insufficiency
    - fetal disorders
    - intrapartum factors

Pathophysiology

- Fetal heart rate monitoring = Fetal brain monitoring
- Brain monitors and responds to
  - Extrinsic influences
  - Intrinsic influences
    - Homeostatic interactions between the fetus and the environment
- Goal = maintain optimal blood flow (oxygenation) of the brain without compromising other organs


Environment
Lungs
Heart
Vasculature
Placenta
Cord
Oxygen Transfer
FETUS
Hypoxemia
Hypoxia
Metabolic acidosis
Metabolic acidemia
Hypotension
Fetal Response
… the subsequent fetal response if oxygen transfer is disrupted
POTENTIAL INJURY

Why Fetal Monitoring in Labor or Throughout Labor?

- Indirect marker of fetal cardiac and central nervous system responses to changes in blood pressure, blood gases, and acid-base status
- Identification of FHR changes *potentially* associated with inadequate fetal oxygenation, such as changes in baseline rate, frequent decelerations, and/or absent/minimal variability; may enable timely intervention to reduce the likelihood of hypoxic injury or death
- Accurate identification of appropriately oxygenated fetuses may prevent unnecessary intervention.

Three Key Concept to Remember

- Significant FHR decelerations (variable, late, prolonged) represent interruptions in fetal oxygen transfer
- Disrupted oxygen transfer does not cause injury unless there is progression to metabolic acidemia
- The presence of FHR variability and/or accelerations predict the ABSENCE of metabolic acidosis*

- * *The converse is not always true*…

Why fetal monitoring?

- Virtually all obstetric societies advise monitoring the FHR during labor
- The benefit of this intervention has not been conclusively demonstrated
- Support of FHR monitoring is largely based upon expert opinion and medicolegal precedent.

Grant et al 1989, Alferic et al 2017, ACOG 2022, SMFM 2025

Continuous Fetal Monitoring Seems to be Standard of Care in MANY Institutions

- Rates of inductions are increasing after ARRIVE
- More medically complicated patients are having babies
- We are better at diagnosing complications prenatally and have expanded the number of people who are candidates for monitoring prenatally AND in labor
- Staffing issues (intermittent monitoring is labor intensive)

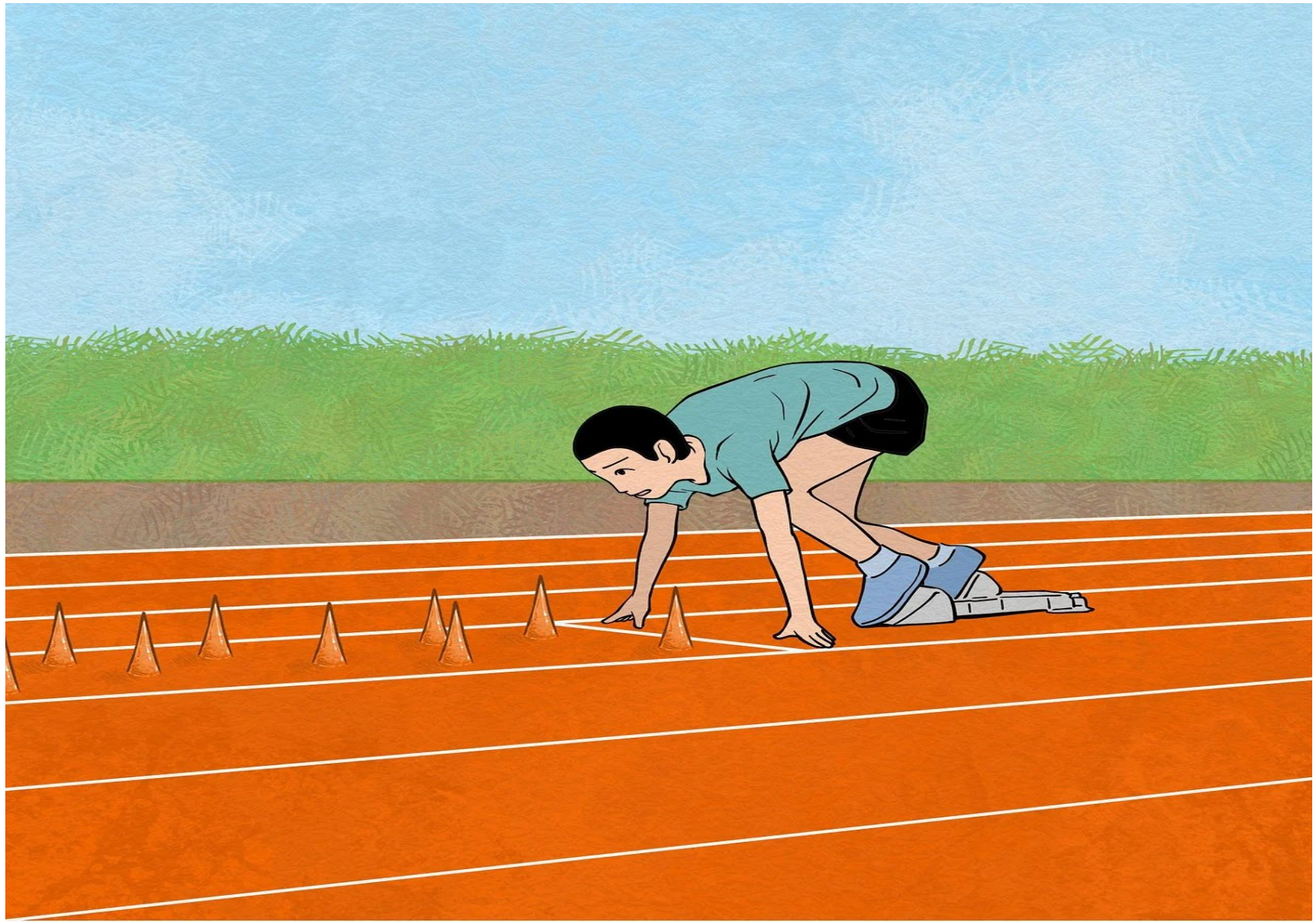
Is There Evidence Behind *Continuous* Monitoring?

- 2017 meta-analysis compared continuous electronic FHR monitoring with intermittent auscultation (13 randomized trials, >37,000 low- and high-risk pregnancies)
- No statistically significant differences between techniques were noted for the following newborn/childhood outcomes:
    - Acidemia (measured in cord blood) (relative risk [RR] 0.92, 95% CI 0.27-3.11)
    - Apgar score <4 at five minutes (RR 1.80, 95% CI 0.71-4.59)
    - Neonatal intensive care unit admission (RR 1.01, 95% CI 0.86-1.18)
    - Hypoxic-ischemic encephalopathy (RR 0.46, 95% CI 0.04-5.03)
    - Perinatal mortality (RR 0.86, 95% CI 0.59-1.24)
    - Neurodevelopmental impairment at ≥12 months of age (RR 3.88, 95% CI 0.83-18.2)
    - Cerebral palsy (RR 1.75, 95% CI 0.84-3.63)

Alferic 2017

I Repeat, is There Evidence?

- Continuous electronic FHR monitoring resulted in:
  - More operative vaginal births for abnormal FHR patterns or acidosis (RR 2.54, 95% CI 1.95-3.31)
  - Fewer spontaneous vaginal births (RR 0.91, 95% CI 0.86-0.96)
  - More cesarean births for abnormal FHR patterns or acidosis (RR 2.38, 95% CI 1.89-3.01)
  - More forceps- or vacuum-assisted vaginal and cesarean births overall (RR 1.15 and 1.63, respectively).
  - Data for low-risk and high-risk subgroups, preterm pregnancies, and high-quality trials were consistent with these overall results.



We have to make this useful to us

since ignoring it is NOT an option

How Can We Make Good Use of it ?

- Where did we start from?
- Is there a clinical risk factor that suggests a predisposition to acidemia?
- What is the pH now?
- When was I last reassured?
- Is there evidence of impaired oxygen transfer?– If yes:
  - Can I improve oxygen transfer (interventions)?
  - Can I reasonably exclude metabolic acidosis?
  - If I cannot exclude metabolic acidosis how long do I have before injury might occur?

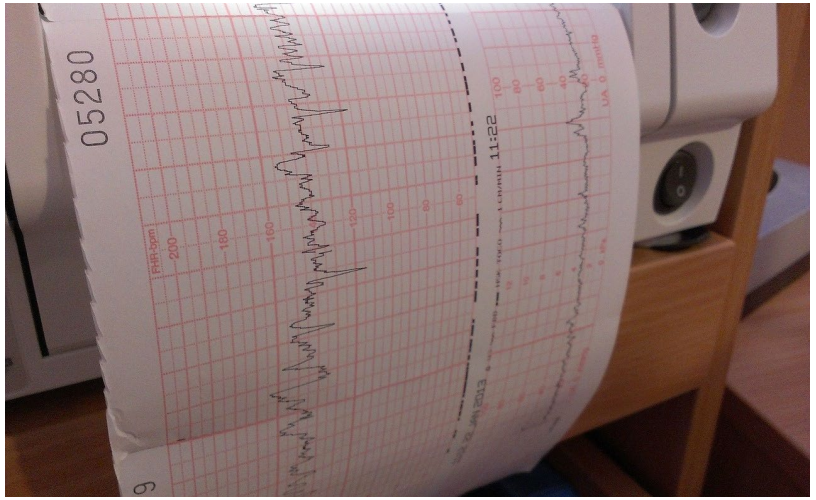
Fetal Heart Tracings and Acidemia

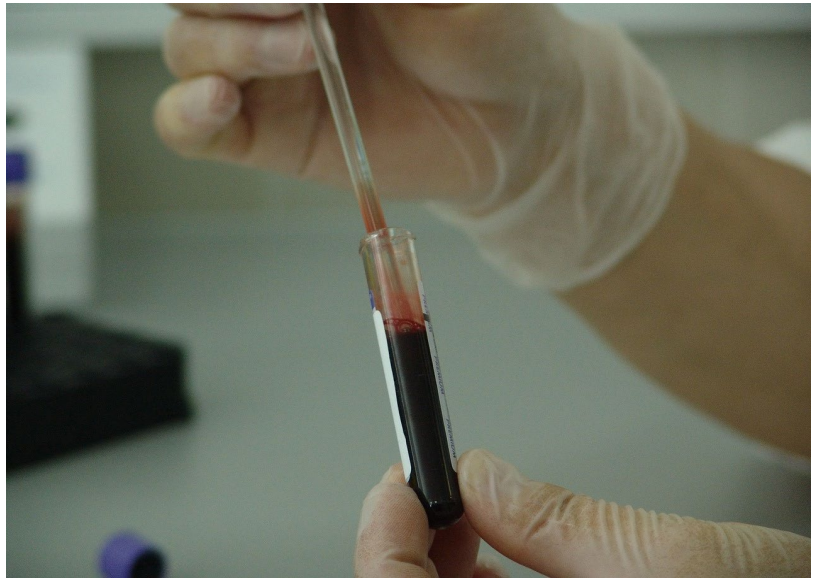
- Moderate variability predicts pH > 7.15 –-Negative predictive value 98%
  - affected by decels, depth and repetition and type of decel
- Minimal/absent variability AND decels associated with pH< 7.15 – Though predictive value still poor (23%)
- Likelihood of acidemia increases with depth of recurrent decelerations– Especially late and with min/absent variability

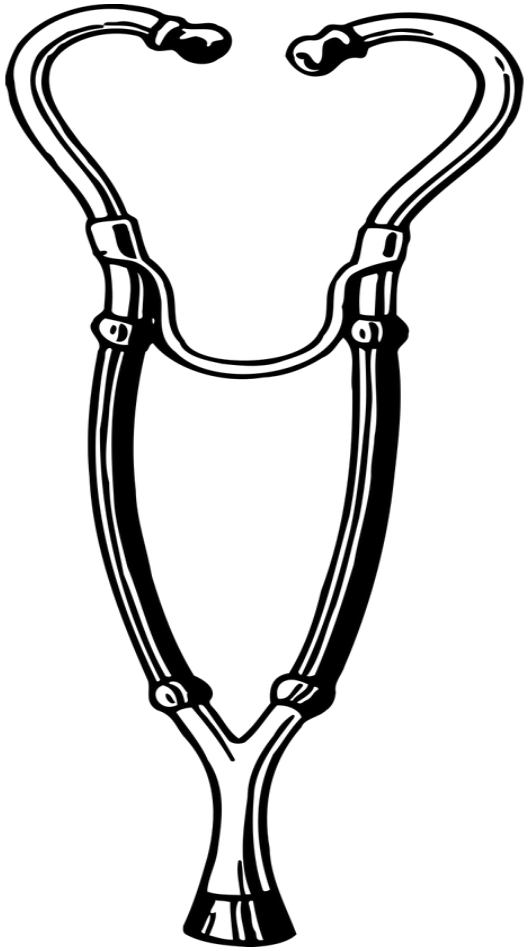
Parer 2006, Parer et al

What About Other Forms of Monitoring?

- Intermittent auscultation/fetal scalp pH, ST segment assessment…..







Comparison of Fetal Monitoring Types

- A 2021 meta-analysis (33 randomized trials, >118,000 participants) evaluated multiple forms of intrapartum fetal monitoring, (intermittent auscultation and cardiotocography with and without computer-aided decision support, fetal scalp lactate assessment, fetal scalp pH analysis, fetal pulse oximetry, and fetal ST segment analysis (STAN))
- Results:
  - No method of intrapartum fetal monitoring increased or decreased the overall cesarean birth rate.
  - Intermittent auscultation neither reduced nor increased adverse neonatal outcomes, including low Apgar scores, neonatal acidemia, neonatal intensive care unit admissions, or perinatal deaths.
  - Intermittent auscultation was associated with fewer emergency cesarean births overall and fewer emergency cesarean births for fetal distress.

Al Wattar et al 2021

Intermittent Monitoring Better for Low risk?

- Doppler device or fetal stethoscope (ex: Pinard or DeLee stethoscope)
  - Relatively uncommon in the United States
    - provides limited information about FHR variability, accelerations, or decelerations
  - Requires one-to-one nursing care

- ACOG guidelines state that either continuous electronic FHR monitoring or intermittent auscultation is acceptable in uncomplicated patients

Continuous Fetal Monitoring *Presumed* Better for High-Risk

- There is consensus that high-risk pregnancies should be monitored continuously during labor
- ….may lead to maternal or fetal compromise
  - Previous cesarean birth
  - Preeclampsia
  - Growth restriction
  - Diabetes mellitus requiring medication to manage hyperglycemia
  - Abruption or unexplained vaginal bleeding
  - IAI/Chorioamnionitis or sepsis
  - Meconium-stained amniotic fluid
  - Post-term pregnancy

Doppler/Fetoscope vs. External vs. Internal monitoring

Noninvasive external FHR monitoring can be performed continuously or for variable periods of time with a Doppler ultrasound device on the maternal abdomen

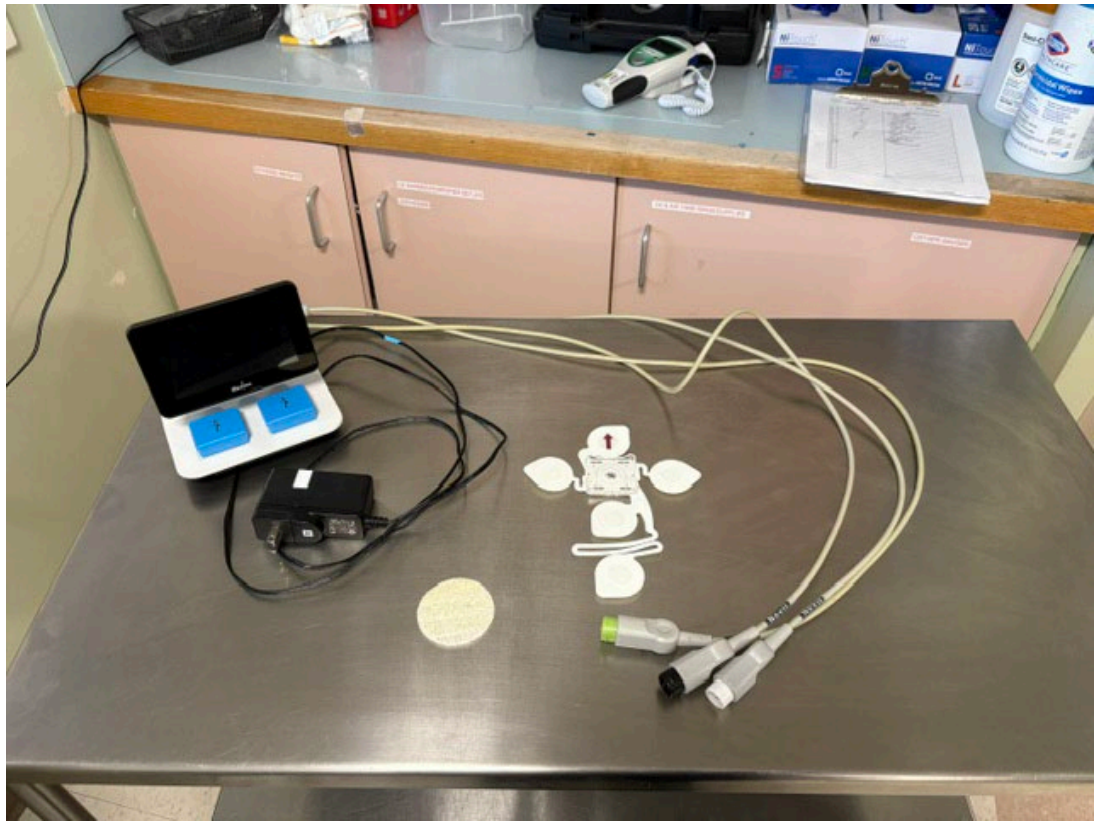
detects the motion of the fetal heart and uses this information to create a complex wave form.

A Pinard or DeLee fetal stethoscope (also called a fetoscope) or a Doppler device may be used for intermittent auscultation.

A fetal ECG can be obtained by placing a bipolar spiral electrode into the fetal scalp transcervically; a second reference electrode is placed on the maternal thigh to eliminate electrical interference from maternal cardiac activity.

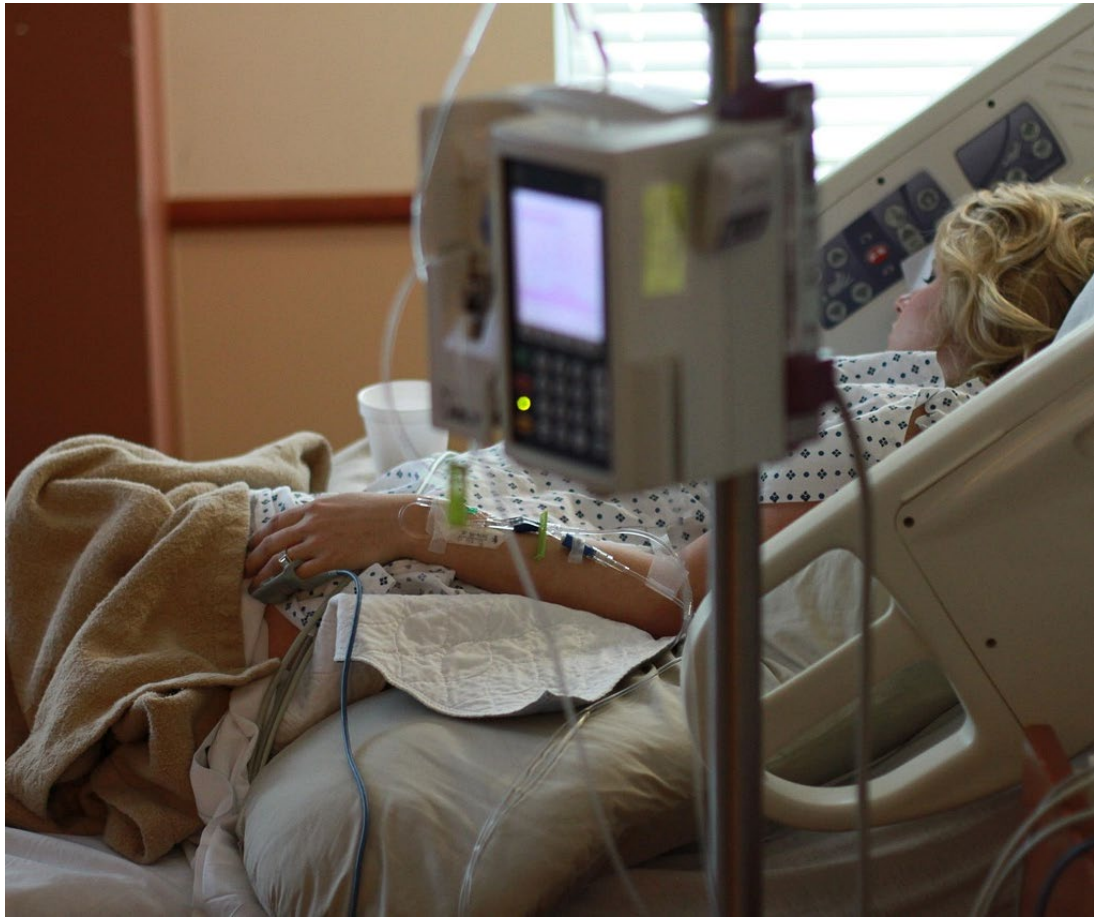
Other Monitoring Devices

- NOVII (wireless)
  - Beltless
  - Monitors the baby's heart rate, parent heart rate and contractions
  - Patch—uses surface electrodes to pick up electrical signals from fetus and parent
  - Pod –clips onto the patch and transmits the signals wirelessly
  - Interface—connects to the hospital's monitor and/or central display
  - Higher accuracy on higher BMI



Upon Admission –STRAIGHT to the Monitor is Typical!

- Admission for labor: assess the FHR for a minimum of 20 to 30 minutes, along with uterine activity and maternal vital signs
    - Purpose: identify fetuses who have or are at increased risk for abnormal intrapartum FHR patterns and who might benefit from continuous rather than intermittent intrapartum FHR monitoring
- In the United States, a common practice in low-risk pregnancies with a normal initial FHR pattern is to monitor the FHR continuously when possible (ie, patient is not ambulating, bathing, moving around, etc.)
- Nursing protocol is to review the FHR at least every 30 minutes in the active phase of the first stage of labor and at least every 15 minutes in the second stage



Phelan 1994, ACOG 2009

If Determined High-risk Automatically Remain on Continuous

FHR is usually reviewed at least every 15 minutes in the active phase of the first stage of labor

at least every 5 minutes in the second stage

Intermittent Auscultation-AAP 2017

listen to the FHR for ≥60 seconds

record the rate during and immediately after a uterine contraction

at least every 30 minutes during the active phase of the first stage of labor	at least every 15 minutes during the second stage [17].	If risk factors for fetal compromise are present, the FHR is determined, evaluated, and recorded preferably before, during, and after a uterine contraction at least every 15 minutes during the active phase of the first stage of labor and at least every 5 minutes during the second stage.

What Makes Low-risk Become High-risk?

- Intermittent auscultation change to continuous
- The American College of Nurse-Midwives considers abnormal findings to be any of the following:
  - Irregular rhythm
  - Decrease in FHR below the baseline
  - Tachycardia
  - Bradycardia
  - An increase in the baseline fetal heart rate by ≥20 beats/minute from the start of labor is also concerning

ACNM 2015, NICE 2022

Antepartum and Intrapartum Factors Indicating High-Risk Labor and the Need for Continuous Electronic Fetal Monitoring*

Antepartum

Any condition in which placental insufficiency is suspected

Known fetal anomalies

Maternal preeclampsia/gestational hypertension

Maternal type 1 diabetes mellitus

Suspected fetal growth restriction

Intrapartum

Presence of meconium

Presence of tachysystole

Signs/symptoms of intrauterine infection

Unexplained vaginal bleeding

Use of oxytocin (Pitocin) or other uterine stimulants for labor induction or augmentation

If one of the following is detected during structured intermittent auscultation for a low-risk patient, switch to continuous electronic fetal monitoring to assess the National Institute of Child Health and Human Development category and to determine necessary clinical management:

Irregular fetal heart rate

Fetal tachycardia (> 160 beats per minute for > 10 minutes)

Fetal bradycardia (< 110 beats per minute for > 10 minutes)

Recurrent decelerations following contractions (> 50% of contractions) or prolonged deceleration (> 2 minutes but < 10 minutes)

*—Likely not a complete list, but what is considered high risk by the American College of Obstetricians and Gynecologists, International Federation of Gynecology and Obstetrics, and American College of Nurse-Midwives by expert opinion in their major practice guidelines.

DR C BRAVADO: Mnemonic for Standardizing Tracing Interpretation and Reporting Tool for Fetal Heart Rate Monitoring

DR	Determine risk*	Normal	Suspicious†	Pathologic
C	Contractions	≤ 5 contractions in 10-minute period averaged over 30 minutes	Tachysystole: > 5 contractions in 10-minute period averaged over 30 minutes	No response to intrauterine resuscitative measures; stopping/reducing uterotonic agents or tocolytics with persistent Category II/III tracing
BRa	Baseline rate	110 to 160 bpm; determine by 2-minute segment in 10-minute period	< 110 bpm: bradycardia > 160 bpm: tachycardia Rate change that persists for > 2 minutes means baseline has changed	< 100 bpm
V	Variability	Fluctuations from baseline over 10-minute period, with 6 to 25 bpm: moderate	≤ 5: minimal ≥ 25: marked	Absent variability Sinusoidal pattern: fetal heart rate baseline undulating every 3 to 5 minutes for ≥ 20 minutes
A	Accelerations	≥ 15 bpm above baseline rate, onset to peak < 30 seconds, lasts for at least 15 seconds‡ Prolonged: ≥ 2 minutes Baseline change: ≥ 10 minutes	None present	None present despite scalp stimulation
D	Decelerations	Early: onset to nadir ≥ 30 seconds, nadir occurs with peak of contraction Due to fetal head compression	Variable: onset to nadir < 30 seconds, decrease in fetal heart rate ≥ 15 bpm with duration ≥ 15 seconds to < 2 minutes Due to cord compression Late: onset to nadir ≥ 30 seconds, onset after start of contraction Recurrent: occurs with > 50% of contractions per 20-minute period Prolonged: > 2 minutes Due to uteroplacental insufficiency	Recurrent late or prolonged decelerations for > 30 minutes or for > 20 minutes if reduced variability Prolonged decelerations > 5 minutes
O	Overall assessment	No hypoxia/acidosis; no intervention necessary	Low probability of hypoxia/acidosis; take action to correct reversible causes and monitor closely	High probability of hypoxia/acidosis; take immediate action to correct reversible causes and expedite delivery

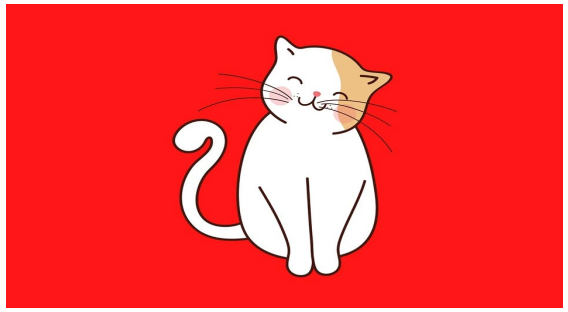
bpm = beats per minute.

*—Based on prenatal and intrapartum risk factors, fetal reserve, labor progress, and risk of uteroplacental insufficiency.
†—Lacking at least one characteristic of normal but no pathologic features. Suspicious features include slow return to baseline, biphasic decelerations, and tachycardia after variable decelerations or accelerations preceding and/or following ("overshoots").
‡—For estimated gestational age ≥ 32 weeks; for estimated gestational age < 32 weeks, accelerations 10 bpm above baseline lasting for > 10 seconds.

Information from references 4, 5, 7, 14, 16, and 26.

National Institute of Child Health and Human Development Categories for Continuous Electronic Fetal Monitoring

Category I (normal)	Must be present: Baseline fetal heart rate of 110 to 160 beats per minute Moderate variability Absent late or variable decelerations May be present or absent: Accelerations Early decelerations
Category II (indeterminate)	Any tracing not meeting the criteria of Category I or III, with any of the following findings: Fetal tachycardia Baseline fetal heart rate with absent/minimal/moderate variability Recurrent late decelerations with moderate variability Variable decelerations with slow return to (or overshoots) baseline Prolonged decelerations No accelerations after fetal scalp stimulation
Category III (pathologic)	Must be present: Sinusoidal pattern Absent fetal heart rate variability with recurrent late decelerations, recurrent variable decelerations, or fetal bradycardia

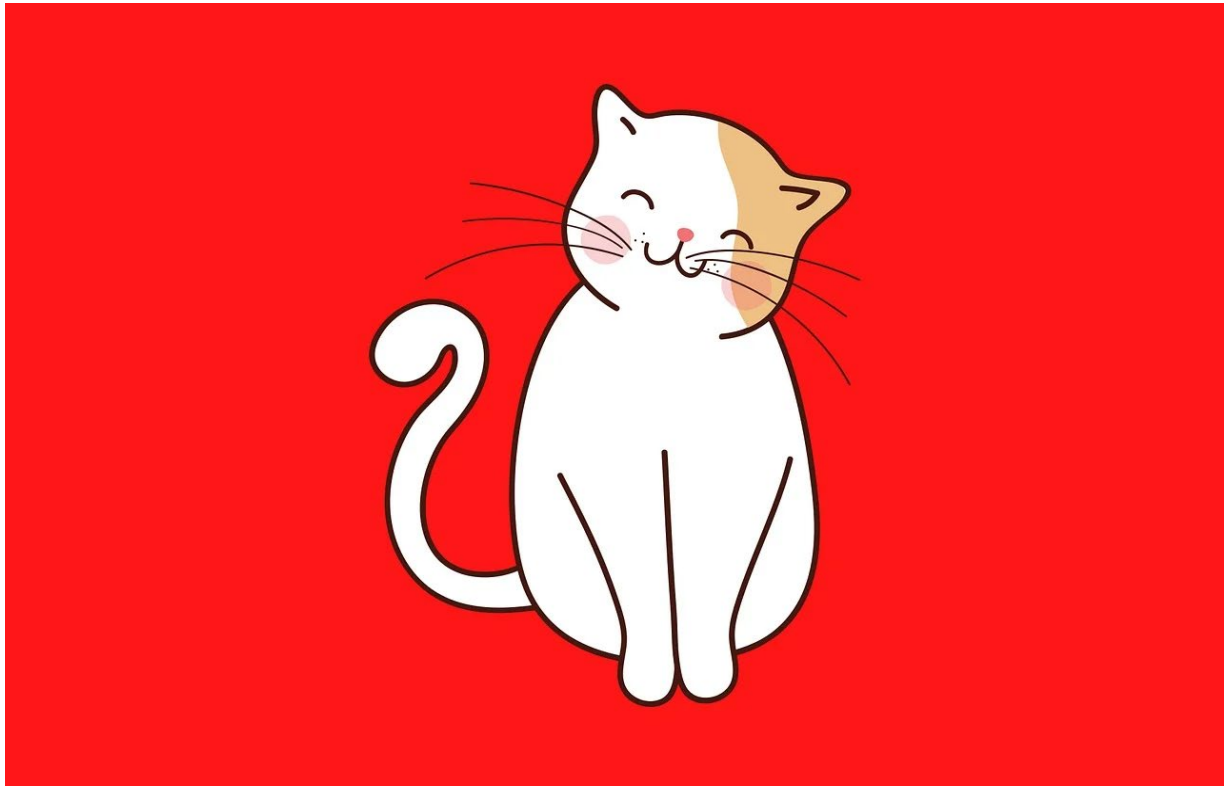


Summary/Essential Characteristics of Interpretation

- Clinical setting – Provides the background risk
- Baseline – Important to determine all other features
- Variability – A marker of normal pH
- Decelerations – A marker of ongoing O2 deprivation
- Contractions – potential cause of O2 deprivation
- Accelerations – A marker of normal pH
- Change over time – evidence of an evolving process and marker of time course

Cat 1 Management

- Intermittent auscultation when low-risk pregnancy



Guidelines for Structured Intermittent Auscultation During Labor

The clinician and the patient with a low-risk pregnancy discuss the benefits of structured intermittent auscultation vs. continuous electronic fetal monitoring; patient agreement to structured intermittent auscultation is documented in medical record; labor team ensures appropriate nurse staffing (1:1)

Labor nurse determines current fetal position and best location to place Doppler handheld probe (usually over the fetal back) with Leopold maneuvers; transabdominal ultrasonography (passive mode) can be used to identify the location of the fetal heart if manual palpation proves difficult

With one hand holding the probe in place, the other hand palpates the uterine fundus to detect maternal contractions

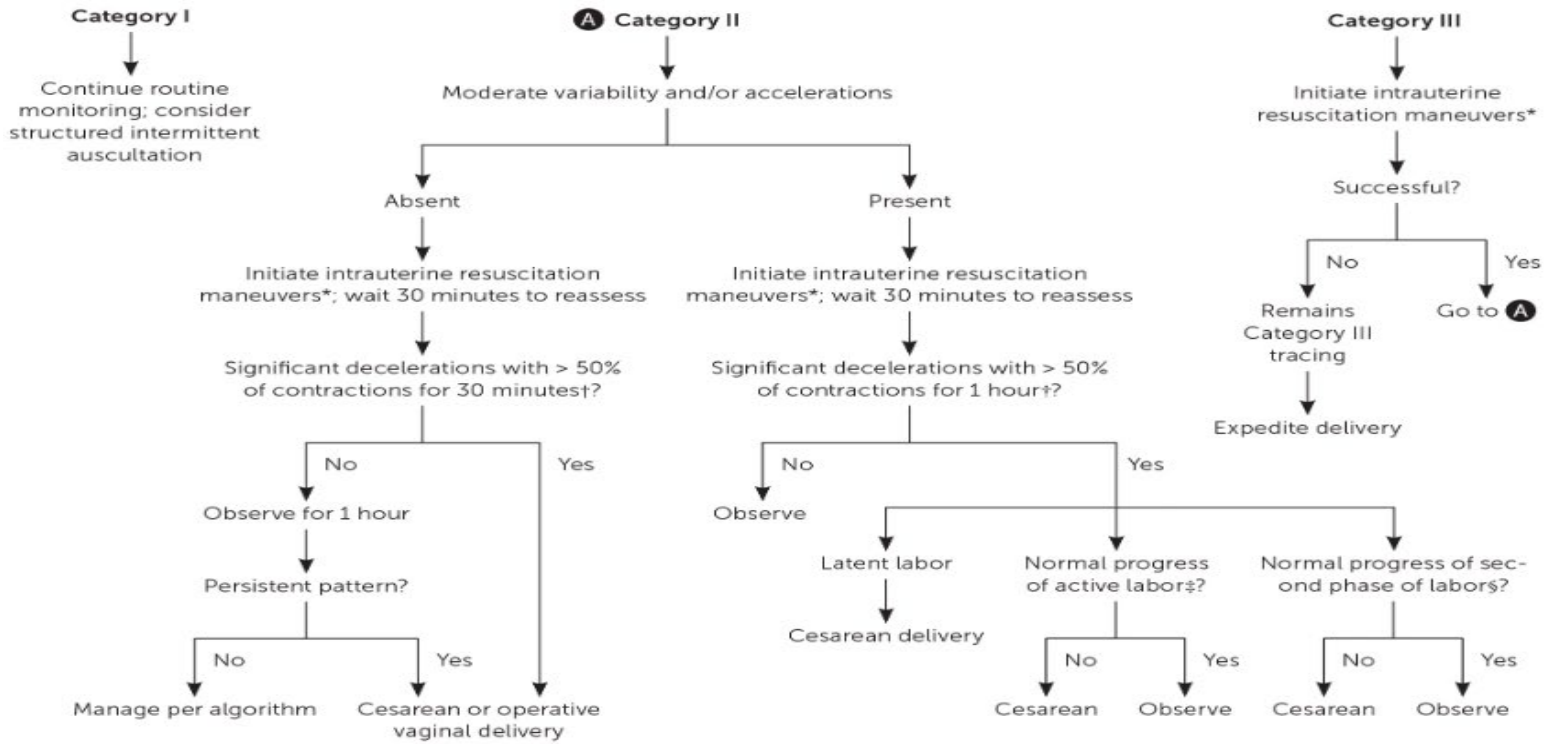
Following contractions, baseline fetal heart rate is assessed by counting the number of beats during a 30- to 60-second interval

For a minimum of 1 minute following contraction onset, fetal heart rate is reassessed at 6- to 10-second intervals to detect accelerations or decelerations in heart rate

Recommended frequency of structured intermittent auscultation during labor*†

Organization	Latent phase	Active phase	Second stage
American College of Nurse-Midwives	No recommendation	15 to 30 minutes	5 minutes
American College of Obstetricians and Gynecologists	No recommendation	30 minutes	15 minutes
Association of Women's Health, Obstetric and Neonatal Nurses	At least hourly (< 4 cm cervical dilation)	15 to 30 minutes (4- to 5-cm cervical dilation)	5 to 15 minutes

INTRAPARTUM FETAL MONITORING



—Intrauterine resuscitation and interventions

1. Change maternal position (lateral recumbent, hands/knees)
2. Assess maternal vital signs (hypotension, fever, tachycardia) and correct as able
3. Discontinue uterine stimulation (stop oxytocin [Pitocin] if using, remove dinoprostone [Cervidil] if in place)
4. Consider use of tocolytics such as terbutaline
5. Administer maternal oxygen via nonrebreather at 10 L per minute
6. Perform vaginal examination (assess for placental abruption, cord prolapse, rapid descent)
7. Bolus 1 L intravenous fluid
8. Initiate amnioinfusion if repetitive variable decelerations present
9. Modify pushing efforts if in second stage of labor
10. Consider need for expedited delivery

—Clarifications for Category II management

Significant decelerations:

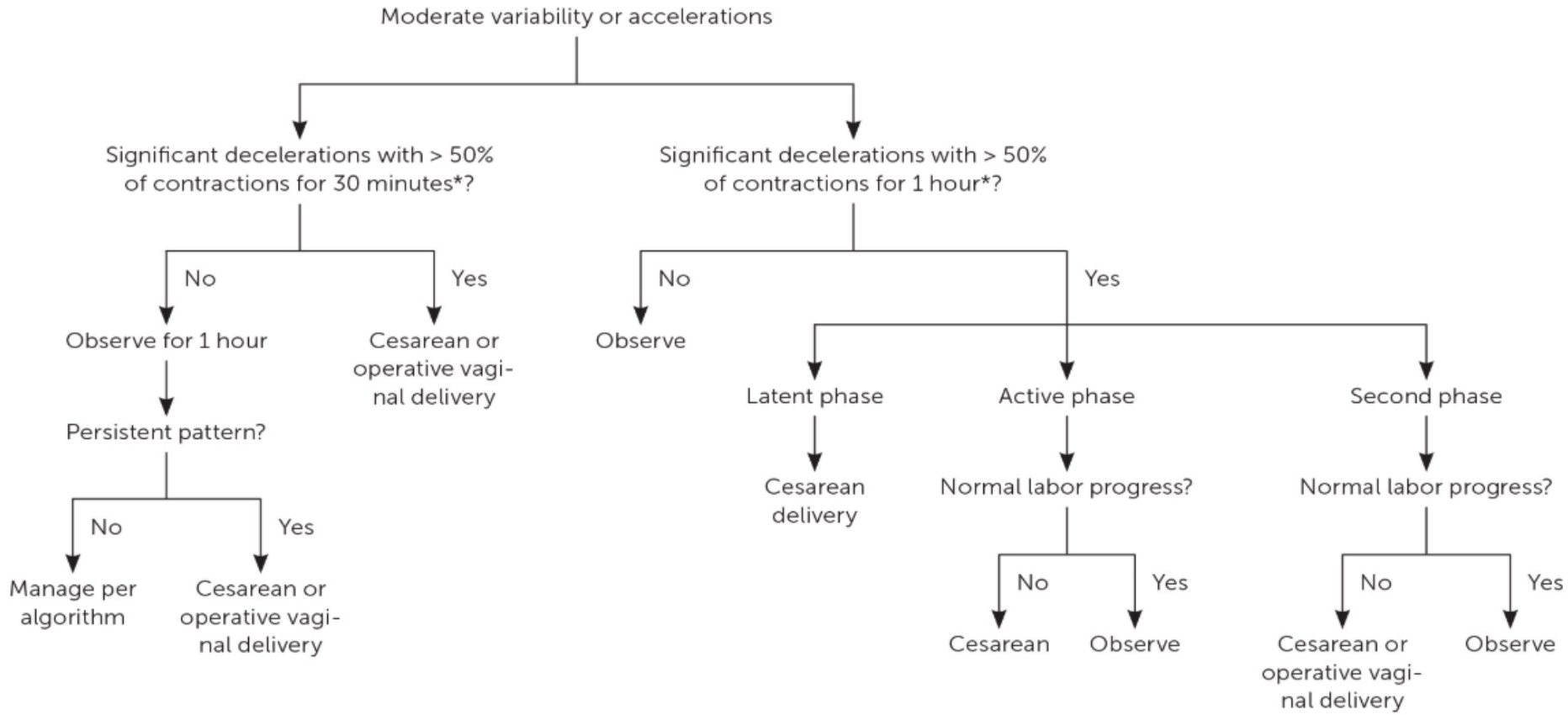
- Variable decelerations > 60 seconds and with nadir > 60 beats per minute below baseline or < 60 beats per minute

Late decelerations

- Initiation of algorithm may be delayed 30 minutes while assessing whether intrauterine resuscitation methods worked
- If expedited delivery is recommended, accomplish within 30 minutes
- Algorithm may be overridden at any time if it is determined to be in the best interest of the fetus to act earlier

‡—Normal labor progress in active phase: ≥ 6-cm dilation with ruptured membranes and increase of cervical dilation/effacement/fetal station with either 4 hours of adequate cervical contractions (200 mVUs) or 6 hours of inadequate contractions

§—Normal labor progress in second phase: advancement in fetal station after 2 hours of pushing in multiparous women or 3 hours in nulliparous women without an epidural; 3 hours in multiparous women or 4 hours in nulliparous women with an epidural



*—That have not resolved with appropriate conservative corrective measures, including supplemental oxygen, maternal position changes, intravenous fluid administration, correction of hypotension, reduction or discontinuation of uterine stimulation, administration of uterine relaxant, amnioinfusion, and/or changes in second stage breathing and pushing techniques.

Cat 2 Management

Cat II Management

Cat II Management /Intrauterine Resuscitation

- Correct reversible causes: stop uterotonic agents and improve placental fetal perfusion through intrauterine resuscitation
- DOCUMENT what you see and interventions!!
  - Lateral recumbent maternal positioning reduces compression of the maternal vena cava and aorta and the fetal umbilical cord.
  - Intravenous fluid boluses up to 1 L have been shown to improve fetal oxygenation up to 30 minutes after administration.
  - Modification in pushing efforts, (initiating only with the urge to push, pushing with every second or third contraction) can improve maternal and fetal oxygenation.
  - Maternal oxygen may be administered after other maneuvers
    - can be discontinued after tracing improvement because there is no evidence to support its routine use.
    - This has fallen out of favor.

Alferic 2007, Fleischer 1987, Oski 1973 Peeters 1979

Consider a Cat 2 Policy

LANDMARK MEDICAL CENTER

DEPARTMENTAL POLICIES and PROCEDURES

	Page(s):	1
	Saved as:	
Subject: Category 2 Fetal Heart Tracing Management	Policy #:	
Manual: LDRP Manual	Formulated:	10/2021
Responsible Party: Chief Obstetrics	Reviewed:	
Approved by: Chief Obstetrics	Revised:	

Purpose:
To outline the process for managing a patient who has a category 2 fetal heart rate tracing.

Policy:

1. Category 2 tracings are very common in the labor process.
2. Laboring patients are monitored throughout their labor either with continuous EFM or with intermittent. If Cat 2 or 3 is discovered with intermittent monitoring then continuous monitoring will be implemented. This monitoring is to be documented the electronic medical record (EMR).
3. Interventions taken to resolve a category 2 tracing will be documented in the EMR. Interventions can include maternal position changes, fluid bolus, etc.

Procedure:

1. When a Category 2 tracing is identified, the treatment team will initiate various treatment modalities. This will be documented in the EMR.
2. The time the initial category 2 tracing was identified starts a countdown clock of 60 minutes. The primary provider will be notified of the Cat 2 tracing and the countdown initiation.
3. If the interventions are successful and the tracing returns to a category 1 tracing within 60 minutes of initiation, the countdown clock stops. This is documented in the EMR.
    a. Should another category 2 tracing occur, the 60-minute countdown clock begins anew.
4. If the category 2 tracing exceeds 60 minutes, a consult for the back-up OB surgeon will be automatically initiated.
    a. This consult can be initiated by any member of the team once the 60 minutes have passed, be it the primary provider or one of the members of the nursing staff.
    b. These notifications will be documented in the EMR.

5 Tier System

- (http://www.obapps.org).
- Each continuous electronic fetal monitoring tracing is color coded to represent the threat of acidosis based on the NICHD definitions
- Category II is broken into three separate severity and intervention subcategories based on the presence of accelerations and/or moderate variability
- This classification has been shown to improve identification of fetal acidosis and newborns requiring immediate intervention after delivery

Phelan 2000, Field 1990, Jensen 1991, Parer 2007, Macones 2008,

ACOG 2010

MODERATE (NORMAL) VARIABILITY

	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	B	B	B	Y	O	Y	Y	O	Y	Y	O
Normal	G	G	G	B	Y	B	Y	Y	Y	Y	O
Mild Brd	Y	Y	Y	Y	O	Y	Y	O	Y	Y	O
Mod Brd	Y	Y			O		O	O			O
Sev Brd	O	O			O			O			O

MINIMAL VARIABILITY

	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	B	Y	Y	O	O	O	O	R	O	O	O
Normal	B	B	Y	O	O	O	O	R	O	O	R
Mild Brd	O	O	R	R	R	R	R	R	R	R	R
Mod Brd	O	O			R		R	R			R
Sev Brd	R	R			R			R			R

ABSENT VARIABILITY

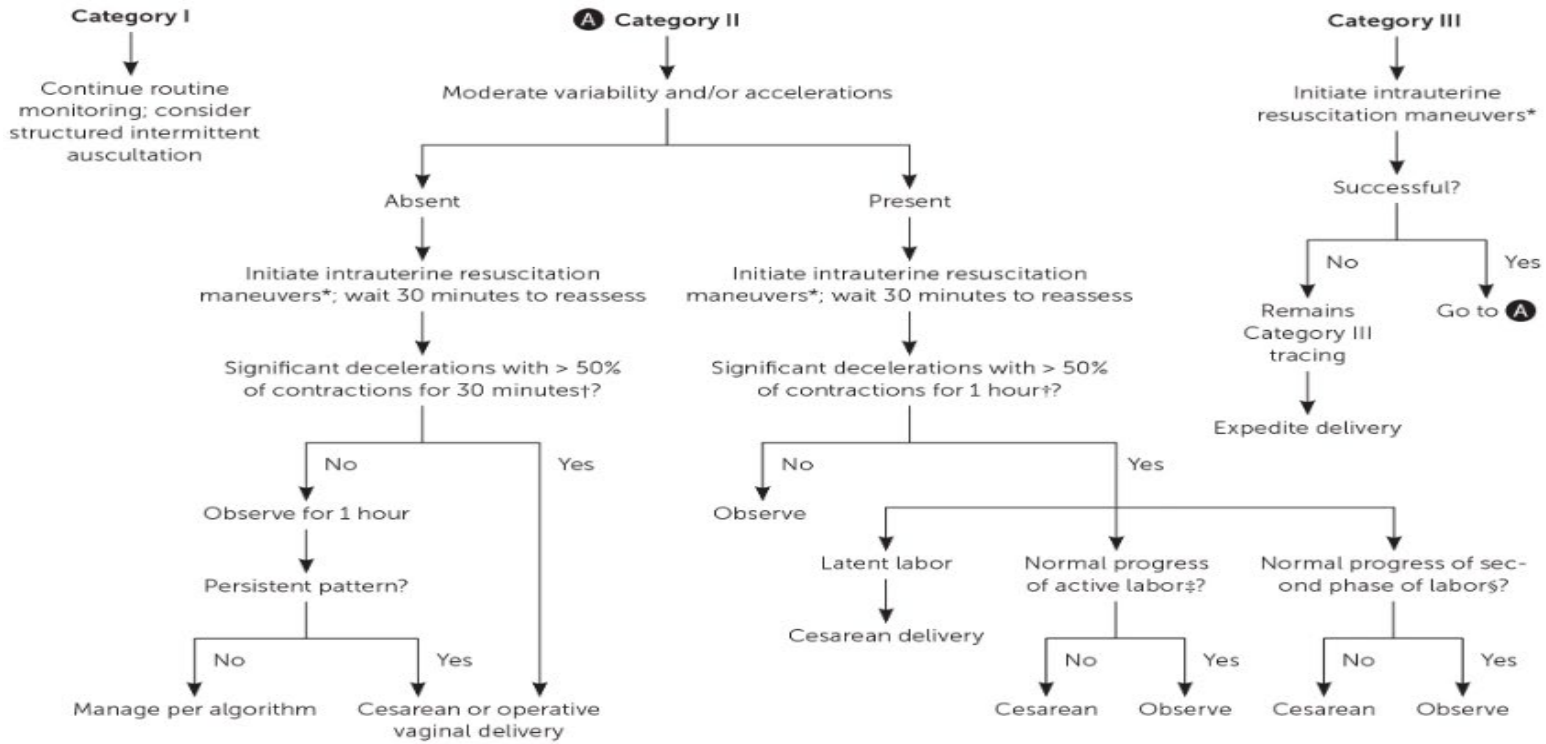
	No	Early	Mild VD	Mod VD	Sev VD	Mild LD	Mod LD	Sev LD	Mild PD	Mod PD	Sev PD
Tachy	R	R	R	R	R	R	R	R	R	R	R
Normal	O	R	R	R	R	R	R	R	R	R	R
Mild Brd	R	R	R	R	R	R	R	R	R	R	R
Mod Brd	R	R			R		R	R			R
Sev Brd	R	R			R			R			R

Sinusoidal	R
Marked Variability	Y

VD, Variable decelerations; LD Late decelerations; PD, Prolonged decelerations; Brd, Bradycardia; Tachy, Tachycardia;

G, Green; B, Blue; Y, Yellow; O, Orange; R, Red

INTRAPARTUM FETAL MONITORING



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Late decelerations

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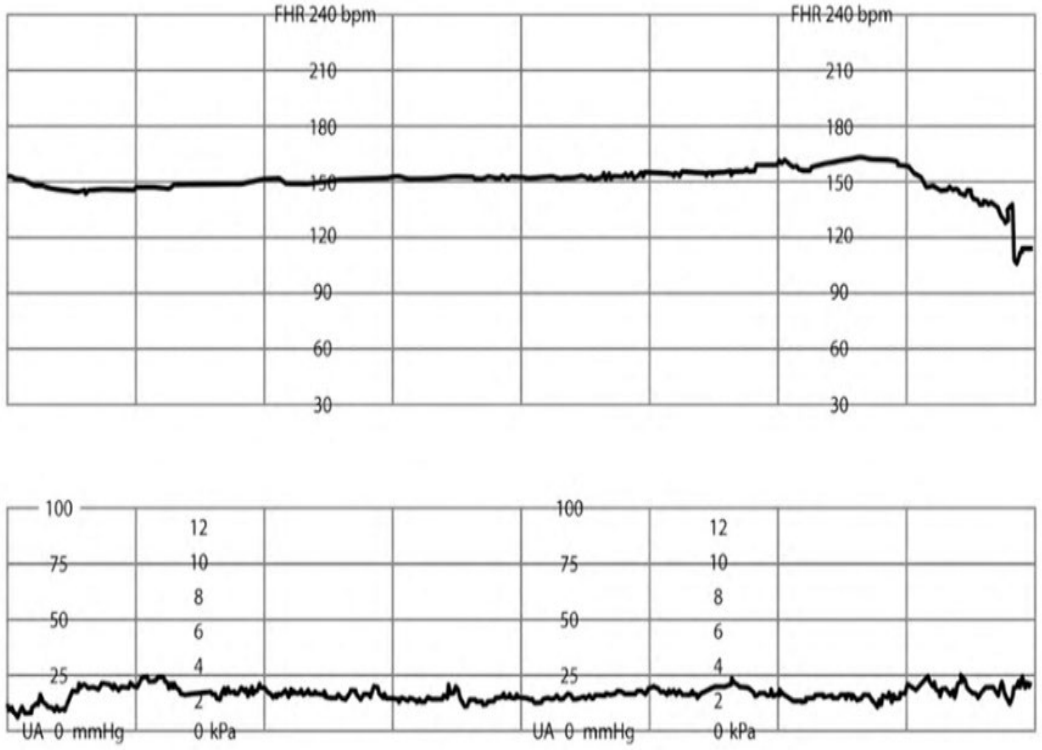
Cat III Management



Absent fetal heart rate variability.

- If immediate intrauterine resuscitation is not effective, DELIVER!!!
- Ex: Absent variability, spontaneous decelerations, bradycardia
  - *Many institutions may have to make operative call on earlier side…..*

Other Methods of Monitoring Fetal Status in Labor

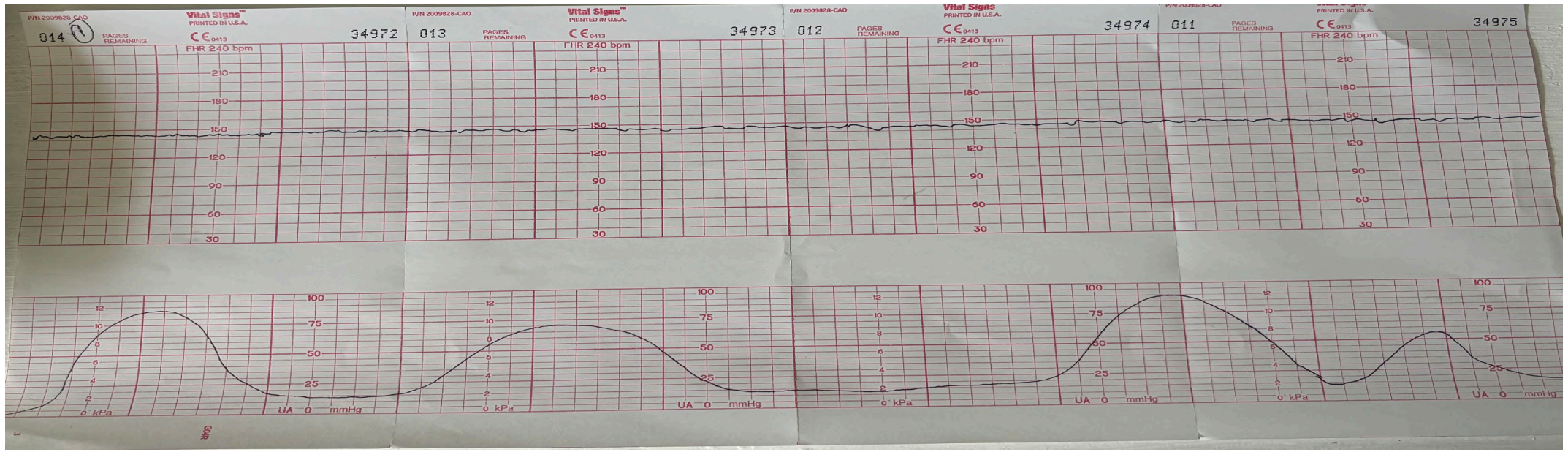
- Fetal scalp sampling
  - However, because of a 10% inadequate sample rate and a prolonged sample-to-result time of 18 minutes on average, has gone out of favor
- Lactate fetal scalp sampling (direct measurement of lactate by a probe)
  - sample-to-result time of two minutes
  - its use has not resulted in improved newborn outcomes.
- Internal real-time fetal pulse oximetry probe (similar to an intrauterine pressure catheter)
  - may lower operative vaginal delivery rates during the second stage of labor
  - no apparent effect on neonatal outcomes.
- Fetal electrocardiograms
  - fetal acidosis can affect the ST interval
  - require attachment of fetal head electrode
  - a recent randomized controlled trial and meta-analysis showed no improvement in neonatal outcomes or rates of operative or cesarean delivery.

ACNM 2015 Clark 2017, ACOG 2013, Romano 2016, NICHD 1997

ARS Question

CASE 1

- 23 yo G1P0 40 3/7 weeks spontaneous labor
- 4/50/-2 was last exam an hour ago
- You are performing intermittent auscultation while pt is receiving hydrotherapy in the tub and hear an audible deceleration at 100 BPM from baseline 140 lasting 1 minute
- Pt exits the tub and you place on continuous monitoring


Vital Signs
PRINTED IN U.S.A.
34972
34973
34974
34975
PAGES REMAINING
FHR 240 bpm
UA
mmHg
kPa

How should this be managed?

A) Return to hydrotherapy with intermittent monitoring
B) Return to hydrotherapy with continuous monitoring
C) Continuous monitoring outside of tub
D) B + IVF bolus and position changes, reassess in 30 min
E) C + IVF bolus and position changes, reassess in 60 min

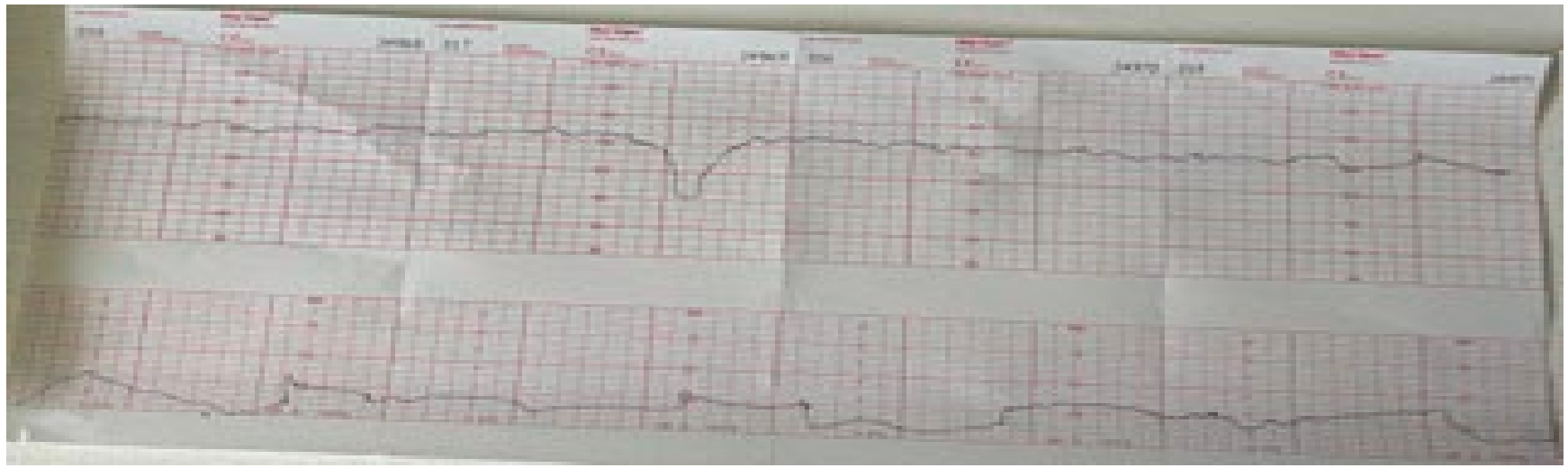
Documentation

- Audible decel with Doppler to 100 for > 30 seconds while in tub
- Removed from hydrotherapy and placed on continuous monitoring
- Baseline 145 minimal variability no accels no decels
- Irregular contractions every 2 to 3 minutes
- Intrauterine resuscitation ordered with 1L IVF bolus and position changes, continuous monitoring ordered
- Will reassess in 30 minutes

ARS Question

CASE 2

- 34 yo G1P0 with gestational hypertension s/p oral misoprostrol for ripening X 2, 4 hours apart
- Pt has been on continuous fetal monitoring given medication dosing
- Cervical exam was 2/30/-3 on admission



How should this be managed?

A) Immediate cesarean
B) IVF bolus and position changes, reassess in 30 min
C) IVF bolus and position changes, reassess in 60 min
D) FSE and IUPC now
E) B + D
F) C + D

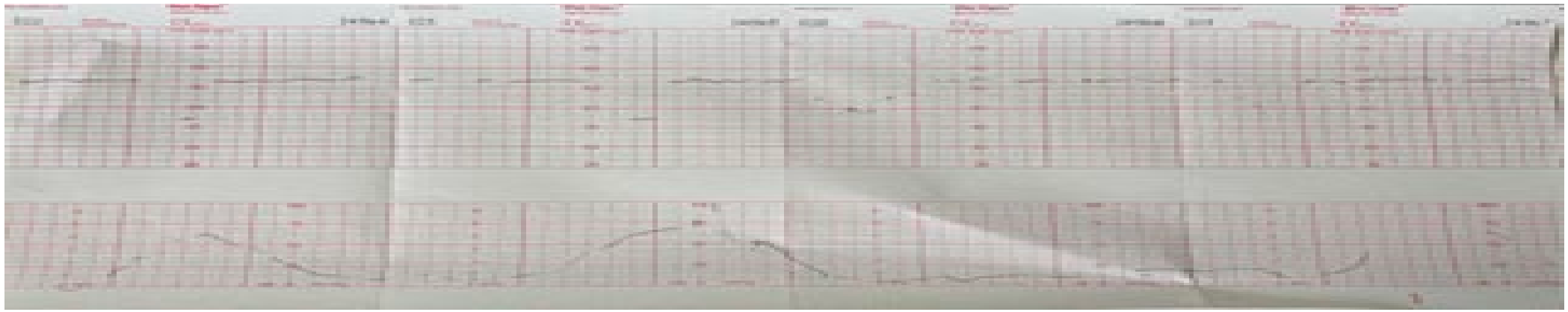
Documentation

- EFM notable for baseline 155 minimal variability
- 1 variable deceleration lasting 1 min nadir to 95
- Contractions are not discernable on the monitor
- Will AROM and place IUPC and FSE to better discern contraction pattern and presence / absence decelerations
- IVF bolus ordered
- Reassess in 30 min

ARS Question

Case 3

- 34 yo G3P2 admitted in labor with “bloody show” and 6/50/-2 on exam
- No previous risk factors
- Given bleeding, was placed on continuous monitoring



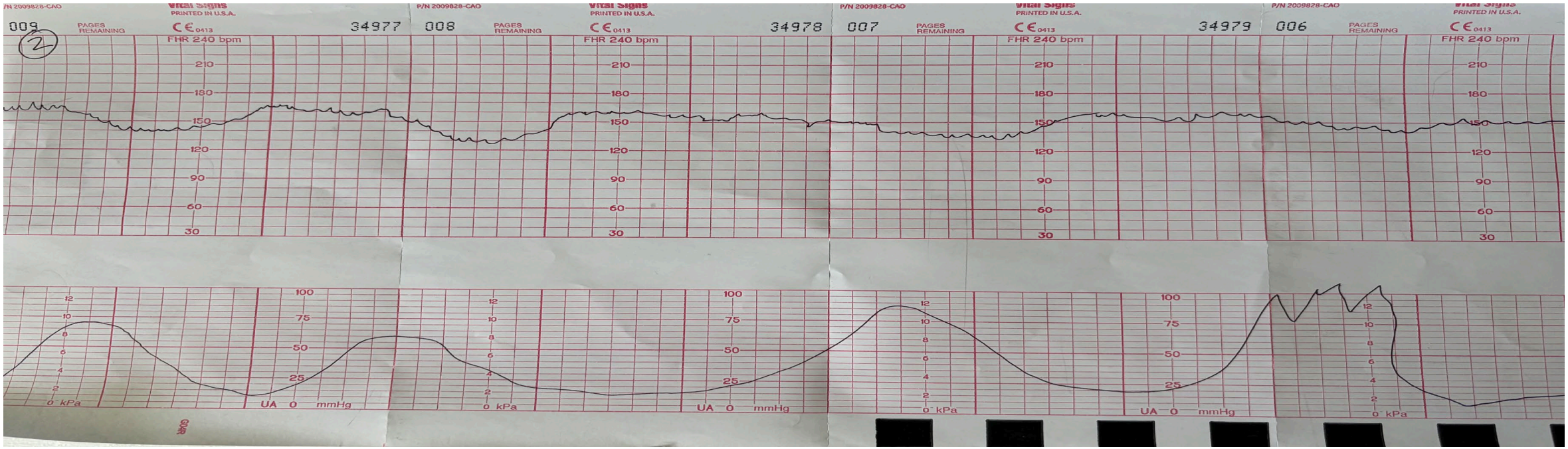
How would you manage this EFM ?

A) Immediate cesarean
B) IVF bolus and position changes, reassess in 30 min
C) IVF bolus and position changes, reassess in 60 min
D) FSE and IUPC
E) B and D
F) C and D

Documentation

- Pt is in active labor and experiencing significant bloody show
- External EFM 160 minimal variability. Accels / decels not noted however, we are not picking up tracing well with external monitor
- AROM and FSE/IUPC placed
- IVF bolus ordered
- Will continue to monitor for increased bleeding and reassess progress in 30 min

Clinical Recommendation	Evidence Rating	Comments
Structured intermittent auscultation can be used for low-risk labor; statistically decreases c/s and operative vaginal delivery rates without increasing risk CP or death	B	Cochrane of low-quality Evidence Expert Opinion ACOG practice guideline
Presence of moderate variability and/or accelerations is predictive of normal acid-base status	C	Reviews of disease-oriented outcomes Guidelines,
Treat placental fetal perfusion with intrauterine resuscitation before proceeding to immediate delivery	C	Guidelines, with one small RCT and one Cochrane focusing on tocolytics as part of intrauterine resuscitation
Perform amnioinfusion for repetitive variable decels to reduce risk c/s	B	Cochrane review of low-quality evidence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FHR 240 bpm
UA
mmHg
kPa

Answers

1. E
2. E
3. E

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Practice Recommendations

AAFP

Thank you

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AAFP

Lead Screening: Protecting Maternal and Fetal Health

Allegra M. Ponshock, MD, FAAFP (she/her)
Mile Bluff Medical Center

Disclosure Statement

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Learning Objectives

1. Determine when a pregnant patient is eligible for lead screening labs and interpret the test results.

2. Counsel patients about the dangers of lead during pregnancy and breastfeeding for both the pregnant patient and the fetus.

3. Describe the management of elevated lead levels in the perinatal period and how to collaborate with your local health department on this issue.

A Brief Thank You

ARS Question

Question 1

Who needs to be screened for lead poisoning?

A. Pediatric patients only
B. Pregnant patients only
C. Both A and B- I knew this
D. Both A and B- I am making an assumption since there is a talk about this
E. My dog who likes to eat walls at times

Abbreviations

Abbreviations

- AAP: American Academy of Pediatrics
- AAFP: American Academy of Family Physicians
- ACOG: American College of Obstetricians and Gynecologists
- B/C: Breast/Chest (reference to lactation)
- BLL: Blood Lead Level
- CDC: Centers for Disease Control
- DHS: Department of Health Services
- FDA: Food and Drug Administration
- Patient: A person who can get pregnant/has a uterus/is pregnant/has delivered (replaces maternal in most slides)
- PCP: Primary Care Provider
- USPSTF: United States Preventive Services Task Force

AAFP

Identifying the Care Gap

Scenario

- You are a new attending about one year out of training, sitting in your office doing notes
- Your lab tech comes in and tells you that the child of patient X just screened positive for lead and wasn't sure if you needed to know because patient X is pregnant
- You realize you know about screening recommendations in pediatric patients, but now are wondering about pregnant patients

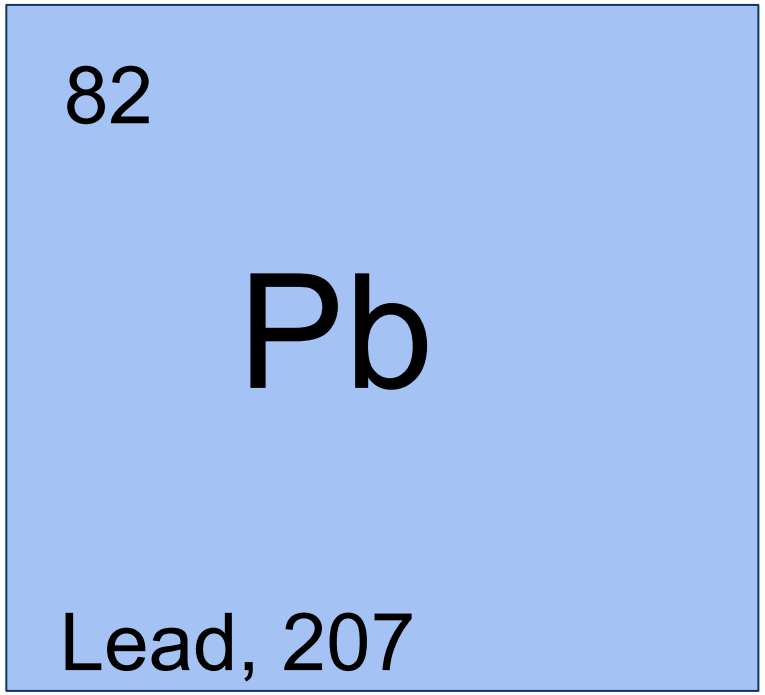
"PCPs are uniquely poised to identify and address care gaps as we care for entire families and see trends in our communities"

-A. Ponshock

Background on Lead

What is Lead?

- #82 on the periodic table
- Naturally occurring in Earth's crust
- Has been used by humans for thousands of years



What Health Impacts does Lead Have?

- Neurologic issues
- Crosses the placenta
- Stays in your body for a long time
- Pregnant Patients:
  - Hypertensive disorders
  - Spontaneous abortion
  - Low birth weight
  - Impaired neurodevelopment of the fetus

Getzin et al (2024), ACOG 533, Johnson et al (2022/2024)

ARS Question

Question 2

Where is lead found?

A. Old houses/paint
B. Water pipes
C. None of these
D. Both A and B and more!

ARS Question

Question 3

Why do children like to eat lead paint?

A. It is colorful
B. It tastes sweet
C. They are bored

Where is lead found?

- Paint
- Old houses (built prior to 1978)
- Batteries
- Coins
- Pipes

Newer sources of lead

- Spices
  - FDA Guidance for Industry: Action Levels for Lead in Processed Food Intended for Babies and Young Children January 2025
    - **10 parts per billion** (ppb) for fruits, vegetables, mixtures, yogurts, custards/puddings, and meats
    - **20 ppb** for single-ingredient root vegetables
    - **20 ppb** for dry infant cereals.

Newer sources of lead, continued

- Bullets, Fishing line sinkers
- Online sources→ cosmetics, pottery, hair dye, etc
- Occupational exposures
  - Artificial turf
  - Stained glass production
  - Shipyards
  - Smelting
- Small aircraft hobby

ARS Question

Question 4

What is a safe blood lead level?

A. Less than the lab reference value
B. None
C. <8 micrograms/dL
D. <10 micrograms/dL

"Adverse effects of lead exposure are being identified at lower levels of exposure than previously recognized in both children and adults"

-ACOG Committee Opinion #533

AAFP

Lead Screening in Pregnant Patients

"Clinical encounters offer an opportunity to screen and counsel patients during prepregnancy and prenatal periods…about opportunities to reduce toxic environmental health exposures"

-ACOG Committee Opinion #832

Who Gets Screened?

ACOG	All pregnant patients get a screening risk assessment. If they have one risk factor, then get a blood level.
USPSTF	Level I: "Evidence…is extremely limited"
AAFP	Insufficient evidence to support screening. Follow public health and pediatric recommendations.
AAP	Risk assessments in children 6 months - 6 years old with universal testing recommended at 12 and 24 months old for those enrolled in Medicaid or those who are high risk
CDC	Follow state guidance

Environmental History	Toxic Agent	Associations	Counseling to Minimize Exposure
See next slide	Lead	Neurodevelopment delays, etc as prior slides discussed	-Clean surfaces of dust with a wet cloth. Dry cloths can spread dust into the air instead of removing it. -There may be lead in house paint, dust, and garden soil. -Call the National Lead Information Center -Coat lead paint with fresh paint, wallpaper, or tiles -Do not sand or remove lead paint yourself. Hire a certified contractor for this. -Use lead free products -More guidance with ACOG Committee Opinion #533

Risk Assessment Questions

1) Recent move from an area where lead contamination is/was high?
2) Currently living near a lead source?
3) Working with and/or living with someone who does work with lead?
4) Use lead glazed ceramic pottery?
5) Eating non food substances/PICA?
6) Using alternative herbs, substances, or therapies?
7) Using imported cosmetics or food products?
8) Engaging in high exposure hobbies or recreational activity?
9) Renovating an older home without lead controls in place?
10) Consuming lead contaminated water?
11) History of previous lead exposure or elevated BLL?
12) Living with someone with an elevated BLL?

ACOG Committee Opinion 533

AAFP

Next Steps After Obtaining the Blood Lead Level

Blood Lead Level (in micrograms/dL)	Follow-Up Action Perinatally
<5	-No follow-up testing indicated
5-14	-Repeat lab in 1 month -Obtain a patient BLL and/or cord lead level at delivery
15-24	-Repeat lab in 1 month and then every 2-3 months -Obtain a patient BLL and/or cord lead level at delivery -May need to consider more frequent testing based on risk factors
25-44	-Repeat lab within 1-4 weeks and then every month -Obtain a patient BLL and/or cord lead level at delivery
45+	-Repeat lab within 24 hours and then at frequent intervals based on interventions and trend of levels -Obtain a patient BLL and/or cord lead level at delivery -Consult with a clinician experienced in management of patients with BLL in this range

Remember to add Lead Poisoning in the problem list or medical history

ARS Question

Question 5

What percentage of patients of childbearing age have blood lead levels >/= 5 micrograms/dL?

A. 0.01%

B. 0.1%

C. 1%

D. 10%

ACOG Committee Opinion #533

1%

OF PATIENTS OF CHILDBEARING AGES (15-49 years old) HAVE BLL >/=5 MICROGRAMS/dL

"Lead…has been detected in the fetal brain as early as the end of the first trimester"

Counseling Recommendations

- Use cold water for drinking, cooking, making baby formula
- Clean your faucet's screen monthly or use filtered water
- Run tap water for 3 minutes before use, if it has been sitting for 2+ hours
- Damp wiping of surfaces 2x/week
- Wash hands before meals
- Remove shoes while indoors
- Change work clothes before leaving work or immediately upon getting home if you work in a high risk of exposure field and wash work clothes separately. If you don't have a separate washing machine, run it empty to rinse any lead out before putting other clothes in.
- Cover bare soil outdoors
- Don't bring home work items. If you do, store them in heavy plastic away from family.

WI DHS, CDC

Links to Handouts

These are from the CDC and Wisconsin DHS

- https://stacks.cdc.gov/view/cdc/111149
- https://www.dhs.wisconsin.gov/library/collection/p-02409
- https://www.dhs.wisconsin.gov/lead/forms-pubs.htm

*They have a specific handout for hunters about meat processing to decrease lead contamination

Role of Nutrition

Calcium→ blocks absorption and release

Iron and zinc→ blocks absorption

Vitamin C → increases excretion

- Per ACOG, patients with BLL >5 micrograms/dL, should receive specific counseling about iron and calcium supplementation
  - Calcium supplementation of 1200 mg/day is associated with a 5-10% decrease in B/C milk lead levels

ARS Question

Question 6

Can patients with a BLL >/= 5 micrograms/dL B/C feed?

A. Yes
B. No
C. Maybe? (Yes, with caveats)
D. I’m unsure
E. I was having a good nap, why did you wake me up with a question?

Lactation and Lead

- Lead has been detected in B/C milk
  - Generally benefits of B/C feeding outweigh the risk of environmental exposure
  - There is limited high quality data to assess the risk for toxicity to the B/C fed infant

<3%

RATIO OF MILK LEAD LEVEL TO INFANT BLL

60%

OF AN EXCLUSIVELY FORMULA FED INFANT'S TOTAL LEAD EXPOSURE IS FROM LEAD IN DRINKING WATER

ACOG Committee Opinion #533

Blood Lead Level (in micrograms/dL)	Follow-Up Action for Lactation
5-39	-Can B/C feed -Sequentially test infant's BLL -If infant's BLL>5, stop B/C feeding until patient BLL decreases
40+	-Do not initiate B/C feeding -Pump and dump until BLL <40 -Repeat BLL testing every 1-2 weeks

ACOG Committee Opinion #533

"Obstetric care clinicians do not need to be experts in environmental health science to provide useful information to patients…It is important for [OB providers] to become knowledgeable about toxic environmental exposures that are endemic to their specific areas"

-ACOG Committee Opinion #832

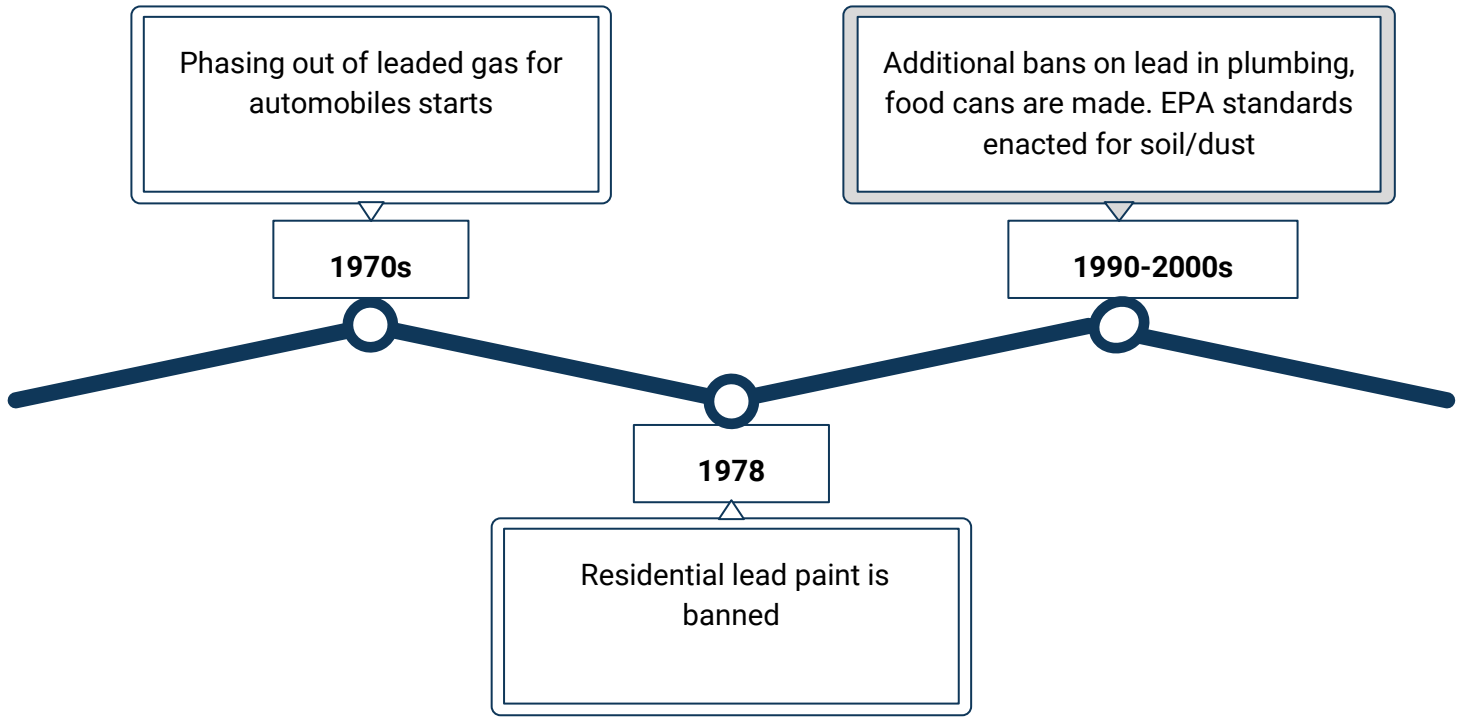
Scenario Follow-up

What Happened to Patient X?

- Patient X was in their first trimester when this situation occurred (2024)
- Her child was 1 year old and had a BLL>10. Other children were >5 y/o and not tested.
- The source? Her partner! He worked at a factory with a lot of lead contamination
  - Identified by our local health department who did extensive testing of the house
- Intervention:
  - Changes in the garage when gets home from work
  - Doesn't bring home items from work
  - Immediately showers when he gets home
- Patient X BLL during pregnancy: <1 so no follow-up testing done
- The child and baby from this pregnancy both have BLL of 4 and 6 respectively in 2026→remember the initial drop is fast, then long slow drop
  - Partner became a little less stringent when the newborn came which is why we think newborn has an elevated BLL

Lead and Public Health

Brief History of Public Health and Lead



Recent Lead Crises

2014: Flint, MI
2022: Providence, RI
2023: WanaBana Recall
2025: Milwaukee, WI

20%

OF A PERSON'S TOTAL LEAD EXPOSURE IS FROM LEAD IN DRINKING WATER

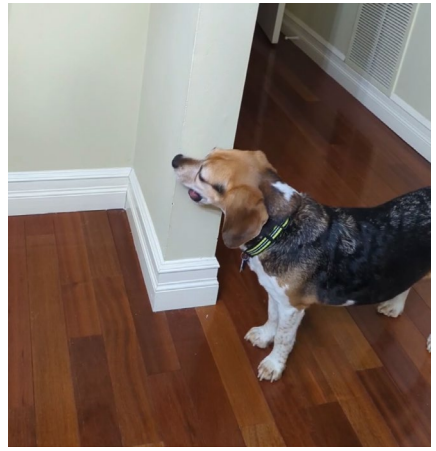
EPA Page about Lead in Drinking Water

Response to Recent Events

- Due to the increase in lead exposures/poisonings, there has been advocacy calls for increased lead screening, including in the perinatal period
  - Most vocal group for this: pediatricians/AAP!
    - (check out reference by K. Johnson on universal lead testing in pregnancy)
- Challenging due to federal policy changes and CDC restructuring
- States are taking matters into their own hands and moving towards universal screening in pediatric populations
  - Example Wisconsin:
    - 2024 State Law for universal testing
      - All children should have had at least two BLL by the age of 2 regardless of insurance/risk status
    - DHS sends personalized report to PCPs with their lead testing results for children enrolled in Medicaid

What Can You Do?

- Incorporate consistent lead risk screening and appropriate follow-up care into your preventive/perinatal/lactation/pediatric appointments
  - Tell your colleagues, hospital higher-ups, etc
- Reach out to your state health department
  - Advocate for universal pediatric or perinatal lead screening, improving access to unleaded water pipes, etc
- Be aware of environmental exposures pertinent to the population you serve
- Include lead poisoning diagnosis on problem lists
- Correct nutritional deficiencies and counsel about healthy diet
- Counsel about decreasing environmental lead exposures
- Remember you make a difference in your patients lives!



Answers

1. C & D
2. D
3. B
4. B
5. C
6. C

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- https://www.cdc.gov/breastfeeding-special-circumstances/hcp/exposures/lead.html

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AAFP

Thank you

AAFP

Vaccinations in Pregnancy: It's Worth a Shot!

Sarah Tiggelaar MD, CLC, FAAFP

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Learning Objectives

1. Identify vaccinations for which pregnant patients of varying gestational age and medical comorbidities are eligible.

2. Interpret the safety and efficacy data for common vaccinations in pregnancy and current controversies in this area.

3. Compare and contrast vaccination guidelines for pregnant patients from different organizations in the US and abroad.

4. Counsel pregnant patients with evidence-based strategies to optimize vaccine uptake.

ARS Question

Question 1

How well-prepared do you feel to educate your patients regarding vaccinations in pregnancy?

A. Very prepared - I can tackle any vaccination issue that comes up in a pregnant patient!
B. Fairly prepared - I have a good idea about most vaccination issues in pregnancy but will look up less common issues.
C. Not so great - I follow the basic recommendations and hope patients don’t have too many questions.
D. I really have no idea – Pregnant patients can get vaccines? Tell me more!

AAFP

Pregnancy Vaccination Guidelines

The Top 4 Vaccines in Pregnancy

Vaccine	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Tdap	Can be administered at any time											
COVID-19		Administer as soon as available		However, can be administered anytime of the year								
Influenza		Ideally administer early fall		However, can be administered anytime while the virus is circulating								
RSV		Administer Sept through Jan in most of the continental US										

They can be safely co-administered!

Table adapted from ACOG 2026

Tdap Vaccine

- **Efficacy:** Highly effective against all 3 infections in infants
  - 91% effective in first 2 months of life against pertussis infections
- **Products:** Any Tdap vaccine product
- **Schedule:** 1 dose preferably as early as possible from gestational weeks 27-36, every pregnancy
  - But safe at any time in pregnancy for wound management, pertussis outbreaks, or 'other extenuating circumstances'
  - If vaccinated earlier in pregnancy, do not give again
- "Cocooning" emphasized - Adolescent and adult family members
  - Ideally at least 2 weeks prior to contact with the newborn
- If not administered in pregnancy, administer immediately postpartum if never received

(Baxter 2017, ACOG 2017)

COVID-19 Vaccine

- **Efficacy:** Protects against infection with COVID-19 virus in both mothers and infants
  - 52% maternal vaccine effectiveness when received during pregnancy

    vs

    6% vaccine effectiveness when received ≥6 months prior (Ciesla 2024)

  - 52% reduction in risk of hospitalization of infants <6mo old with maternal vaccination (Halasa 2022)
- **Products:** Any COVID-19 vaccine
- **Schedule:** In any trimester, with emphasis on vaccine receipt as soon as possible

(ACOG 2025)

ARS Question

Question 2

Which of the following are correct about pregnancy and influenza infection and vaccination?

A. Pregnant people are more susceptible to influenza infection than those that are not pregnant.

B. Pregnant people are more likely to have severe influenza disease than those who are infected and not pregnant.

C. Influenza vaccination reduces the risk of influenza-related ED visits and hospitalizations among pregnant people.

D. B and C

E. All of the above

Influenza Vaccine

- **Efficacy:** Benefits to both pregnant people and infants
  - Similar vaccine efficacy among pregnant people as non-pregnant people, reducing influenza-like illness, ED visits, and hospitalizations
  - 4 large scale RCTs demonstrate neonatal protection from maternal influenza vaccination
- **Products:** Inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIV) products
  - No live vaccines!
- **Schedule**: One dose to people during any trimester who are or will be pregnant during flu season
  - Ideally prior to the start of flu season but any time is acceptable
  - If not vaccinated while pregnant, vaccinate immediately postpartum
  - History of egg allergy:
    - Only hives – any licensed vaccine appropriate for their age and health status
    - Other reactions – STILL any licensed vaccine, but in a medical setting

(ACOG 2018, ACOG 2024)

RSV Vaccine

- **Efficacy:** Protects against both maternal and neonatal upper and lower respiratory tract RSV infection
  - Phase 3 clinical trial: Reduced the risk of severe LRTI by 91% within 90 days after birth, and 76% within 180 days
  - Post-implementation: Significantly reduces severe LRTI in first 6 months of life, reduces hospital length-of-stay
- **Product:** Only one approved RSV vaccine product – Pfizer's bivalent RSVpreF vaccine (Abrysvo)
- **Schedule:** 1 dose between 32w0d and 36w6d gestation, in people who meet the following criteria:
  - Do not have a planned delivery within 2 weeks
  - **Did not receive the maternal RSV vaccine during a previous pregnancy**
  - Are not planning to have their infant receive a RSV monoclonal antibody
  - People who are 32w-36w6d from September 1 – January 31 (can be different in some areas of the country)
- Document well in the EMR so the baby's medical providers can see

(ACOG 2023)

RSV Vaccine Safety Concerns

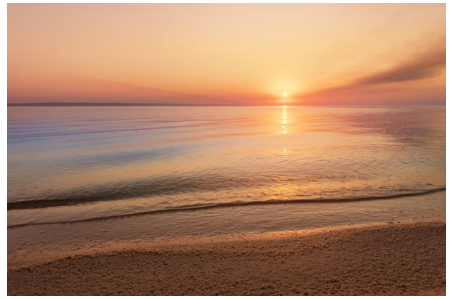
- Does it increase risk of Guillan-Barré (GBS)?
  - FDA labeling for Abrysvo changed in January 2025 to include increased risk of GBS
  - **However, this was from an observational study in people aged 65 and older!**
- Does it increase risk of preterm birth?
  - Phase 3 clinical trial had a non-statistically significant numerical imbalance in preterm births among Abrysvo recipients (5.7% vs 4.7%) in low to middle income countries
  - **Post-authorization surveillance rates of preterm births are not elevated post-vaccine compared to previous levels, and are equal to those not receiving vaccine**
- Does it increase risk of hypertensive disorders of pregnancy?
  - Phase 3 trial did not show any significant increase
  - A retrospective observational cohort study showed a small increase in frequency with one statistical method and not another
  - VSD propensity-matching study found 17.4% incidence in RSV-vaccinated and 15.3% in those unvaccinated, but did not control for parity
  - **Might be due to residual confounding variables, further study is needed**

(Jamieson 2026)

RSV Vaccine Alternatives

- 2 long-acting monoclonal antibodies now available – Nirsevimab (Beyfortus) and Clesrovimab (Enflonsia)
  - One dose recommended in all infants younger than 8 months born **DURING or ENTERING their first RSV season**
    - IF mothers did not receive Abrysvo OR
    - Infant was born 14 days or earlier after maternal vaccination OR
    - Concern that maternal immune response to the vaccine will be inadequate OR
    - There is a condition that could affect transplacental transfer of antibodies (HIV, malaria...)
  - **Optimal timing is at birth** or within first week of birth, but can receive at any time before they turn 8 months old
    - Regardless of gestational age at birth or underlying conditions
- Up to 91% effective against RSV-associated hospitalization among infants
- ACOG and CDC do not have preferential recommendation for maternal vs infant treatment if the pregnant person has not been vaccinated to RSV in the past

- Goodbye Palivizumab (Synagis) – discontinued as of December 31, 2025



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(ACOG 2026)

Additional Vaccines that Might be Indicated

- Other vaccine recommendations depend on the patient's age, health status, risk of exposure, and vaccination history
  - Pneumococcal
  - Meningococcal
  - Hepatitis A
  - Hepatitis B

Microsoft 365 stock images

(ACOG 2026)

Pneumococcal Vaccination in Pregnancy

- **Efficacy:** Decreases both maternal infections and complications and neonatal acute lower respiratory tract infections
- **Products:** Any vaccine approved for use in the US with some sources excluding PCV-21
- **Schedule:** During the 2nd or 3rd trimester for those with eligible pre-existing conditions
  - Limited data in the 1st trimester but reports after inadvertent administration are reassuring
- **Eligibility:** Eligible individuals according to CDC guidelines:
  - Immunocompromising conditions – sickle cell, HIV, asplenia, chronic renal failure, immunodeficiency, immunosuppressive medications
  - Chronic health conditions – including **diabetes, asthma,** chronic liver disease, alcoholism, chronic heart disease, and **cigarette smoking**
  - Neurological conditions – CSF leak, cochlear implants

(Dutra 2025, Jamieson 2026)

Meningococcal Vaccination in Pregnancy

- **Efficacy:** Similar efficacy as in non-pregnant people
- **Products:** Meningococcal conjugate vaccine (MenACWY)
  - Serogroup B vaccines with limited safety data, defer unless high risk
- **Schedule:** Any point during pregnancy
- **Eligibility:** If pregnant person is at risk for meningococcal disease:
  - Complement deficiency
  - Use of complement-blocking drugs
  - Functional or anatomic asplenia including sickle cell disease
  - Workplace-related risk
    - Clinical microbiology lab workers, military settings, communal living
  - International travel
  - Outbreaks

(Jamieson 2026)

Hepatitis A Vaccination in Pregnancy

- **Efficacy:** Similar to non-pregnant people
- **Products:** Any hepatitis A vaccine approved in the US including combos
- **Schedule:** Any point during pregnancy
- **Eligibility:** Pregnant people at high risk of acquiring hepatitis or having severe outcomes
  - International travel
  - Injection or non-injection drug use
  - Occupational risk for infection,
  - Close personal contact with an international adoptee
  - Unhoused
  - Chronic liver disease, HIV

(Jamieson 2026, ACOG 2026)

Hepatitis B Vaccination in Pregnancy

- **Efficacy:** Similar to non-pregnant people
  - Immunoprophylaxis at birth >95% effective in preventing vertical transmission
- **Products:** Any hepatitis B vaccine approved in the US including combos
- **Schedule:** Any point during pregnancy
  - All neonates should receive Hep B vaccine
  - Neonates born to people with Hepatitis B infection: vaccine + hepatitis B immunoglobulin within 12 hours of birth
- **Eligibility:** Any pregnant person who is previously unvaccinated
  - Unvaccinated and high-risk pregnant people should have a triple screen at presentation for prenatal care (HBsAg, anti-HBs, anti-HBc)

(Jamieson 2026)

“Special Situation” Vaccines in Pregnancy

Disease	Vaccine Indication in Pregnancy
Anthrax	Exposure to inhalational anthrax
Japanese Encephalitis	International travel with long stays in endemic areas/seasons
Mpox	High risk of infection or exposure
Polio	Travel to endemic countries, laboratory work
Rabies	Pre-exposure for “substantial and unavoidable risk” (e.g. global veterinary work) Post-exposure if unvaccinated
Smallpox	Pre-exposure if high risk Postexposure
Typhoid fever	International travel or other high risk
Yellow fever*	International travel

*Exception to live vaccine contraindication, see next slide

(Galang 2026, Jamieson 2026)

Live Vaccines: Contraindicated during Pregnancy

- MMR/Varicella
- Live attenuated influenza (nasal spray)
- Herpes zoster
- Dengue
- BCG
- **Yellow Fever: EXCEPTION** - Pregnancy is a 'precaution'
  - Unavoidable travel and risk of yellow fever exposure outweighs the vaccination risk
    - Pregnancy might affect immune responses - serologic testing
    - Should receive additional vaccine dose after pregnancy before next exposure
  - If the risks for vaccination outweigh the risks for exposure:
    - Medical waiver
- Avoid pregnancy for 4 weeks after administration of a live vaccine

(ACOG 2026)

Postpartum Vaccination Recommendations

- All vaccines recommended during pregnancy are still indicated postpartum and are safe during lactation
  - Exception: Tdap indicated only if pt did not receive as an adolescent or adult
- Most vaccines that are contraindicated during pregnancy are safe in postpartum period, including during lactation
  - Exception: Smallpox – the live replicating vaccine (ACAM2000) can transmit vaccinia to the infant
    - Use non-replicating vaccine (JYNNEOS) instead
  - Exception: Yellow fever – cases of infant vaccine-associated encephalitis have been reported
    - 2-week pump/dump period recommended if vaccination needed

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Vaccine Safety

Vaccine Safety in Pregnancy

- **No evidence of risks to pregnant people** greater than non-pregnant people with inactivated vaccines (Jamieson 2026)
- **No evidence of risk to the fetus** from vaccinating pregnant people with inactivated vaccines (ACOG 2026, Scott 2026, McMillan 2017)
  - 6 decades of RCTs, observational studies, case-control evaluations
- **HUGE evidence of risks to pregnant people and fetuses WITHOUT vaccination**
- Not enough data to assess safety risk of commonly used vaccine adjuvants but no data to suggest risk (ACOG 2026)
- No evidence exists to associate vaccination with risks of autism or adverse effects from thimerosal (Thompson 2007)
  - Tdap, COVID-19, and RSV vaccines do not have thimoseral
  - Multi-dose influenza vaccines do have thimoseral, but single-dose vials without thimoseral are available

ARS Question

Question 3

How many US monitoring programs for vaccine safety specifically address pregnant patients?

A. None
B. One
C. Two
D. Three or more

Vaccine Safety Monitoring Programs

- Vaccine Adverse Event Reporting System (VAERS)
  - Passive reporting system from providers and patients
- Vaccine Safety Datalink (VSD)
  - Collaborative project between CDC and 8 large US managed care organizations
  - Focused on the entire US population but has specific projects for pregnant patients
- Vaccines and Medications in Pregnancy Surveillance System (VAMPSS)
  - Specifically designed to assess safety in pregnancy
  - Prospective surveillance component (people enrolled in 1st trimester) + case-control surveillance component (pregnancies resulting in birth defects and controls interviewed about vaccine exposure)
- Clinical Immunization Safety Assessment (CISA)
  - Network of vaccine-safety experts who conduct vaccine safety studies
- V-Safe
  - Platform from the CDC specifically for studying safety of COVID-19 vaccines in pregnancy
  - Has now been used to study RSV vaccines as well
- Vaccine manufacturer's registries

COVID-19 Vaccine Guideline Discrepancy

- COVID-19 Vaccination in pregnancy: CDC vs ACOG/AAP
  - HHS and CDC announced in May 2025 that CDC no longer recommends COVID-19 vaccination during pregnancy
  - ACOG continues to strongly recommend vaccination in every pregnancy
  - AAP also recommends vaccination for every child age 6-23 mo

*"Although federal language has shifted toward shared clinical decision-making, **the underlying scientific evidence has not changed**. Robust data continue to demonstrate that pregnant and recently pregnant individuals are at increased risk for severe COVID-19–associated morbidity and adverse pregnancy outcomes. Accumulated safety data from millions of administered doses show no increased risk of adverse maternal, fetal, or neonatal outcomes associated with COVID-19 vaccination in pregnancy.*
*Accordingly, ACOG continues to recommend routine administration of updated COVID-19 vaccines for individuals who are pregnant, contemplating pregnancy, recently pregnant, or lactating. For this high-risk population, **vaccination should be recommended as standard preventive care** rather than deferred solely to neutral shared decision-making."* (ACOG 2020, updated 2026)

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Global Pregnancy Vaccine Considerations and Upcoming Advances

Global Differences in Pregnancy Vaccination Recommendations

- Tetanus and pertussis vaccine recommendations are common around the world but vary in timing and specific vaccine
  - High-income countries: 20-32 weeks gestation
  - Low and middle-income countries (LMIC): WHO prioritizes tetanus-toxoid alone
- Influenza
  - Most high-income countries recommend
  - LMIC: WHO recommends that pregnant women are the highest priority for vaccination, but few countries have programs
- COVID-19
  - High-income countries mostly recommend, prioritize mRNA vaccines
  - LMIC: WHO approved all 7 vaccine platforms in pregnancy (viral vector, inactivated, etc)
- RSV vaccination so far has mostly only reached high-income countries
  - United Kingdom prefers maternal vaccination: 28-36 weeks
  - France, Spain: prioritize neonatal Nirsevimab
- Other vaccine recommendations vary according to availability and disease prevalence

(Nassar 2021)

Vaccines On the Horizon

- Group B Streptococcus vaccines
  - Phase 2 clinical trials completed for 2 promising vaccine candidates
  - Phase 3 trials now underway
- Hepatitis E vaccine
  - Currently licensed in China
  - Studies ongoing in endemic areas
- Malaria vaccine
  - Radiation-attenuated vaccine based on P. falciparum sporozoites
  - Studies ongoing in endemic areas
- Chikungunya virus vaccine
  - Recently licensed
  - Studies needed!

(Jamieson 2026)

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Vaccine Uptake Challenges and Strategies

ARS Question

Question 4

What is the biggest challenge with vaccinating pregnant patients in your practice?

A. Availability/supply
B. Patient vaccine hesitancy
C. Internal staff hesitancy
D. State/local guidelines
E. Finances/reimbursement
F. Other

Vaccine Uptake Challenges

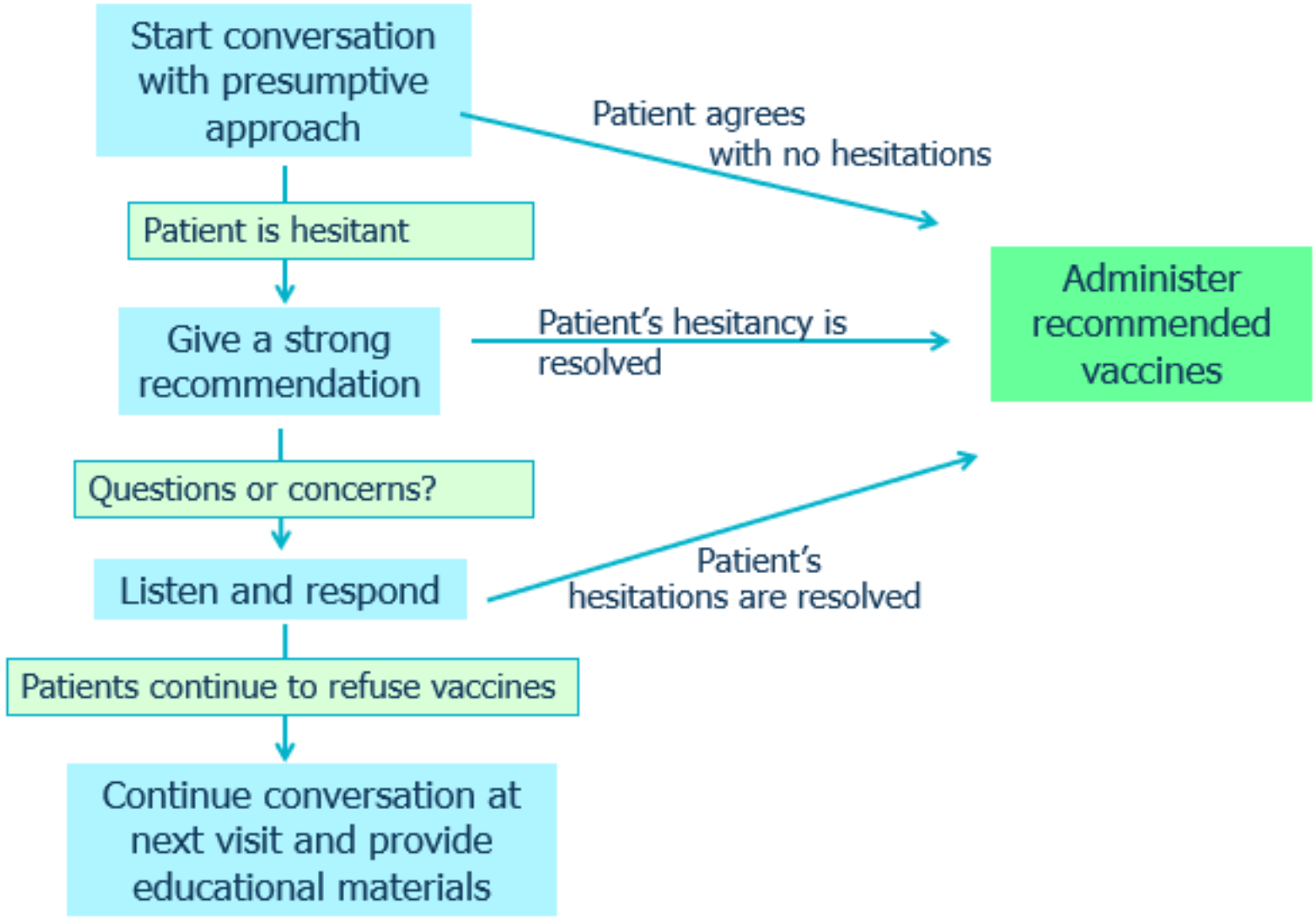
- Vaccine hesitancy: a delay in acceptance of vaccination, a refusal of vaccination despite availability of a vaccine, or a state of indecision and uncertainty about vaccination (Spires 2023)
  - Affordability
  - Restrictions, like inconvenience in accessing
  - Lessened confidence in efficacy
  - Diminished concerns over the diseases they prevent
- WHO identified vaccine hesitancy as a 2019 Top 10 Threat to Global Health
  - Prior to the pandemic!
- From 2019 to 2023 during pregnancy:
  - Influenza vaccination declined from 57.5 to 47.2%
  - Tdap vaccination remained stable at 54%.8 (Dutra 2025)
- In 2020 among pregnant people:
  - 72% of pregnant people reported anxiety about catching COVID-19
  - Only 41% considered vaccination (Battarbee 2022)

How to Increase Vaccine Uptake

- Counseling strategies:
  - Start at the first visit!
  - 'Opt out' is more effective than 'opt in' – start with a presumptive approach
  - Focus on the **benefits**
  - **Give a strong recommendation**
  - Tailor your message to your audience
  - Assess your implicit biases and offer non-judgmental counseling
  - Ask 'why'
  - Have patient handouts and information ready
  - Cheerful (or at least non-blaming) acceptance of refusal … and then offer it again next time!
- Other strategies:
  - Make vaccines **available in antenatal clinics**, including group prenatal care visits
  - Assess insurance status early in pregnancy
  - Stay up to date with new clinical guidance and local news that might affect vaccine uptake in your population

(AAFP 2026, Dutra 2025, Spires 2023)

Strategies to Increase Vaccine Uptake



"There is no one size fits all approach when it comes to vaccine communication."
– Dr. George C. Benjamin, Executive Director of the American Public Health Association

Graphic adapted from AAFP 2023 Physician Vaccines in Pregnancy Handout

Maternal Immunization Task Force

Formed in 2024 to share immunization resources, address the needs to prenatal care providers, and create a shared vision of maternal immunization.

AMERICAN ACADEMY OF FAMILY PHYSICIANS

AMERICAN COLLEGE of NURSE-MIDWIVES

ACOG 75
American College of Obstetricians & Gynecologists

AWHONN
PROMOTING THE HEALTH OF WOMEN AND NEWBORNS

NPWH The National Association of NURSE PRACTITIONERS in WOMEN'S HEALTH

Society for Maternal-Fetal Medicine
High-risk pregnancy experts

Vaccination Resources

Maternal Immunization Task Force Tools and Resources page:
https://www.acog.org/programs/immunization-infectious-disease-public-health/maternal-immunization-task-force

ACOG Vaccine Social Media Toolkit:
https://www.acog.org/programs/immunization-infectious-disease-public-health/tools-and-resources/maternal-immunization-social-media-toolkit

AAFP Immunizations and Vaccines page:
https://www.aafp.org/family-physician/patient-care/prevention-wellness/immunizations-vaccines.html#pregnancy

Questions? Contact me!

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Microsoft 365 stock images

Answers

1. No correct answer
2. D
3. D
4. No correct answer

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Practice Recommendations

- Strongly recommend all pregnant people receive Tdap, Influenza, COVID-19, and RSV vaccinations as part of routine prenatal care. (SORT A)
- Offer other vaccinations during pregnancy depending on the patients ages, health status, risks of exposure, and vaccination history. (SORT A)
- Approach vaccine counseling for pregnant patients with an 'opt-out' presumption, non-judgmental curiosity, tailored messaging, and persistence. (SORT B)
- Familiarize yourself with provider and patient-oriented vaccination resources and select several to use in your practice. (SORT C)

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Thank you!