WELCOME
to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Funding Statement

This resource is supported by funding through the Rural Maternal Obstetric Management Strategies (RMOMS) grant from the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS), part of a 4-year award totaling $991,467 annually with 0% financed with non-governmental sources. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government. For more information, please visit HRSA.gov

North Country Maternity Network partners

- **North Country Health Consortium**
  - Rural health network to enhance collaboration among regional health and human service providers
- **Critical access/community hospitals providing birthing services**
  - Androscoggin Valley/North Country Healthcare
  - Littleton Regional Hospital
  - Northeastern VT Regional Hospital (VT)
- **Critical access hospitals that don't provide birthing services**
  - Weeks Medical Center
  - Upper ConnecticutValley Hospital
- **Federally Qualified Health Centers**
  - Coos County Family Health Services
  - Little Rivers Health Center (VT)
- **Family Resource Center**
  - Community-based family support program
- **Women of the Mountains Birth Initiative**
  - Community-based educational and perinatal support program
- **Dartmouth Health**
  - Academic Medical Center

NCMN Partners

Series Learning Objectives

After participating in this activity, learners will be able to:

- Discuss maternal health conditions, including labor induction and prenatal/postpartum emergencies to improve management of obstetrical complications
- Develop a collaborative network of healthcare providers to support high quality, consistent care of pregnant people
- Utilize evidence-based practice resources and support

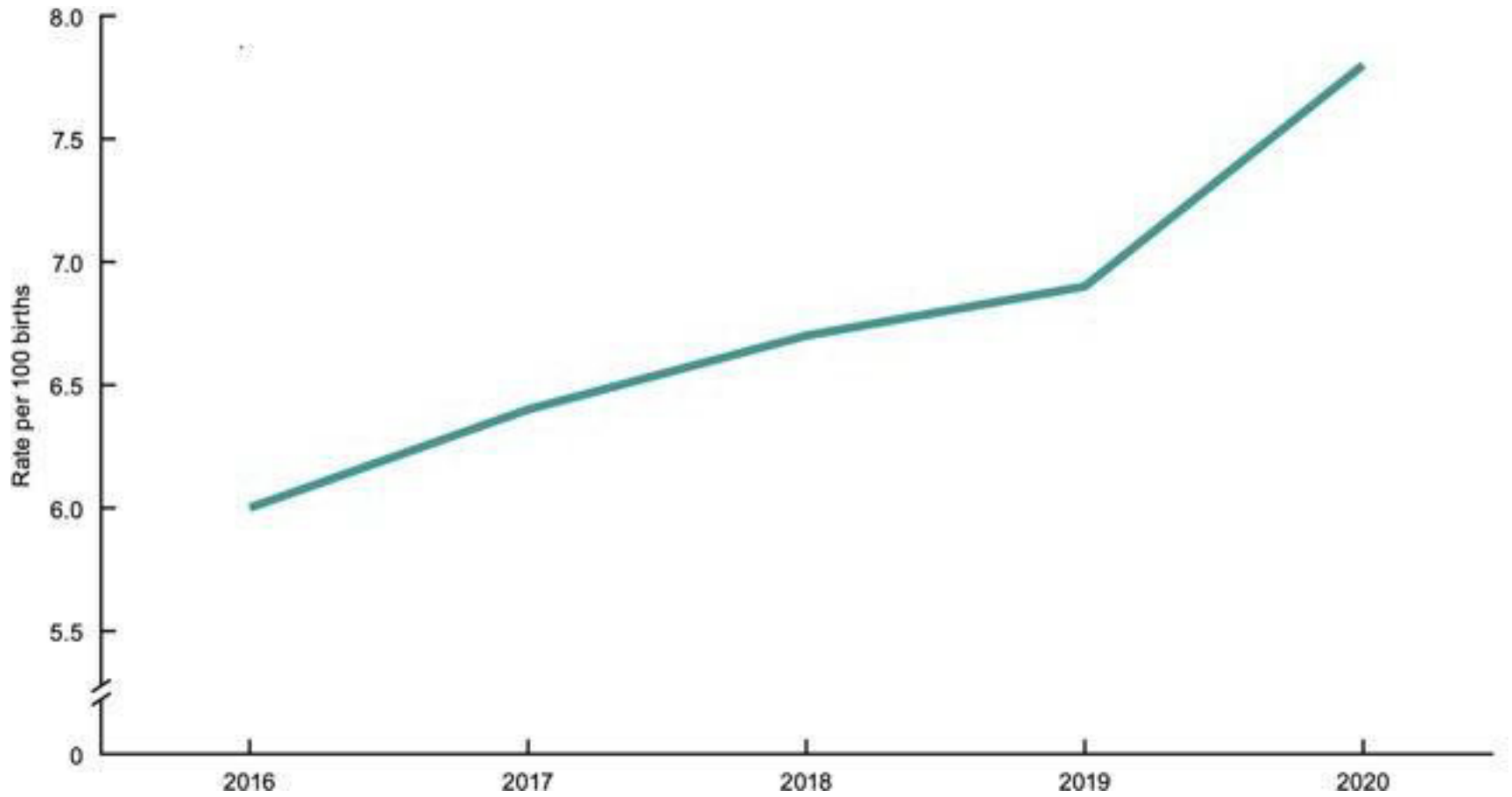
Dartmouth Health ECHO

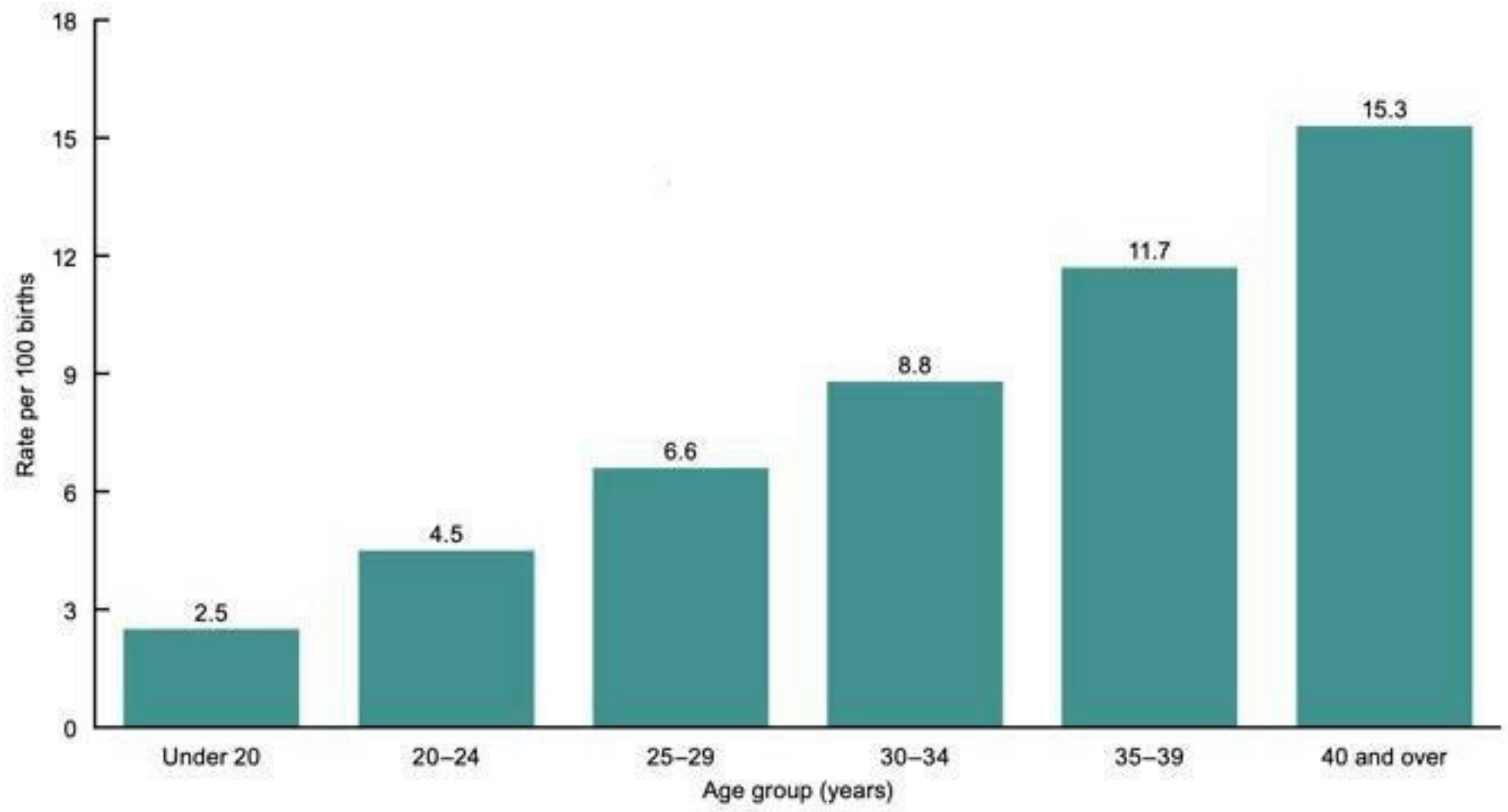
Series Sessions

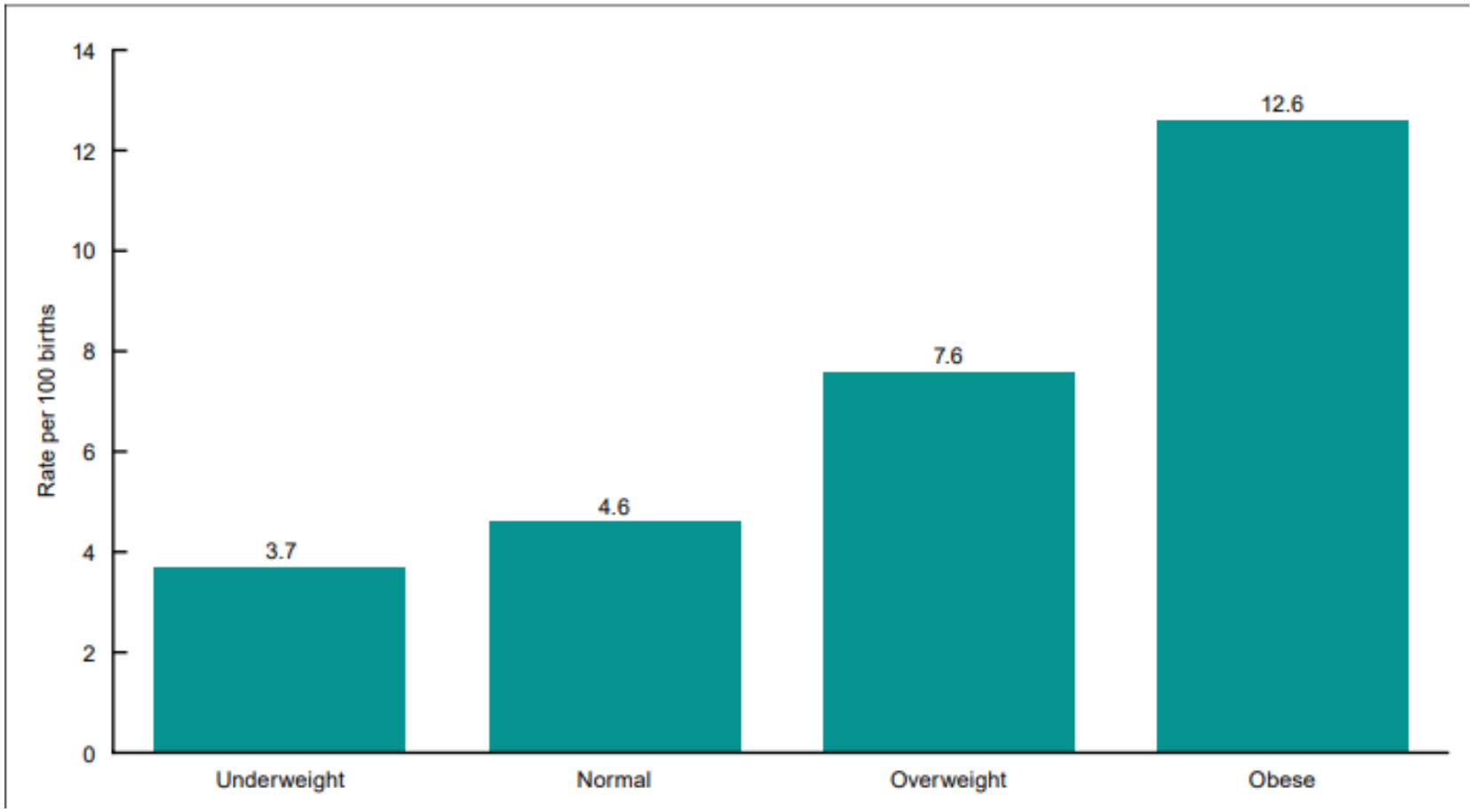
Date	Session Title
January 21	Maternal Care in Rural Areas: focus on Gestational Diabetes
February 18	Hypertension and Pre-eclampsia
March 18	Mood Disorders: Prenatal and Post-partum
April 15	Updates on Syphilis and HIV
May 20	Screening and Management of Hepatitis B and C
June 17	Risk Appropriate Care for Perinatal Substance Use Disorders
July 15	Doulas, Midwives, and Medical Providers
August 19	Advocating Current Standards in Pain Management
September 16	Best Practices in Induction of Labor
October 21	VBACs (vaginal birth after cesarian)
November 18	Decision Making for Third Trimester Obstetric Emergencies and Transport
December 16	Management of Postpartum Hemorrhage

Gestational Diabetes

Emily R. Baker, MD
Maternal Fetal Medicine
Dartmouth Health


8.0
7.5
7.0
6.5
6.0
5.5
0
Rate per 100 births
2016
2017
2018
2019
2020


18
15
12
9
6
3
0
Rate per 100 births
2.5
4.5
6.6
8.8
11.7
15.3
Under 20
20–24
25–29
30–34
35–39
40 and over
Age group (years)


Rate per 100 births
14
12
10
8
6
4
2
0
3.7
4.6
7.6
12.6
Underweight
Normal
Overweight
Obese

Pathophysiology

- Personal insulin resistance

Plus

- Steadily rising insulin resistance related to human placental lactogen.

- Immediate fall after placenta delivery

Morbidity

- Preeclampsia
- Cesarean section
- Macrosomia
- Shoulder dystocia
- Neonatal hypoglycemia
- Neonatal Jaundice
- NICU stay

Screen for pre-pregnancy diabetes by HbA1c

- BMI > 25 kg/m^2 *or* BMI >23 kg/m2 in Asian Americans *with one or more of the following*
  - Physical inactivity
  - First degree relative with diabetes
  - High risk ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
  - Previously given birth to an infant weighing ≥ 4000 gm
  - Previous gestational diabetes
  - Hypertension (140/90 mm Hg or on treatment for hypertension)
  - HDL cholesterol <35 mg/dl or triglyceride level > 250mg/dl
  - Polycystic ovarian syndrome
  - HbA1c ≥ 5.7%, impaired glucose tolerance or impaired fasting glucose on previous testing
  - Other clinical conditions associated with insulin resistance (e.g. acanthosis nigricans)
  - History of cardiovascular disease
  - Age 35 years or greater
  - HIV infection

Screen for pre-pregnancy diabetes by HbA1c

- HgbA1c results
  - ≥6.5% – meets criteria for diagnosis of diabetes. Manage as a pre-existing diabetic.
  - 5.7 – 6.4% - impaired glucose tolerance. Consider recommendation for nutrition counseling. Plan routine screening with 1hr GCT at 24-28w. Clinical judgement and shared decision making about starting home glucose monitoring before routine screening if additional risk factors
  - <5.7% - normal. 1hr GCT at 24-28w

Glucose challenge test tips for patients

- 50 gram is not a fasting test
- Do not restrict carbohydrates for 3 days prior to the 100 gram test
- Bring a sandwich to eat after last blood draw
- Drink it cold

Glucose cutoffs

- 50 gram ≥ 135 mg/DL
- 100 gram
  - Fasting ≥ 95 mg/dL
  - 1-hour ≥ 180 mg/dL
  - 2-hour ≥ 155 mg/dL
  - 3-hour ≥ 140 mg/dL
- Home targets
  - Fasting < 95 mg/dl
  - 1-hour < 140 mg/dl
  - 2-hour < 120 mg/dl

Three hour 100 gram OGTT with one abnormal value

- Fasting blood glucose ≥ 95 mg/dL.
  - Consider home glucose monitoring for 7-10 days to determine need for ongoing monitoring.
  - Review recommendations for nutrition and exercise during pregnancy or refer to dietician or clinical diabetes educator
- Elevated 1, 2, or 3 hour
  - Review recommendations for nutrition and exercise during pregnancy or refer to dietician or clinical diabetes educator

Next steps after diagnosis

- Medical Nutrition Therapy
  - Refer to nutrition counselor RD
  - Clinic generated handouts
  - ADA handouts
  - Video/on line resources
  - The intention of diet changes is not to lose weight and is not to be hungry
- Exercise
  - Encourage moderate intensity aerobic exercise at least 5 days per week or a minimum of 150 minutes per week.
  - 15-to-20-minute brisk walk after meals

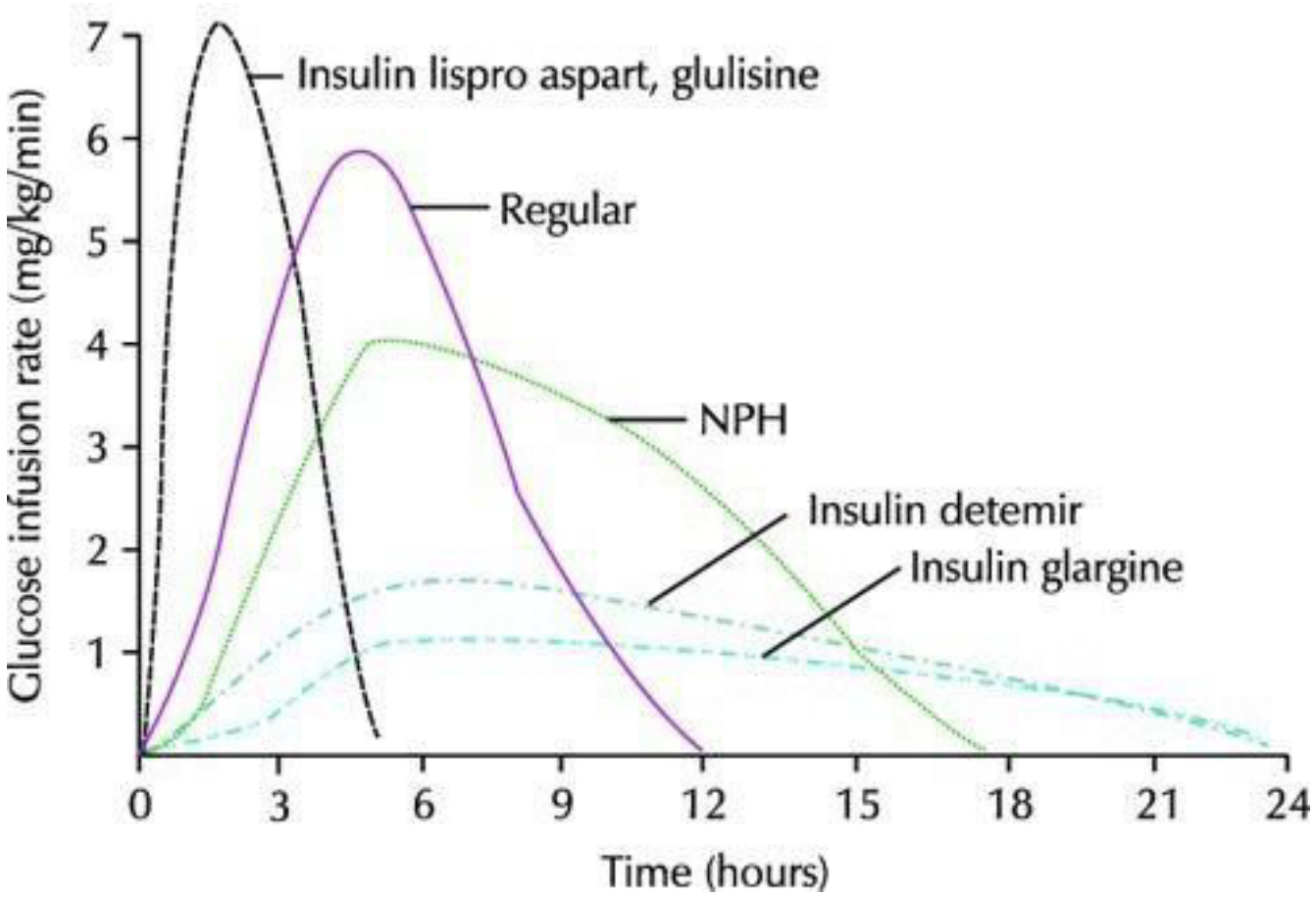
Next steps

- Home monitoring (fasting and 1 hour postprandial)
- Establish means to communicate glucose numbers (phone, fax, portal, CGM)
- Communication allows coaching and encouragement

Medication

- Insulin is the standard treatment – many reasonable option)
- Start medication if roughly 30% of a given time-frame is abnormal
- Lots of nuance and experience drives dosing decisions
- Many regimen options
- GDM patient are not “brittle”
- Can be fairly aggressive at increasing insulin dose especially when high BMI
- Expect high amount of insulin
- At extreme U500

Medication- Insulin



Medications

- Metformin
  - Metformin can be used for patients who decline insulin therapy, who cannot afford insulin therapy or for those patients whom the obstetrical care providers believe will be unable to safely administer insulin.

Surveillance

- GDMA1
  - No antenatal testing.
  - Deliver 39w0d – 40w6d
  - Ultrasound q 4w
- GDMA2
  - NST 1-2/week depending on control
  - Deliver 39w0d – 39w6d
  - Prior to 39 weeks if very poor control
  - Ultrasound q 4week

Mode of Delivery

- ACOG

  “Women with GDM should be counseled regarding the risks and benefits of a scheduled cesarean delivery when the estimated fetal weight is 4,500 g or more”

Delivery

- Intrapartum
  - Every 2 hour fingerstick with short acting insulin
  - No intermediate or long acting insulin
  - The work of labor will help keep glucose down
- After delivery: immediate resolution of placenta- mediated insulin resistance
  - 75- gram OGTT postpartum day 1-3 or at 4-12 weeks postpartum

75 gram OGTT

- Type 2 Diabetes
  - A single abnormal value on 75 gram GTT
    - Fasting ≥ 126 mg/dL
    - 2-hour ≥ 200 mg/dL
  - HBA1c ≥ 6.5%
  - Random plasma glucose ≥ 200mg/dL with symptoms of diabetes
- Impaired Fasting Glucose (IFG)
  - Fasting ≥ 100-125 mg /dl
- Impaired Glucose Tolerance (IGT)
  - 2-hour ≥ 140-199 mg/dl

Follow up care

- Amend EMR history and problem list
- Copy the primary care provider regarding GDM
- Careful discussion with her about the risk for type 2 diabetes and repeat GDM, need for frequent testing
- Encourage breast feeding

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Session 2, Maternal Care in Rural Areas: focus on Hypertension and Pre-Eclampsia

February 18, 2025

Hypertensive Disorders of Pregnancy

Robert N. Blatman, MD
Maternal Fetal Medicine
Dartmouth Health

Hypertensive Disorders of Pregnancy

- Chronic Hypertension
  - Hypertension before 20 weeks and after 12 weeks postpartum
- **Gestational Hypertension**
  - Hypertension that develops after 20 weeks and resolves by 12 weeks postpartum
  - No proteinuria or
  - No sign/symptoms of end-organ dysfunction
- **Preeclampsia**
  - Hypertension that develops after 20 weeks and resolves by 12 weeks postpartum
  - Proteinuria and/or
  - Signs/symptoms of end-organ dysfunction
  - Does not require edema
- Chronic Hypertension with Superimposed preeclampsia
- Eclampsia

Epidemiology basics

- >70000 deaths worldwide
- Incidence in US is about 5% (and creeping up)
- Late onset preeclampsia (>34 weeks) is about 6 fold more common than early onset
- One third are nulliparous
- About 5% are recognized postpartum

Risk Factors Preeclampsia

- Previous preeclampsia
- Family history of preeclampsia
- Renal Disease
- Autoimmune disease
- Diabetes
- Obesity
- AMA
- Adolescent pregnancy
- Multiple Gestation

Typical Presentation of preeclampsia

- 85% present with hypertension and proteinuria after 34 weeks
  - Hypertension: Diastolic >=140 or systolic >=90
  - On 2 occasions 4 hours apart
- Proteinuria
  - 300mg/24 hour or
  - Urine Pr/Cr ratio of >= 0.3 or
  - 2+ on urine dip (only if more quantitative options are not available)

Severe Preeclampsia

- **Symptoms**
  - Headache
    - Generally not responsive to pain medication
  - Abdominal Pain
    - RUQ or epigastric
  - Visual changes
    - Scotomata, blurred vision, rarely cortical blindness
  - Pulmonary edema
- **Laboratory findings**
  - Elevated LFTs (> double high end of normal)
  - Thrombocytopenia (<100)
  - Elevated Creatinine (>1.1)
- **Oliguria** (<500cc/24 hour**)**

Potential Complications of Preeclampsia

- **Seizures (eclampsia)**
- **Hypoxia**
- **Stroke**
- **Abruption**
- **Fetal Growth Restriction**
- **Stillbirth**
- **Death**

Atypical Presentations

- HELLP syndrome
  - Hemolysis
  - Elevated LFTs
  - Low Platelets
- Gestational proteinuria
  - 20-25% go onto develop preeclampsia
- Presentation <20 weeks
  - Most are associated with molar pregnancies or severe preexisting disease (Such as antiphospholipid antibody syndrome)

Management:
Gestational Hypertension/Preeclampsia without severe features

- Delivery at 37 week

- <37 week, Expectant management until:
  - 37 week or
  - Development of severe features

Management:
Preeclampsia with severe features

- Admit

- Delivery may often be delayed until 34 weeks
  - Severe range blood pressure that can be controlled
  - No evidence of end-organ damage

Management:
Preeclampsia with severe features

- Delivery before 34 weeks is indicated for:
  - Fetal demise
  - Fetal surveillance indicating fetal jeopardy
  - Escalating hypertension poorly responsive to antihypertensives
  - Persistent symptoms unresponsive to pain medication
    - Headache
    - Upper abdominal pain
  - Pulmonary Edema
  - Acute renal injury
  - Escalating LFTs
  - HELLP Syndrome

Management:
Preeclampsia with severe features

- Possible indications for delivery before 34 weeks
- Abruption
- Labor
- Maternal request?

Intrapartum Management: General Principals

- OK to induce labor
- Use Continuous EFM (not a candidate for Intermit Ausculation
- Manage Hypertension:
  - Target BP is unclear. 130's-140's/80's-90's is probably reasonable
- May reasonable to have primary c/section for those most at risk of failing IOL:
  - Early gestational age
  - Worrisome maternal pathology
    - Very low platelets, severe symptoms

Intrapartum Management: General Principals

Seizure Prophylaxis

- Preeclampsia without severe features
  - Probably doesn't need Magnesium (We usually don't)
  - (but seizure risk is close to 1%)
- Preeclampsia with severe features
  - Magnesium Sulfate 4-6 gram loading dose and then 2gm/hour for most people
  - Adjust maintenance downward for those with high creatinine or low urine output
  - Check levels clinically or with lab every 4 hours
  - Continue until 24 hours postpartum. Maybe longer with neurologic symptoms.

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Confounding and clinically tricky Circumstances

- Preexisting Maternal disease with
  - Proteinuria
  - Hypertension
  - Elevated LFTs
  - Headache
  - Often difficult diagnostic conundrum
- Almost severe?
  - Headache the is somewhat responsive to treatment
  - BP that is tickling severe

Prevention of Preeclampsia

- Aspirin
- Timing and best doses are not completely clear
- ACOG, SMFM and USPSTF all recommend 81mg/day
- Europe (FIGO) uses 150mg
- Society of Ob/Gyns of Canada recommends 162mg/day
- I generally recommend 162/day starting at 12 weeks and continuing until delivery

Strategies to Improve Rural Perinatal Healthcare: Maternal Mental Health

Julia Frew, MD

Department of Psychiatry, Dartmouth Health

March 18, 2025

Outline

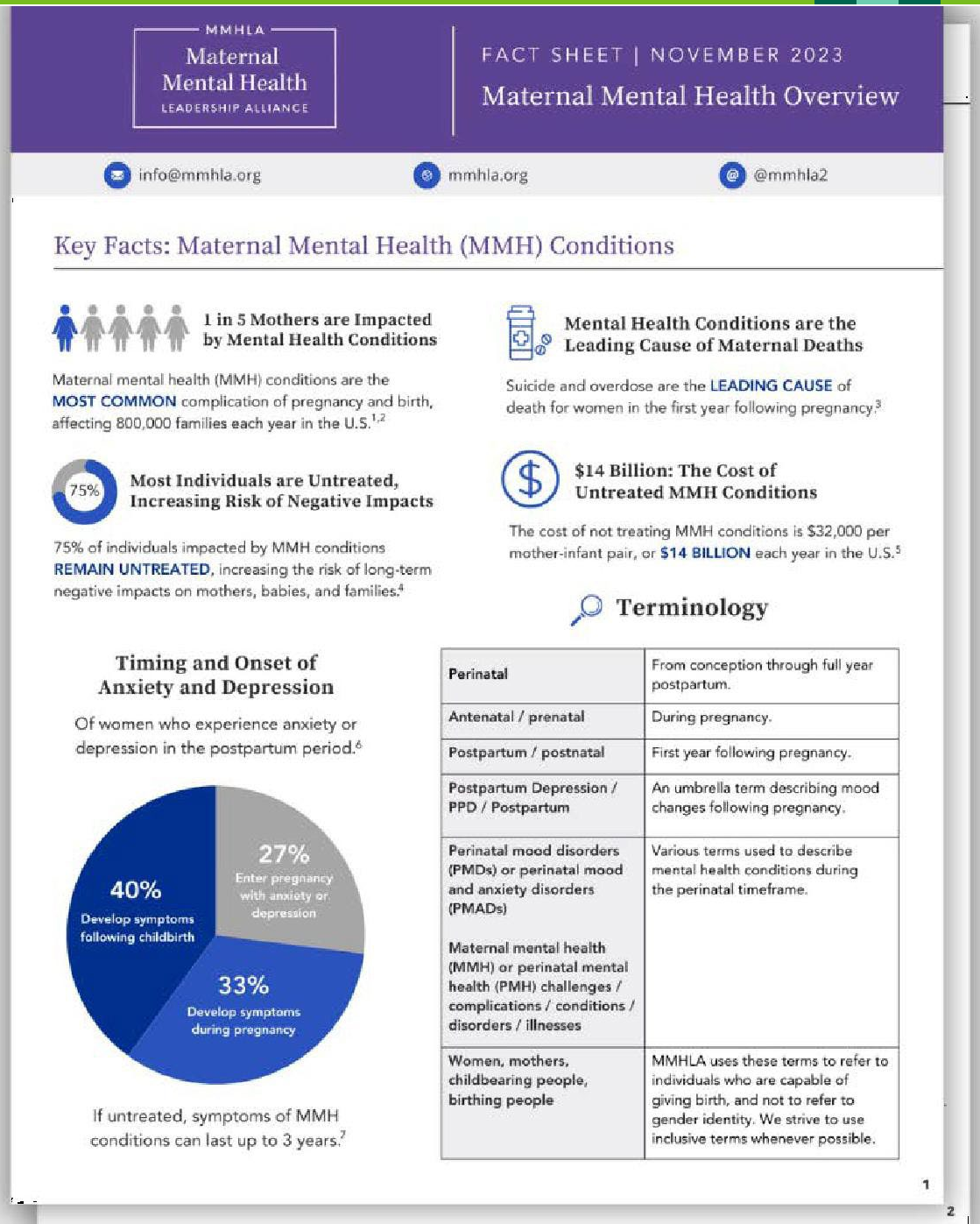
- Epidemiology
- Screening
- Assessment
- Treatment
- Resources

Perinatal Mental Health Conditions

- Common
- Impactful
- Treatable, but often go untreated

Suicide and overdose are the LEADING CAUSE of death for women in the first year following pregnancy, with 80% of those deaths deemed preventable.

https://www.cdc.gov/maternal-mortality/php/data-research/index.html



MMHLA Maternal Mental Health LEADERSHIP ALLIANCE

FACT SHEET | NOVEMBER 2023

Maternal Mental Health Overview

info@mmhla.org mmhla.org @mmhla2

Key Facts: Maternal Mental Health (MMH) Conditions

1 in 5 Mothers are Impacted by Mental Health Conditions

Maternal mental health (MMH) conditions are the **MOST COMMON** complication of pregnancy and birth, affecting 800,000 families each year in the U.S.[1,2]

Mental Health Conditions are the Leading Cause of Maternal Deaths

Suicide and overdose are the **LEADING CAUSE** of death for women in the first year following pregnancy.[3]

Most Individuals are Untreated, Increasing Risk of Negative Impacts

75% of individuals impacted by MMH conditions **REMAIN UNTREATED**, increasing the risk of long-term negative impacts on mothers, babies, and families.[4]

$14 Billion: The Cost of Untreated MMH Conditions

The cost of not treating MMH conditions is $32,000 per mother-infant pair, or **$14 BILLION** each year in the U.S.[5]

Timing and Onset of Anxiety and Depression

Of women who experience anxiety or depression in the postpartum period.[6]

If untreated, symptoms of MMH conditions can last up to 3 years.[7]

Terminology

Perinatal	From conception through full year postpartum.
Antenatal / prenatal	During pregnancy.
Postpartum / postnatal	First year following pregnancy.
Postpartum Depression / PPD / Postpartum	An umbrella term describing mood changes following pregnancy.
Perinatal mood disorders (PMDs) or perinatal mood and anxiety disorders (PMADs) Maternal mental health (MMH) or perinatal mental health (PMH) challenges / complications / conditions / disorders / illnesses	Various terms used to describe mental health conditions during the perinatal timeframe.
Women, mothers, childbearing people, birthing people	MMHLA uses these terms to refer to individuals who are capable of giving birth, and not to refer to gender identity. We strive to use inclusive terms whenever possible.

1

Screening

- ACOG recommends that screening for perinatal depression and anxiety occur at the initial prenatal visit, later in pregnancy, and at postpartum visits using a standardized, validated instrument.

- Lifeline for Moms has created composite screeners including:
  - Depression: PHQ9 or EPDS
  - Anxiety: GAD-7
  - Bipolar disorder: MDQ (only needs to be done once as it queries lifetime symptoms)
  - PTSD: PC-PTSD-5
  - Supplemental patient safety screener

- Screen all perinatal patients for SUD using a validated questionnaire or conversation with patient
  - Routine urine drug screening not recommended

https://www.acog.org/programs/perinatal-mental-health/patient-screening

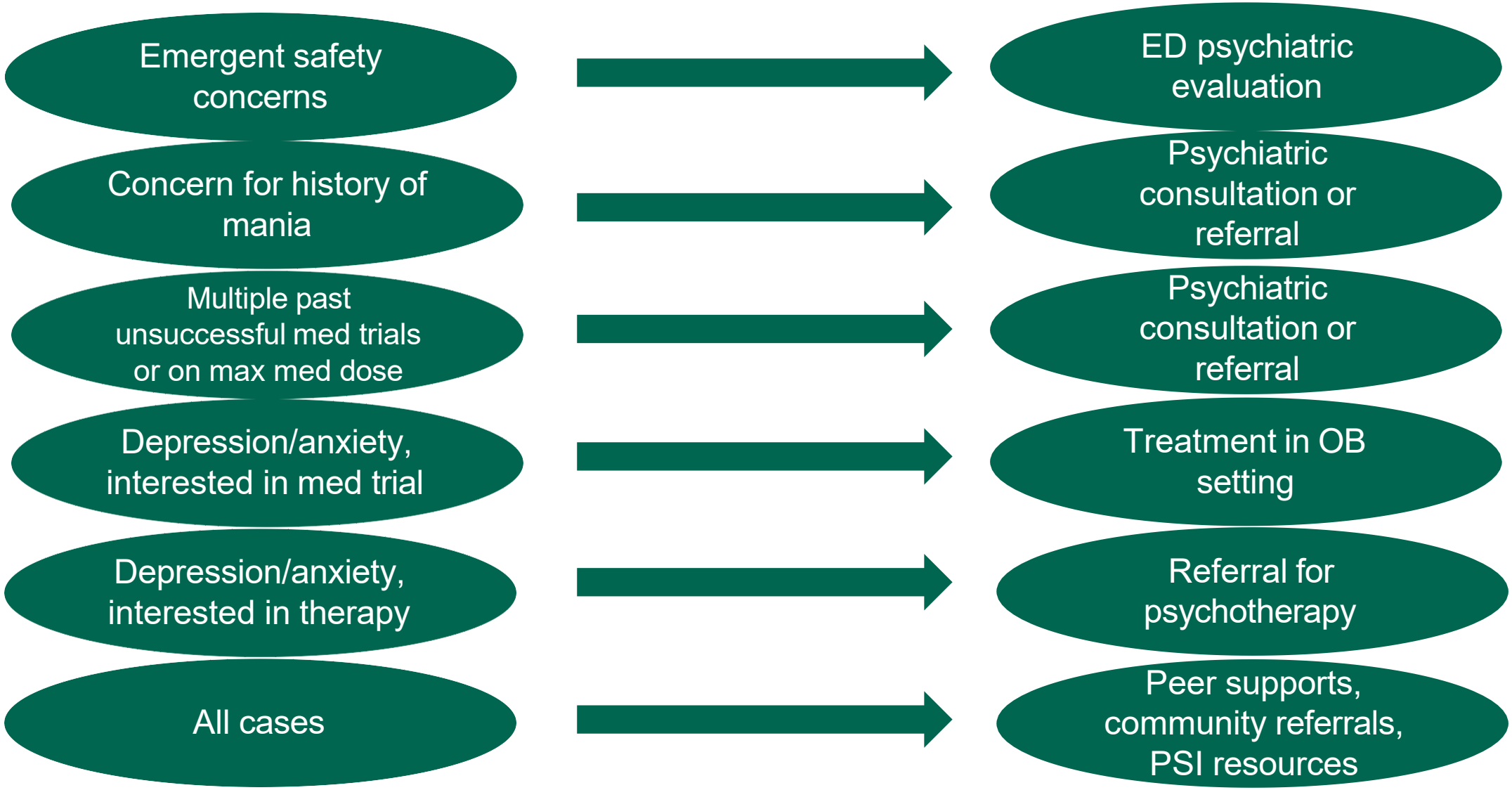
https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2015/06/alcohol-abuse-and-other-substance-use-disorders-ethical-issues-in-obstetric-and-gynecologic-practice

Assessment (screening ≠ diagnosis)

- Positive screening results should trigger further assessment
- At a minimum, assess:
  - Safety
  - Severity of symptoms
  - Interest/openness to treatment options (meds, psychotherapy)
  - Presence of current treatment providers

"Is this something I can address in the OB setting, or do I need additional support?"

Assessment


Emergent safety concerns
ED psychiatric evaluation
Concern for history of mania
Psychiatric consultation or referral
Multiple past unsuccessful med trials or on max med dose
Psychiatric consultation or referral
Depression/anxiety, interested in med trial
Treatment in OB setting
Depression/anxiety, interested in therapy
Referral for psychotherapy
All cases
Peer supports, community referrals, PSI resources

Treatment of MMH conditions in the OB setting

- **If:**
  - No concern for history of mania
  - At least moderate symptoms of anxiety/depression
  - Interest in med trial
- **Then:**
  - Initiate SSRI or SNRI (choose previously effective med, if applicable)
  - Titrate to effect or to at least a moderate dose
    - Sertraline 100-150mg
    - Fluoxetine 40-60mg
    - Escitalopram 15-20mg

Know Your Local Resources

- Psychiatry services in your medical system
  - Collaborative/integrated care models
  - Subspecialty mental health care
  - Electronic or curbside consultation
- Community Mental Health Centers
- Family Resource Centers/Parent Child Centers
- Private Practice providers in the community
  - https://www.psychologytoday.com/us/therapists
- PSI Online Provider Directory:
  - https://www.postpartum.net/get-help/provider-directory/

State Resources

National Network of Perinatal Psychiatry Access Programs

Our National Network of Perinatal Psychiatry Access Programs:

- Facilitates peer learning and resource sharing among aspiring, emerging, and established Perinatal Psychiatry Access Programs and relevant partners across the U.S.
- Nurtures relationships to promote continued support for, and innovation and expansion of, existing and future programs.
- Facilitates quality improvement, program evaluation, and equity advancement within and across programs.

Learn more about our commitment to equity across our Network of Perinatal Psychiatry Access Programs.

If your state doesn't have a Perinatal Psychiatry Access Program yet and you are interested in consulting with a perinatal psychiatrist, you can contact the **Postpartum Support International (PSI) Perinatal Psychiatric Consult Line** online or by calling **877-944-4773**.

https://www.umassmed.edu/lifeline4moms/Access-Programs/

National Resources

- PSI Perinatal Psychiatric Consult Line
  https://www.postpartum.net/professionals/perinatal-psychiatric-consult-line/

POSTPARTUM SUPPORT INTERNATIONAL

Medical Providers (For Prescribers):

The PSI perinatal psychiatric consultation line is a service provided at no cost.

The consultation line is available for medical professionals who are prescribers and have questions about the mental health care related to pregnant and postpartum patients and pre-conception planning. This consultation service is available for medical providers only.

The Perinatal Psychiatric Consult Line is staffed by experts in the field of psychiatry who are members of PSI and specialists in the treatment of perinatal mental health disorders. The service is free and available by appointment.

Fill out this form **and we will match you with an appointment. We will respond to your request within one business day.**

The presentation of perinatal mental health disorders is not always straightforward, and medication is not always immediately effective. PSI's expert perinatal psychiatrists are available to share their skills and expertise with fellow medical professionals, providing necessary guidance and reassurance on any matter, but particularly those that may be more challenging.

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Online Resources for Providers

MGH CENTER for Women's Mental Health
Reproductive Psychiatry Resource & Information Center

Welcome to Reprotox

An information system developed by the Reproductive Toxicology Center for its members.

Login

REPROTOX® contains summaries on the effects of medications, chemicals, infections, and physical agents on pregnancy, reproduction, and development. The REPROTOX® system was developed as an adjunct information source for clinicians, scientists, and government agencies. Patients should consult their health care providers rather than relying on REPROTOX® summaries.

Lifeline for moms

PSI POSTPARTUM SUPPORT INTERNATIONAL

Bumps Best use of medicines in pregnancy

Drugs and Lactation Database (LactMed®)

Bethesda (MD): National Institute of Child Health and Human Development; 2006-

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Search this book

The LactMed® database contains information on drugs and other chemicals to which breastfeeding mothers may be exposed. It includes information on the levels of such substances in breast milk and infant blood, and the possible adverse effects in the nursing infant. Suggested therapeutic alternatives to those drugs are provided, where appropriate. All data are derived from the scientific literature and fully referenced. A peer review panel reviews the data to assure scientific validity and currency.

Online Resources for Pati

MGH CENTER for Women's Mental Health
Reproductive Psychiatry Resource & Information Center

PSI POSTPARTUM SUPPORT INTERNATIONAL

STAR LEGACY FOUNDATION

resolve THE NATIONAL INFERTILITY ASSOCIATION

Bumps Best use of medicines in pregnancy

Resources

- Postpartum Support International: https://www.postpartum.net/
- Ammon-Pinizzotto Center for Women's Mental Health at MGH: https://womensmentalhealth.org/
- Mother to Baby (Organization of Teratology Information Specialists): https://mothertobaby.org/
- Reprotox: https://reprotox.org/
- LactMed: https://www.ncbi.nlm.nih.gov/books/NBK501922/
- BUMPS (UK Teratology Information Service): https://www.medicinesinpregnancy.org/
- Lifeline4Moms: https://www.umassmed.edu/lifeline4moms/
- Star Legacy Foundation (stillbirth and infant loss): https://starlegacyfoundation.org/
- Resolve (infertility): https://resolve.org/

Syphilis and HIV

Strategies to Optimize Rural Perinatal Healthcare ECHO

Learn more at:
www.cdc.gov/sti

The State of STIs in the United States in 2023.

Sexually transmitted infections (STIs) are very common but preventable.

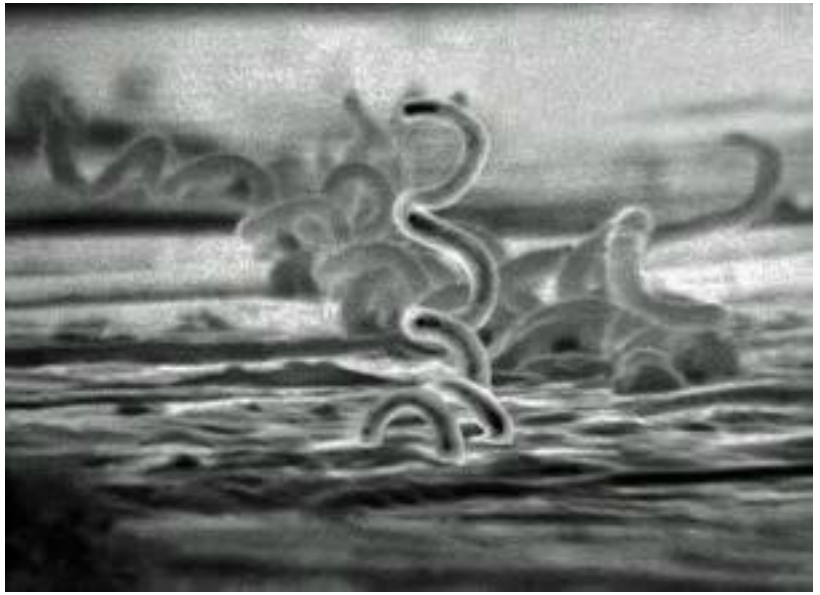
1.6 million cases of **CHLAMYDIA; 9% decrease** since 2019.

601,319 cases of **GONORRHEA; 2% decrease** since 2019.

209,253 cases of **SYPHILIS; 61% increase** since 2019.

3,882 cases of **SYPHILIS AMONG NEWBORNS; 106% increase** since 2019.

Syphilis



- *Treponema pallidum*
- Spirochete - corkscrew-shaped, motile microaerophilic bacterium that cannot be viewed by normal light microscopy.
- Transmitted sexually through skin and mucous membranes (during primary or secondary stages when lesions or rash are present), and hematogenously (transplacental spread to fetus)

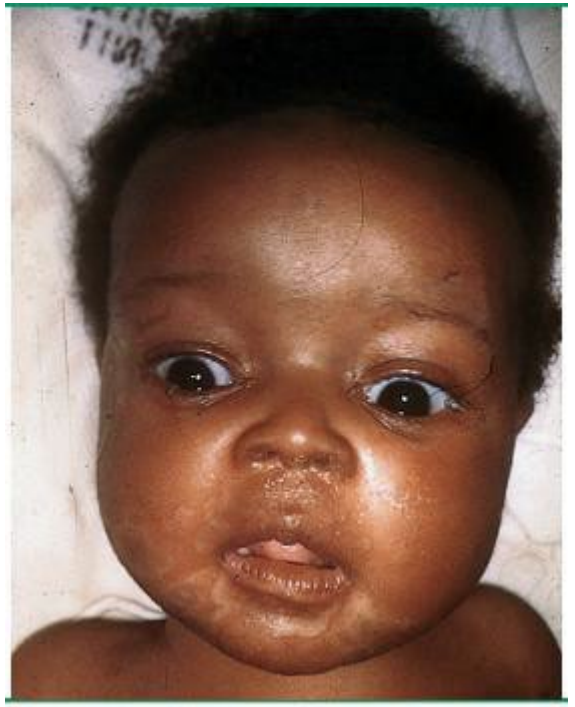
Syphilis in Pregnancy

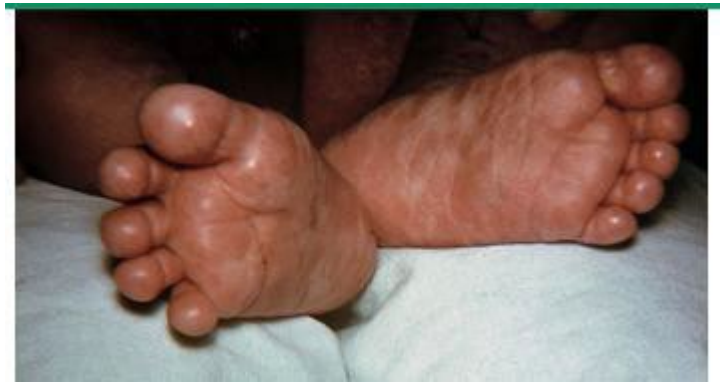
- Transplacental transmission of *T. pallidum* can occur at any time during gestation but occurs with increasing frequency as gestation advances.
- Women with untreated primary or secondary syphilis are more likely to transmit syphilis to their fetuses than women with latent disease.
- If acquired within 4 years of delivery, can lead to infection in fetus in 80% of cases and may result in stillbirth or infant death in up to 40%.
  - The risk of transmission is only 2% after four years.
- *T. pallidum* is not transferred in breast milk, but transmission may occur if the mother has a chancre on her breast.

N Engl J Med. 1952;247(2):48.

Congenital Syphilis

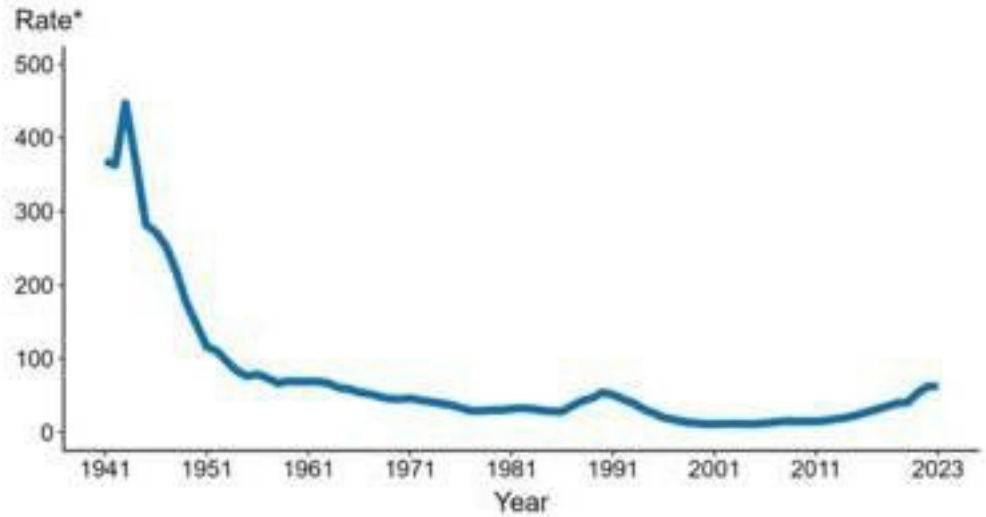
- Wide spectrum of clinical manifestations
- Only severe cases are clinically apparent at birth
  - 60-90% of live-born neonates with congenital syphilis are asymptomatic at birth
- Bones, liver, pancreas, intestine, kidney, and spleen are the most frequently and severely involved





Pediatr Infect Dis J. 2012;31(9):988
MMWR Morb Mortal Wkly Rep. 2015;64(44):1241

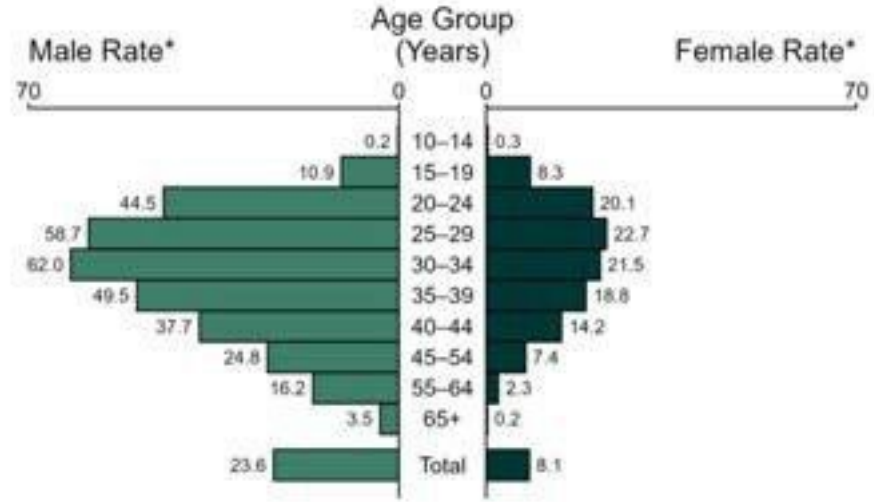
Syphilis — Rates of Reported Cases by Year, United States, 1941–2023



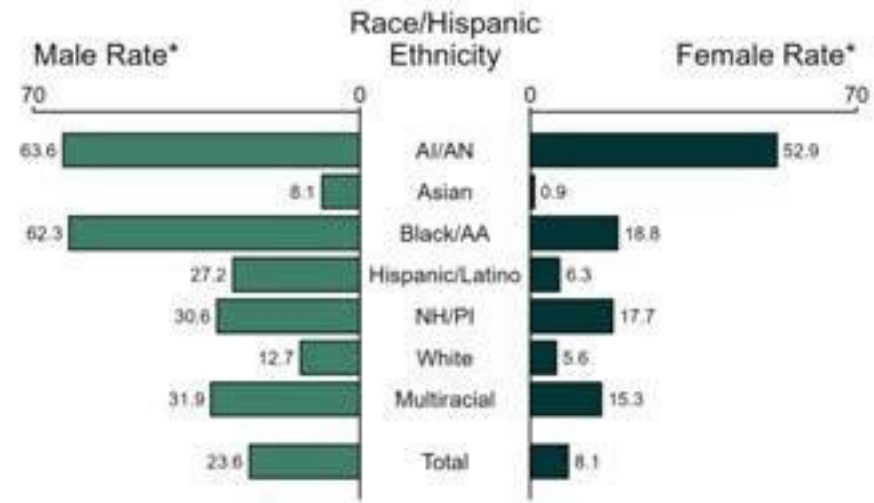
* Per 100,000

NOTE: Includes all stages of syphilis and congenital syphilis.

Primary and Secondary Syphilis — Rates of Reported Cases by Age Group and Sex, United States, 2023



Primary and Secondary Syphilis — Rates of Reported Cases by Race/Hispanic Ethnicity and Sex, United States, 2023

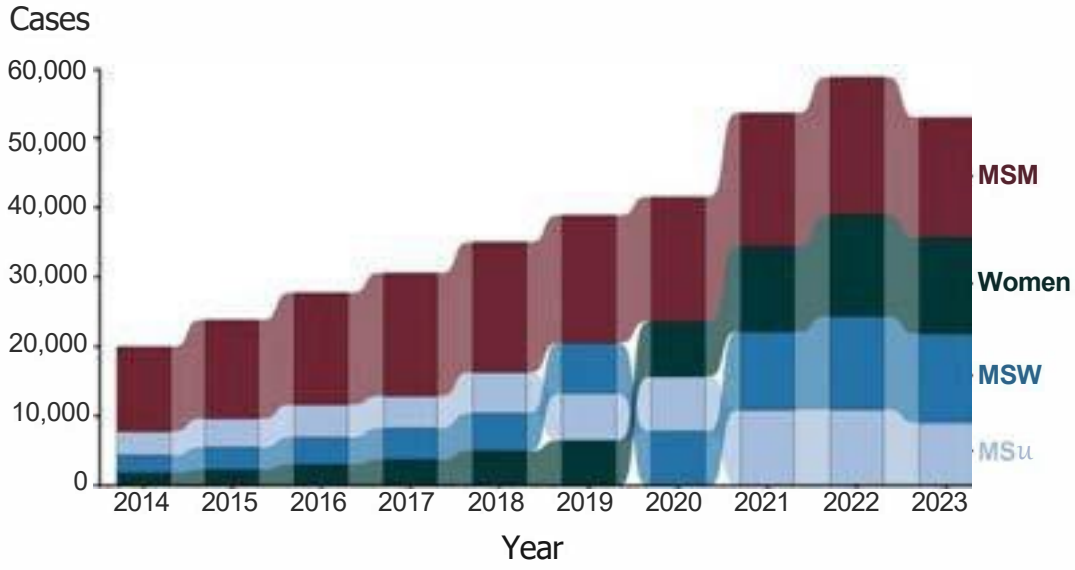


* Per 100,000

ACRONYMS: AI/AN = American Indian or Alaska Native; Black/AA = Black or African American; NH/PI = Native Hawaiian or other Pacific Islander

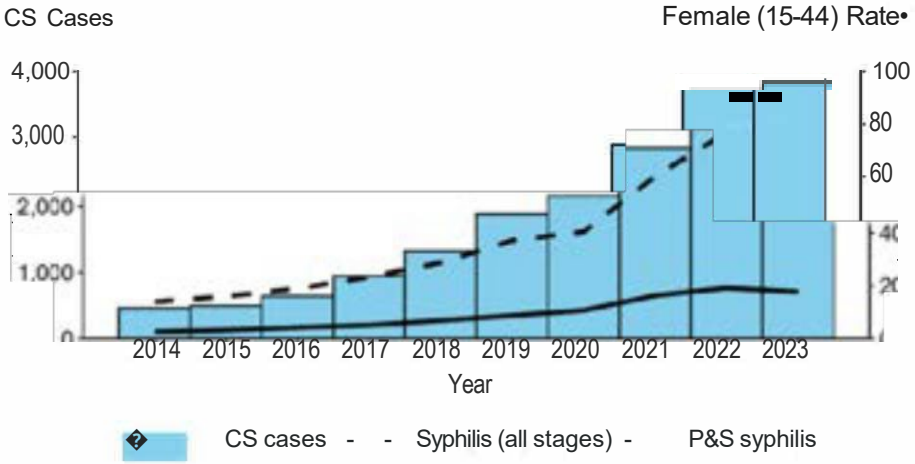
NOTE: In 2023, 2,292 primary and secondary syphilis cases among men (5.8%) and 647 cases among women (4.7%) had missing, unknown, or other race and were not reported to be of Hispanic ethnicity. These cases are included in the total rates.

Primary and Secondary Syphilis - Reported Cases by Sex and Sex of Sex Partners and Vear, United States, 2014-2023



ACRONYMS: MSM = Men who have sex with men; MSU = Men with unknown sex of sex partners; MSW = Men who have sex with women only

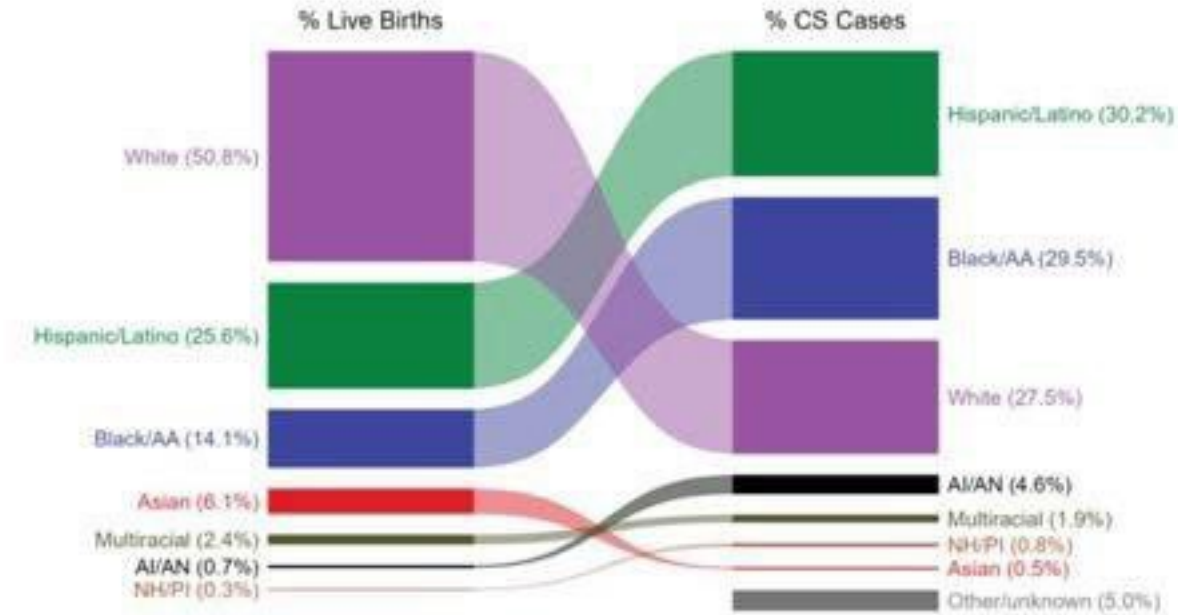
Congenital Syphilis - Reported Cases by Year of Birth and Rates of Reported Cases of Primary and Secondary Syphilis and Syphilis (All Stages) Among Women Aged 15-44 Years, United States, 2014-2023



• Per 100,000

ACRONYMS: CS = Congenital syphilis; P&S Syphilis= Primary and secondary syphilis

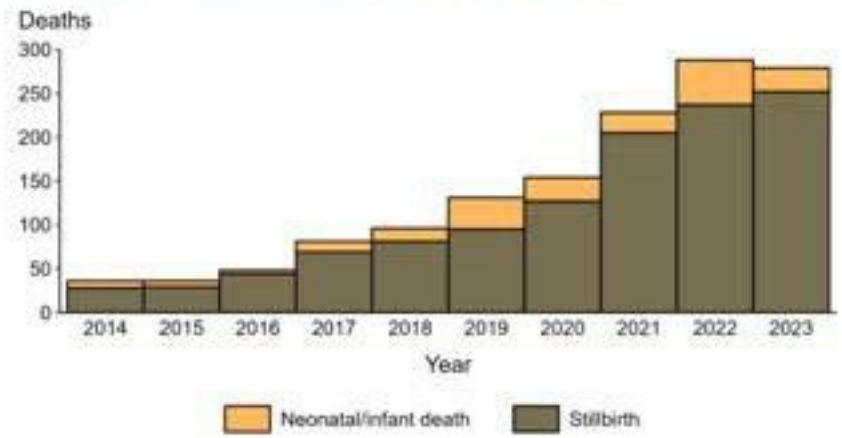
Congenital Syphilis — Total Live Births and Reported Cases by Race/Hispanic Ethnicity of Birth Parent, United States, 2023



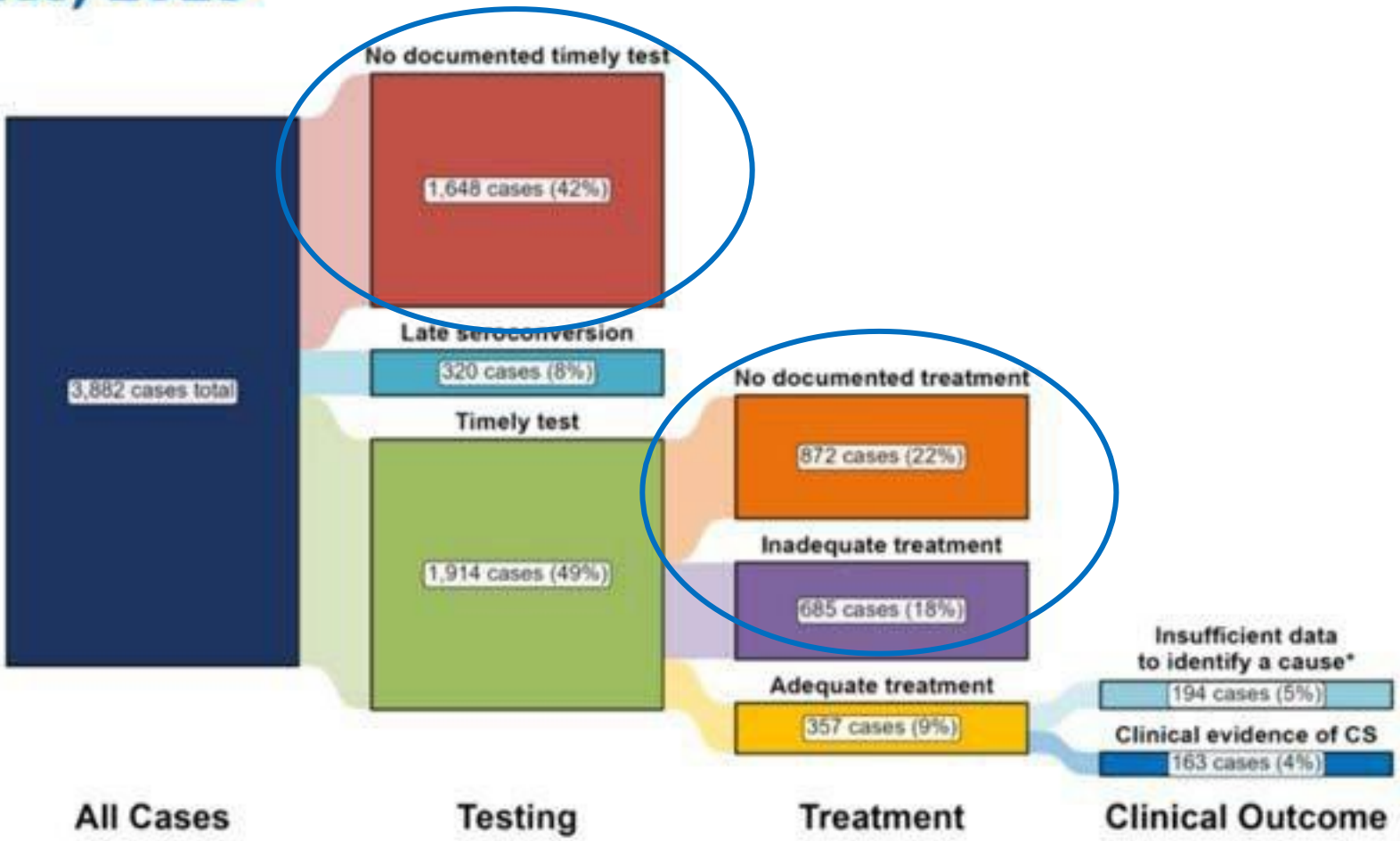
NOTE: In 2023, a total of 193 congenital syphilis cases (5.0%) had missing, unknown, or other race and were not reported to be of Hispanic ethnicity. These cases are included in the "other/unknown" category.

ACRONYMS: AI/AN = American Indian or Alaska Native; Black/AA = Black or African American; NH/PI = Native Hawaiian or other Pacific Islander

Congenital Syphilis — Reported Stillbirths and Neonatal/Infant Deaths by Year, United States, 2014–2023



Congenital Syphilis — Distribution of Receipt of Testing and Treatment by Pregnant Persons with a Congenital Syphilis Outcome, United States, 2023



* Cases with insufficient data to assign a likely missed opportunity were due to missing or incomplete data in case notification data at CDC. More complete data on these cases may be available at the jurisdictional level, allowing for ascertainment of the likely missed opportunity.

NOTE: Percentages represent the number of congenital syphilis (CS) cases among the 3,882 total CS cases reported among states and the District of Columbia in 2023.

Vital Signs: Missed Opportunities for Preventing Congenital Syphilis — United States, 2022

10x

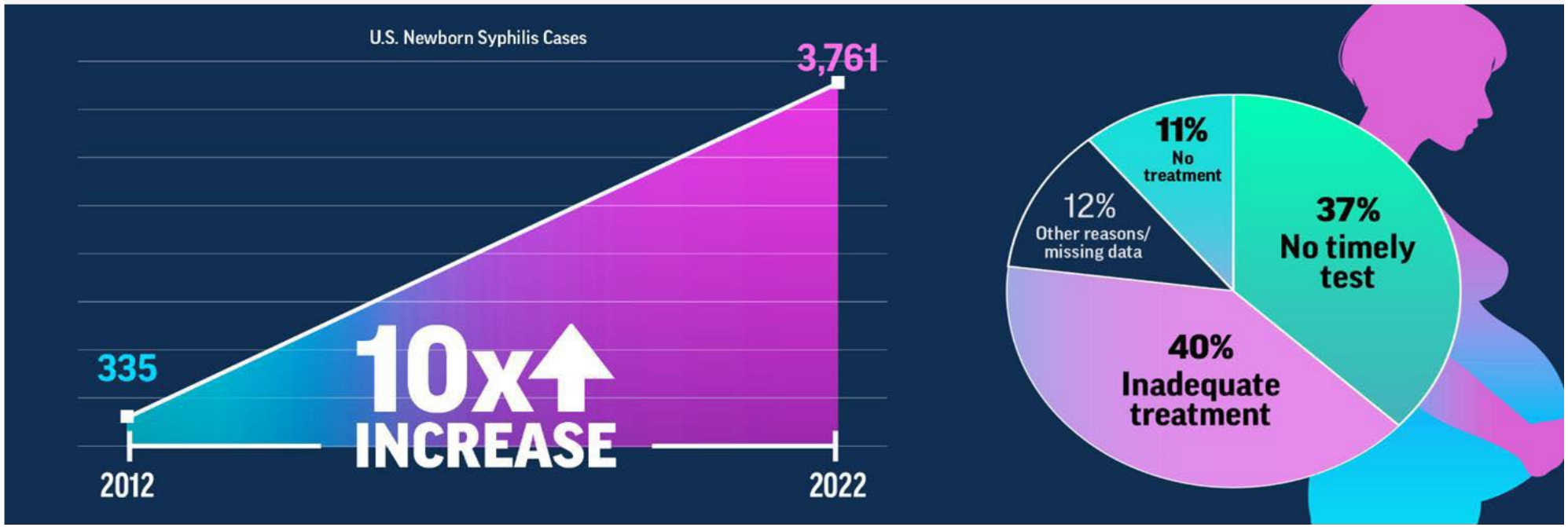
Over 10 times as many babies were born with syphilis in 2022 than in 2012.

9 in 10

Timely testing and treatment during pregnancy might have prevented almost 9 in 10 (88%) cases in 2022.

2 in 5

Two in 5 (40%) people who had a baby with syphilis did not get prenatal care.



https://www.cdc.gov/vitalsigns/newborn-syphilis/index.html

USPSTF Screening Recommendations for Syphilis

2022

Population	Recommendation	Grade
Asymptomatic, nonpregnant adolescents and adults who are at increased risk for syphilis infection	The USPSTF recommends screening for syphilis infection in persons who are at increased risk for infection.	A

- **Risk of syphilis is higher in men who have sex with men; persons with HIV infection or other sexually transmitted infections; persons who use illicit drugs; and persons with a history of incarceration, sex work, or military service.**
- However, clinicians should be aware of how common syphilis infection is in their community and assess patient's individual risk.

2018

Population	Recommendation	Grade
Pregnant women	The USPSTF recommends early screening for syphilis infection in all pregnant women.	A

CDC STI Guidelines 2021

- All pregnant women should be tested for syphilis at their first prenatal visit.
- For women at high risk for infection*, serologic testing should be performed twice during the third trimester: once at 28–32 wk gestation and again at delivery.
- Any woman who has a fetal death after 20 wk gestation should be tested for syphilis.
- No mother or neonate should leave the hospital without maternal serologic status having been documented at least once during pregnancy, and if the mother is considered high risk, documented at delivery.
- Concurrent HIV screening recommended for all pregnant woman.

2021 CDC STI Treatment Guidelines

*Women at high risk

- Diagnosed with a STI during pregnancy
- Exchanging sex for drugs or money
- Multiple sex partners
- Late entry into care (second trimester or later)
- No prenatal care
- Residence in an area of high syphilis prevalence
- Methamphetamine or heroin use
- Incarceration of woman or her partner
- Unstable housing or homelessness

Legal requirements for syphilis screening among pregnant women by time of test and state

	First Visit	Third Trimester	Delivery
Alabama	X	X	X
Alaska	X		
Arizona	X	X	X
Arkansas	X	X	
California	X	X	O
Colorado	X		
Connecticut	X	X	
Delaware	X	X	
DC	X	X	
Florida	X	X	O
Georgia	X	X	X
Hawaii			
Idaho	X		
Illinois	X	X	
Indiana	X	O	
Iowa			
Kansas	X		
Kentucky	X		
Louisiana	X	X	O
Maine			
Maryland	X	X	O
Massachusetts	X		
Michigan	X	X	O
Minnesota			
Mississippi	X	X	X
Missouri	X	O	O
Montana	X		
Nebraska	X		
Nevada	X	X	O
New Hampshire			
New Jersey	X		X
New Mexico	X		
New York	X	X	
North Carolina	X	X	X
North Dakota			
Ohio	X		
Oklahoma	X	O	O
Oregon	X		
Pennsylvania	X	O	
Rhode Island	X		
South Carolina	X		
South Dakota	X		
Tennessee	X	O	
Texas	X	X	X
Utah	X		
Vermont	X		
Virginia	X		
Washington	X		
West Virginia	X		
Wisconsin			
Wyoming	X		

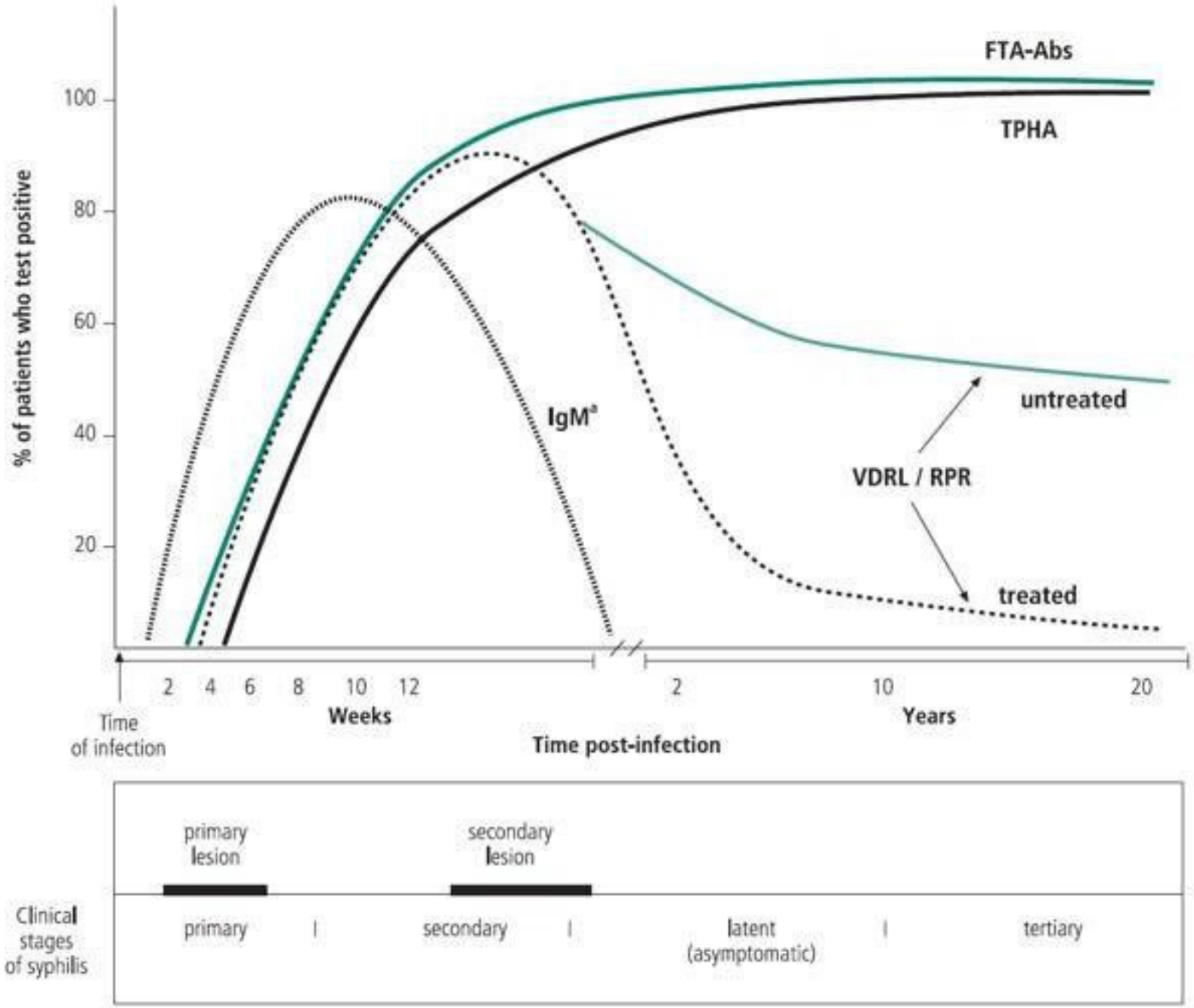
X	Screening required
O	Screening Required only if at increased risk

[Prenatal-Syphilis-Screening-Laws-Web-Document-25-July-2024-final.pdf]

Serologic Tests

- Nontreponemal – nonspecific, low cost, able to quantify response to treatment
  - Rapid plasma reagin (RPR)
  - Venereal Disease Research Laboratory (VDRL)
  - Toluidine Red Unheated Serum Test (TRUST)

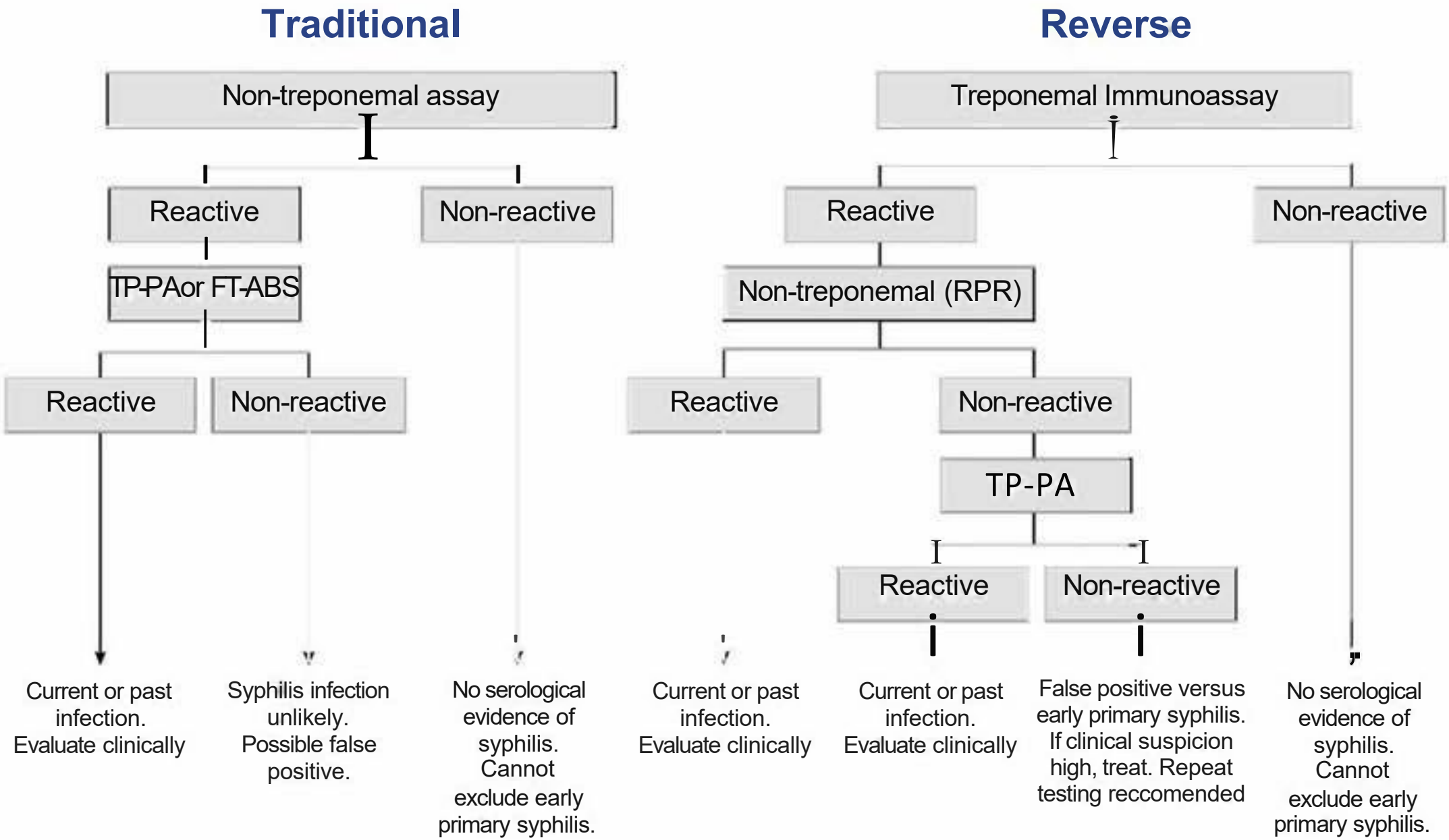
- Treponemal – more complex, expensive, specific, qualitative
  - Fluorescent treponemal antibody absorption (FTA-ABS)
  - *T. pallidum* particle agglutination assay (TPPA)
  - *T. pallidum* enzyme immunoassay (TP-EIA)
  - Microhemagglutination test for antibodies to *Treponema pallidum* (MHA-TP)
  - Chemiluminescence immunoassay (CIA)



Rac et al. Syphilis during pregnancy: a preventable threat to maternal-fetal health. AJOG. 2017.

B

Screening Algorithms



Rac et al. Syphilis during pregnancy: a preventable threat to maternal-fetal health. AJOG. 2017.

False-positive tests

Nontreponemal tests

- Biologically due to pregnancy
  - 31% FP VDRL
- Acute febrile illness
- Recent immunization
- Autoimmune disorders
- IVDU
- Chronic liver disease
- HIV

Treponemal tests

- Biologically due to pregnancy
  - 47-88% FP TP-EIA or CIA
- Advanced age
- Tumor
- Dialysis
- Autoimmune disease
- Other spirochetal infections, malaria, leprosy

Hence all positive tests need confirmatory testing!

Genitourin Med. 1990;66(2):76
Clin Microbiol Rev. 1995;8(1):1

J Med Assoc Thai. 2016;99(2):119
Clin Infect Dis. 2015;61(7):1049.
Sex Transm Dis. 2011;38(12):1126

False-negative nontreponemal test

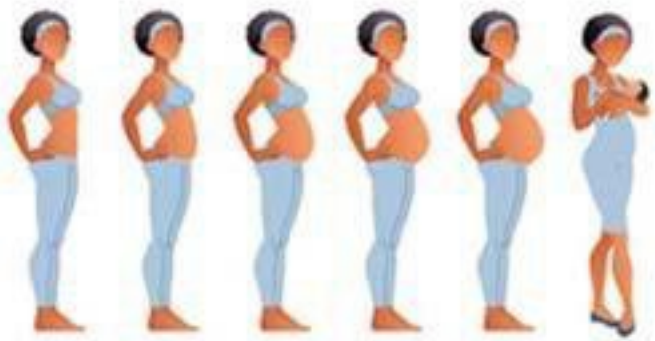
- Very early infection (primary or secondary)
  - 20-30% of patients presenting with chancre will have negative nontreponemal test
- Prozone reaction
  - Antibody titers are high (as often seen in secondary syphilis), an overabundance of antibodies interferes with clumping of antigen-antibody complexes
  - Occurs in pregnancy, HIV and neurosyphilis
- Early treatment preventing antibody formation
- Late infection (nontreponemal tests become nonreactive over time)

Clin Infect Dis. 2010;51(6):700
Ann Intern Med. 1986;104(3):368

HIV

- *Human Immunodeficiency Virus*
- Attacks the immune system and without treatment leads to AIDS (acquired immunodeficiency syndrome)
- Spreads through anal or vaginal sex, sharing needles or other drug injection equipment, or during pregnancy
- No cure, but treatment saves lives and prevents transmission to others

Perinatal Transmission



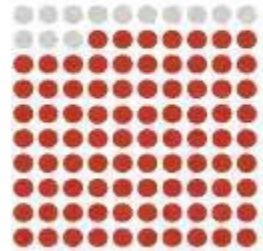
HIV can be passed from mother-to-child anytime during pregnancy, childbirth, and breastfeeding. This is called *perinatal transmission*.

HIV and Pregnancy

- 3,000 HIV infected women give birth annually in the US
- Estimated rate of perinatal transmission in the absence of intervention is about **25%**
  - 20% of transmission occurs before 36wks
  - 50% occurs between 36wks and delivery
  - 30% occurs during active labor and delivery
- Acute HIV infection **during pregnancy or while breastfeeding** confers very high risk of HIV transmission to the child due to high levels of HIV RNA in maternal plasma, genital tract and breastmilk.
- With the use of suppressive **ART during pregnancy**, followed by postnatal **infant ART prophylaxis**, the current rate of perinatal HIV transmission in the US is **<1%**.

In 2022, an estimated **1.2 million people** had HIV.

For every 100 people with HIV



87 knew their HIV status.

Estimated HIV infections in the US by transmission category, 2022

There were **31,800 estimated new HIV infections** in the US in 2022. Of those:

were among gay, bisexual, and other men who reported male-to-male sexual contact*

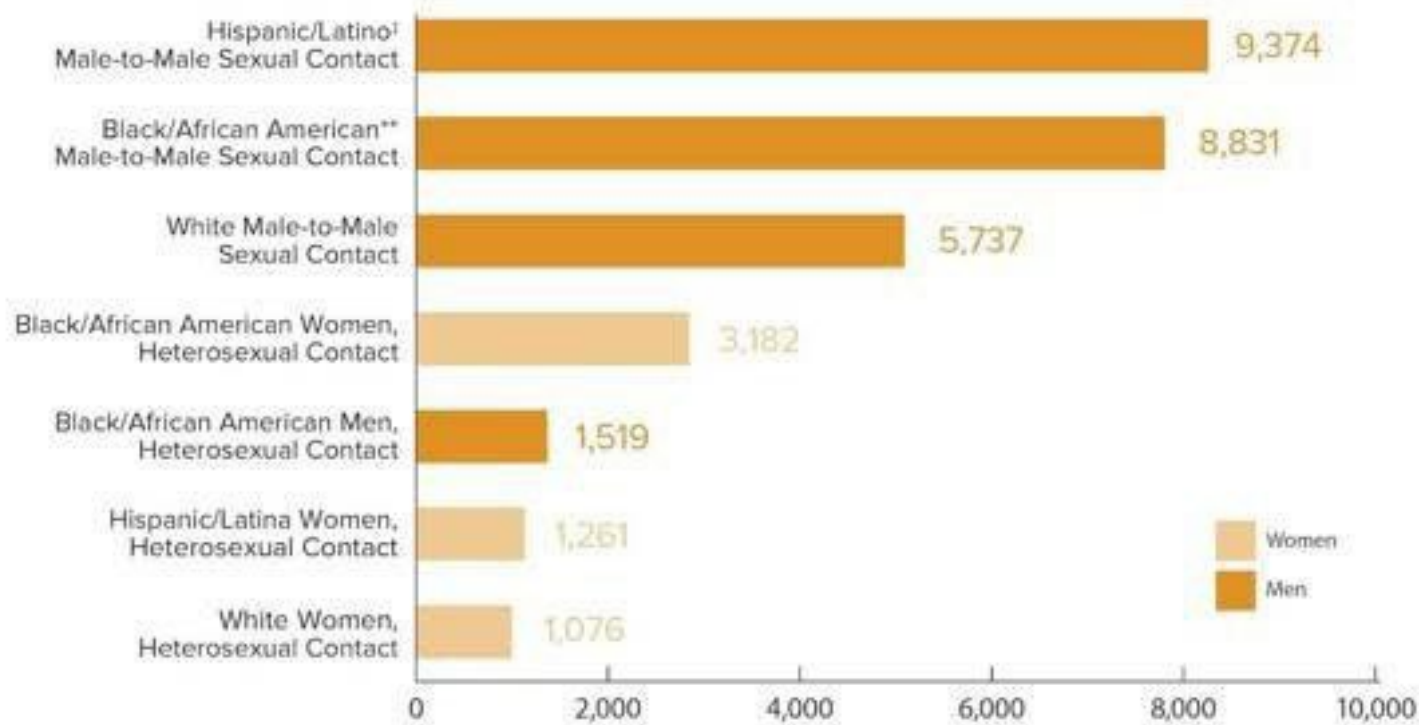
were among people who reported heterosexual contact

were among people who inject drugs

Fast Facts: HIV in the United States | HIV | CDC

HIV diagnoses in the US and 6 territories and freely associated states for the most-affected subpopulations, 2022*†

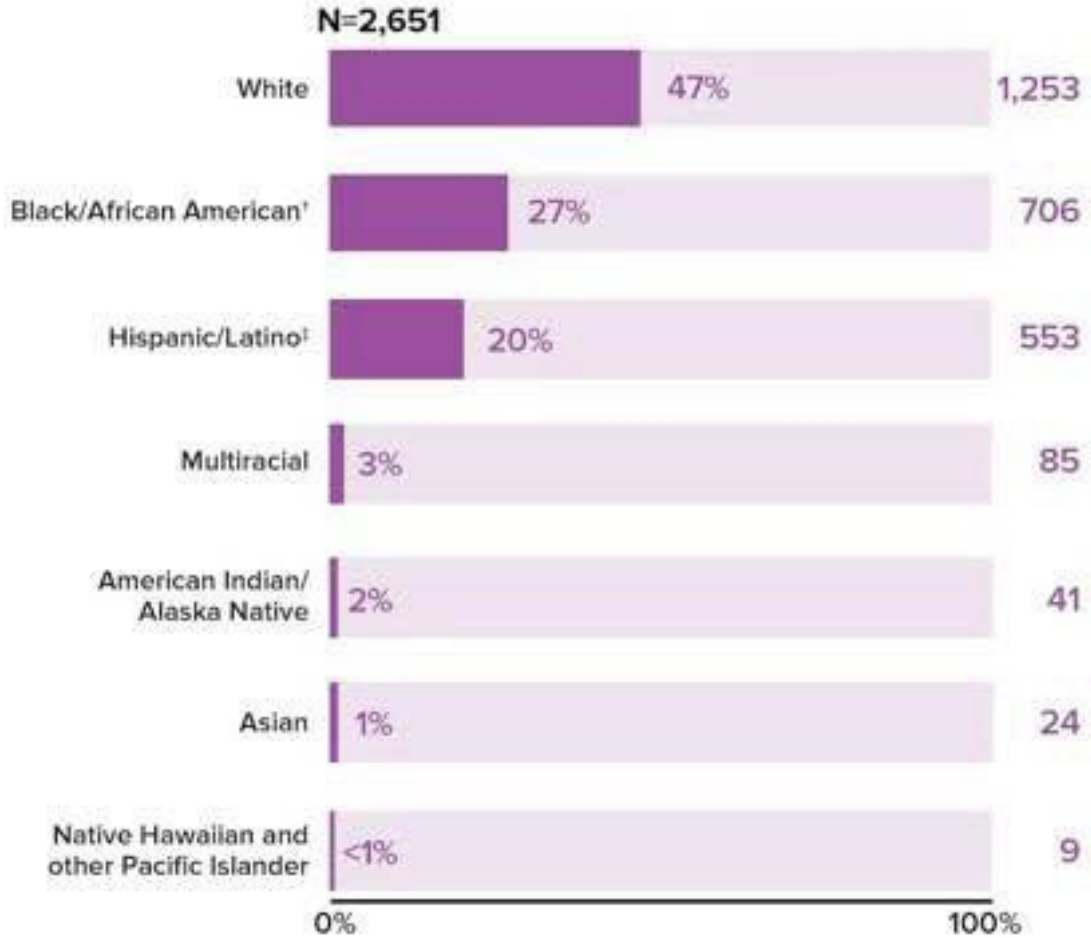
Gay and bisexual men are the population most affected by HIV.



[Fast Facts: HIV in the United States | HIV | CDC]

HIV diagnoses among people who inject drugs in the US and 6 territories and freely associated states by race and ethnicity, 2022*

White people accounted for the highest number of new HIV diagnoses among people who inject drugs.



Total may not equal 100% due to rounding.

* Among people aged 13 and older.

† *Black* refers to people having origins in any of the Black racial groups of Africa. *African American* is a term often used for people of African descent with ancestry in North America.

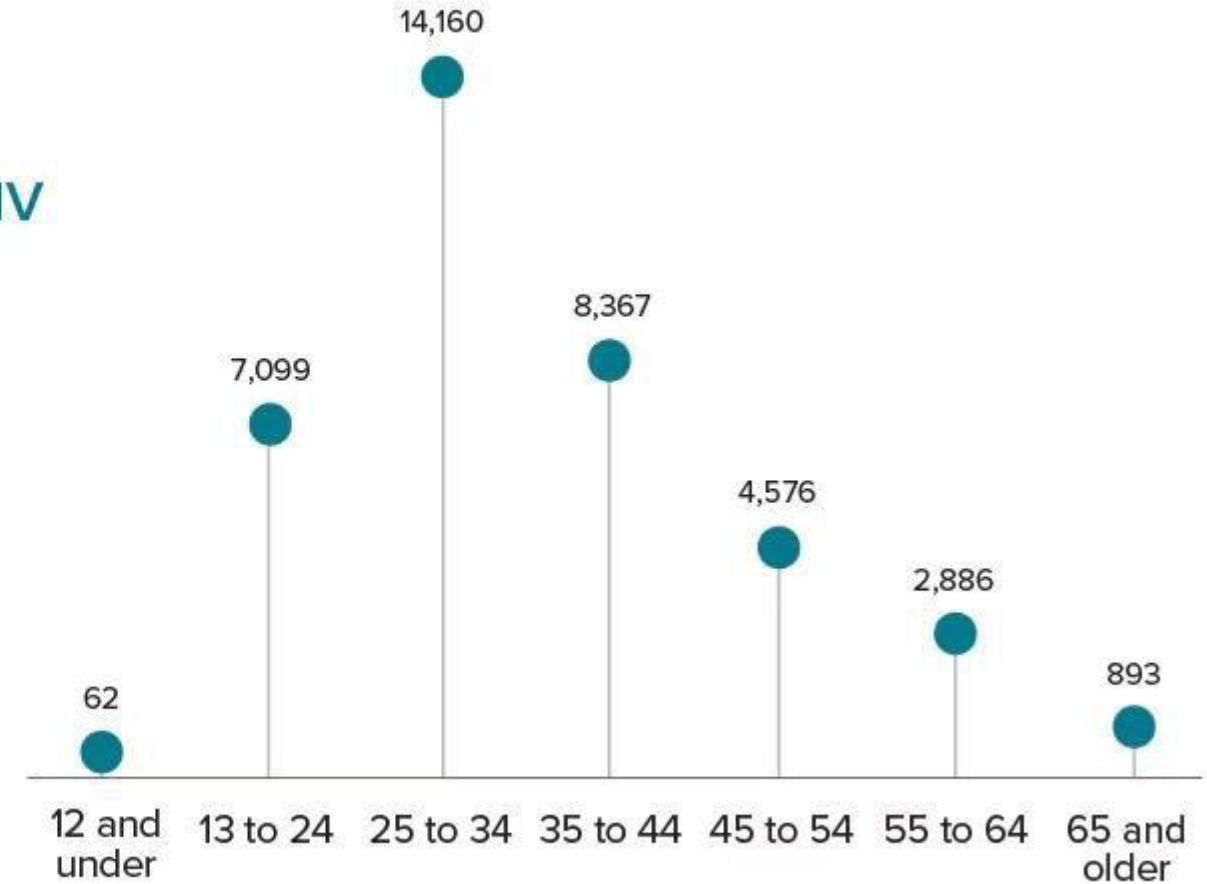
‡ Hispanic/Latino people can be of any race.

Source: CDC. Diagnoses, deaths, and prevalance of HIV in the United States and 6 territories and freely associated states, 2022. *HIV Surveillance Report*, 2024; 35.

Fast Facts: HIV in the United States | HIV | CDC

HIV diagnoses in the US and 6 territories and freely associated states by age, 2022

In 2022, 37,981 people received an HIV diagnosis in the US and 6 territories and freely associated states. People aged 13 to 34 accounted for more than half (56%) of new HIV diagnoses in 2022.

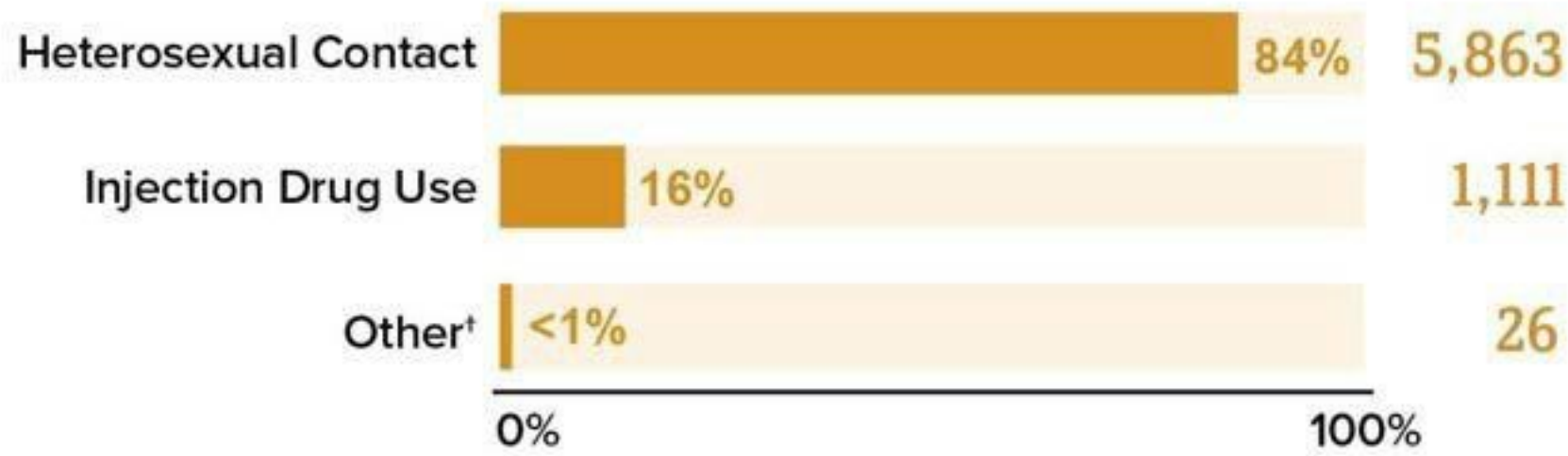


Source: CDC. Diagnoses, deaths, and prevalence of HIV in the United States and 6 territories and freely associated states, 2022. *HIV Surveillance Report*, 2022;35.

[Fast Facts: HIV in the United States | HIV | CDC]

There were **36,801 new HIV diagnoses** in the US and dependent areas in 2019. Of those, 19% (6,999) were among women.

Most new HIV diagnoses among women were attributed to heterosexual contact.



[Fast Facts: HIV in the United States | HIV | CDC]

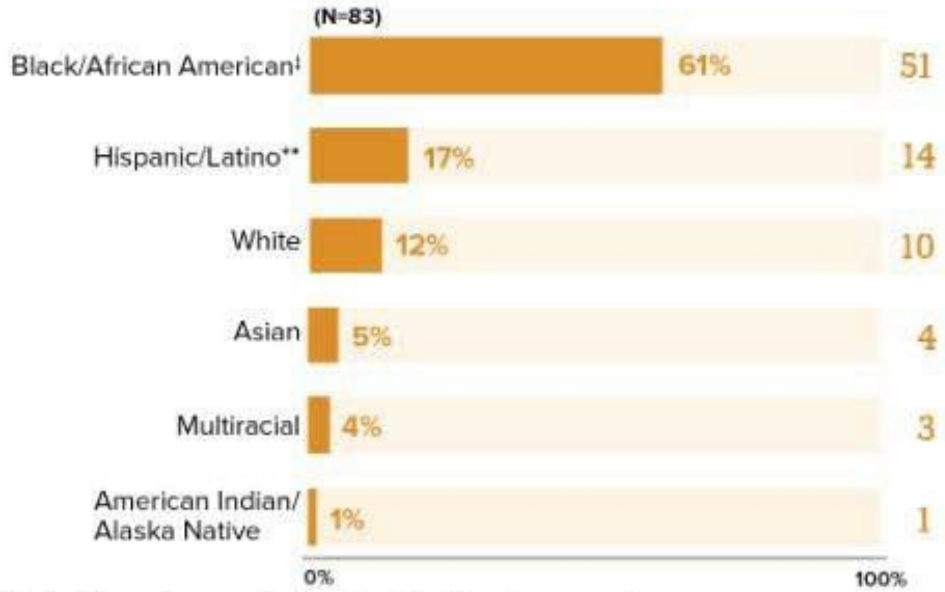
<1%

Of the **36,801 new HIV diagnoses** in the US and dependent areas in 2019, <1% (84) were due to perinatal transmission.*

*Includes HIV diagnoses attributed to perinatal transmission among adults, adolescents, and children.

New Perinatal HIV Diagnoses in the US and Dependent Areas by Race and Ethnicity, 2019*†

New perinatal HIV diagnoses disproportionately affect certain racial and ethnic groups.



* In 2019, there were no cases of perinatal HIV among Native Hawaiian and other Pacific Islander people.

† Includes HIV diagnoses attributed to perinatal transmission among adults, adolescents, and children. Data have been statistically adjusted to account for missing transmission category.

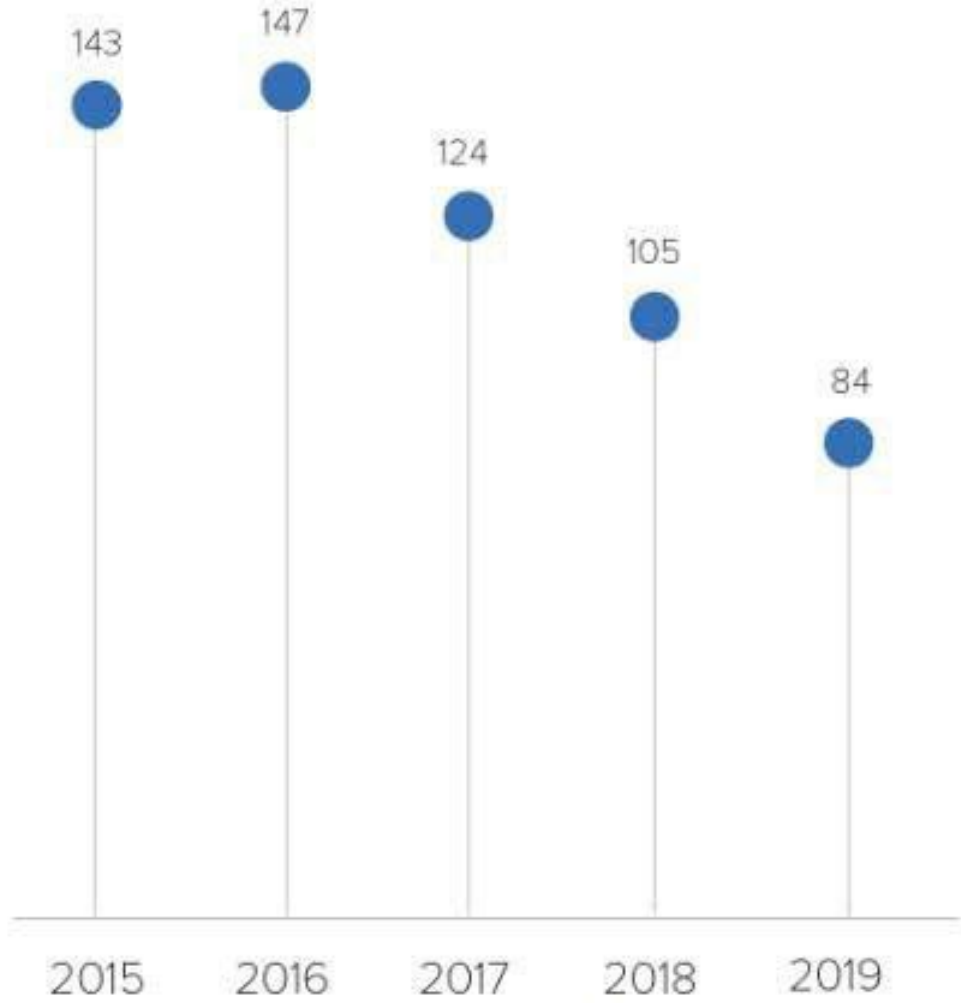
‡ *Black* refers to people having origins in any of the Black racial groups of Africa. *African American* is a term often used for people of African descent with ancestry in North America.

** Hispanic/Latino people can be of any race.

Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2019. *HIV Surveillance Report* 2021;32.

Trends in New Perinatal HIV Diagnoses in the US and Dependent Areas, 2015-2019*

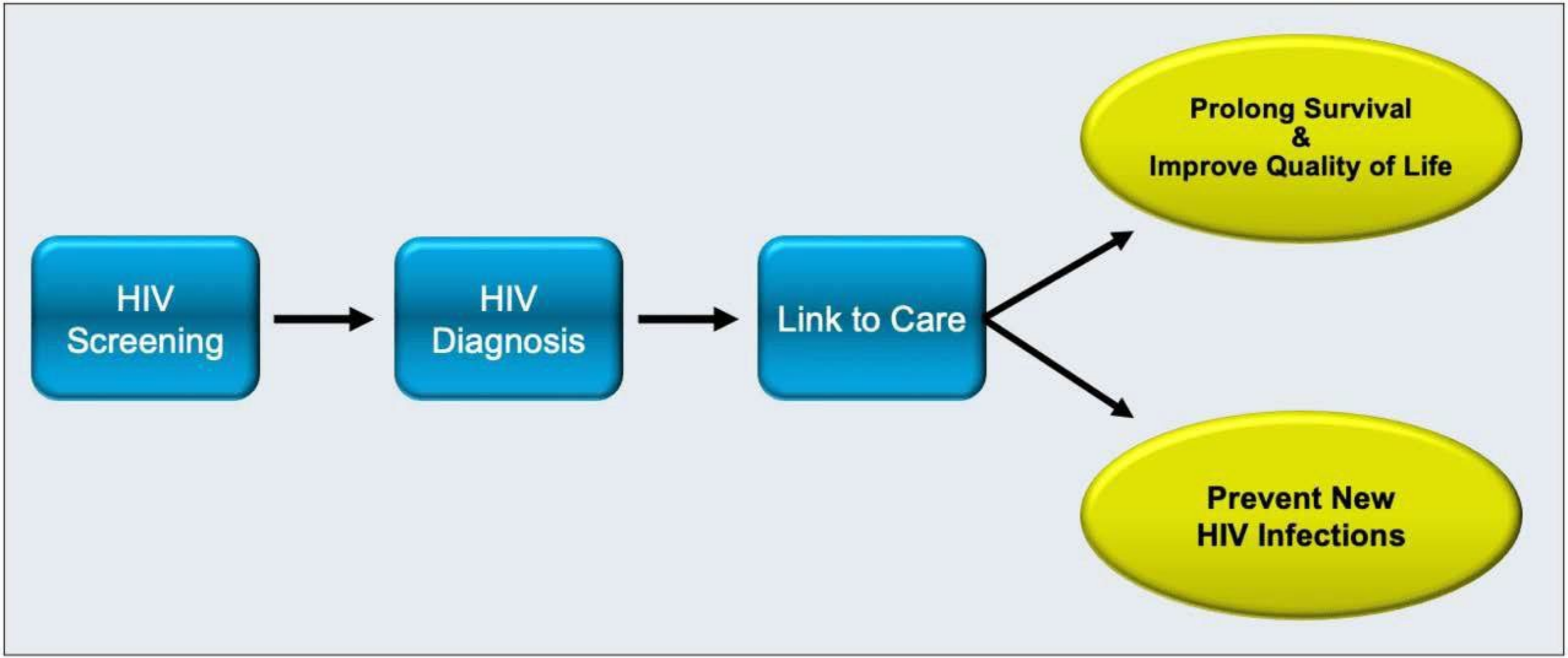
Perinatal HIV diagnoses decreased 41% from 2015 to 2019.



*Includes HIV diagnoses attributed to perinatal transmission among adults, adolescents, and children.

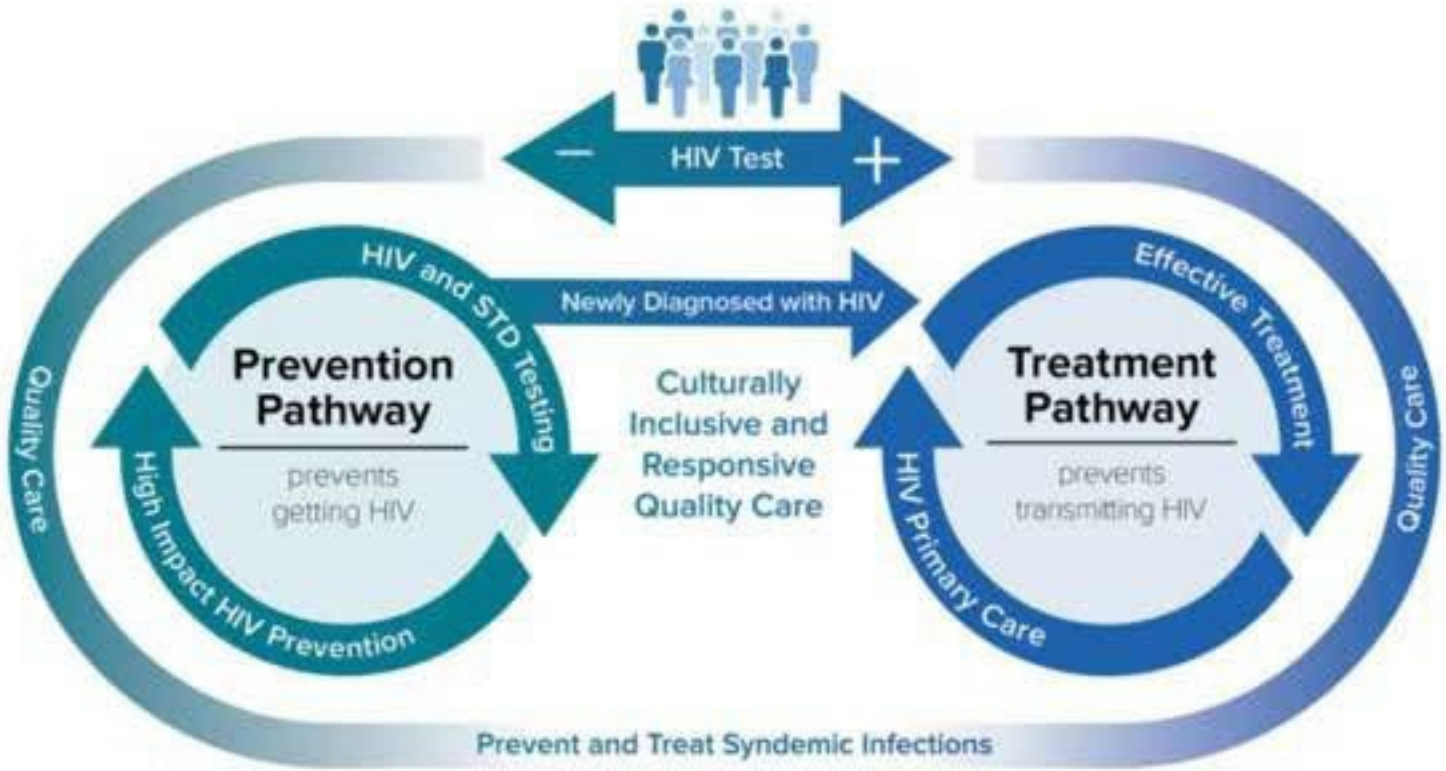
Source: CDC. Diagnoses of HIV infection in the United States and dependent areas, 2019. *HIV Surveillance Report* 2021;32.

Goals of routine screening



Status Neutral HIV Prevention and Care

People whose HIV tests are negative are offered powerful prevention tools like PrEP, condoms, harm reduction (e.g. SSPs), and supportive services to stay HIV negative.



People whose HIV tests are positive enter primary care and are offered effective treatment and supportive services to achieve and maintain viral suppression.

Follow CDC guidelines to test people for HIV. Regardless of HIV status, quality care is the foundation of HIV prevention and effective treatment. Both pathways provide people with the tools they need to stay healthy and stop HIV.

CDC

LET'S STOP HIV TOGETHER

Ending the HIV Epidemic

CDC | CDC Home | Search | Health Topics A-Z

MMWR

2006

Recommendations and Reports

September 22, 2006 / 55(RR14);1-17

Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings

- Opt-out screening for:
  - All persons age 13 through 64 yrs
  - All patients with TB
  - All patients with STI
- Persons at high risk should be screened at least annually
  - MSM
  - HIV + sex partner
  - >1 partner
  - IVDU and their sex partners
  - Exchange sex for drugs or money
- **Routine prenatal screening with repeat screening in 3rd trimester in certain high risk populations (2001)**

USPSTF 2019 HIV Screening Recommendations

Recommendation Summary

Population	Recommendation	Grade
Pregnant persons	The USPSTF recommends that clinicians screen for HIV infection in all pregnant persons, including those who present in labor or at delivery whose HIV status is unknown.	A
Adolescents and adults aged 15 to 65 years	The USPSTF recommends that clinicians screen for HIV infection in adolescents and adults aged 15 to 65 years. Younger adolescents and older adults who are at increased risk of infection should also be screened. See the Clinical Considerations section for more information about assessment of risk, screening intervals, and rescreening in pregnancy.	A

Maternal HIV Testing and Identification of Perinatal HIV Exposure

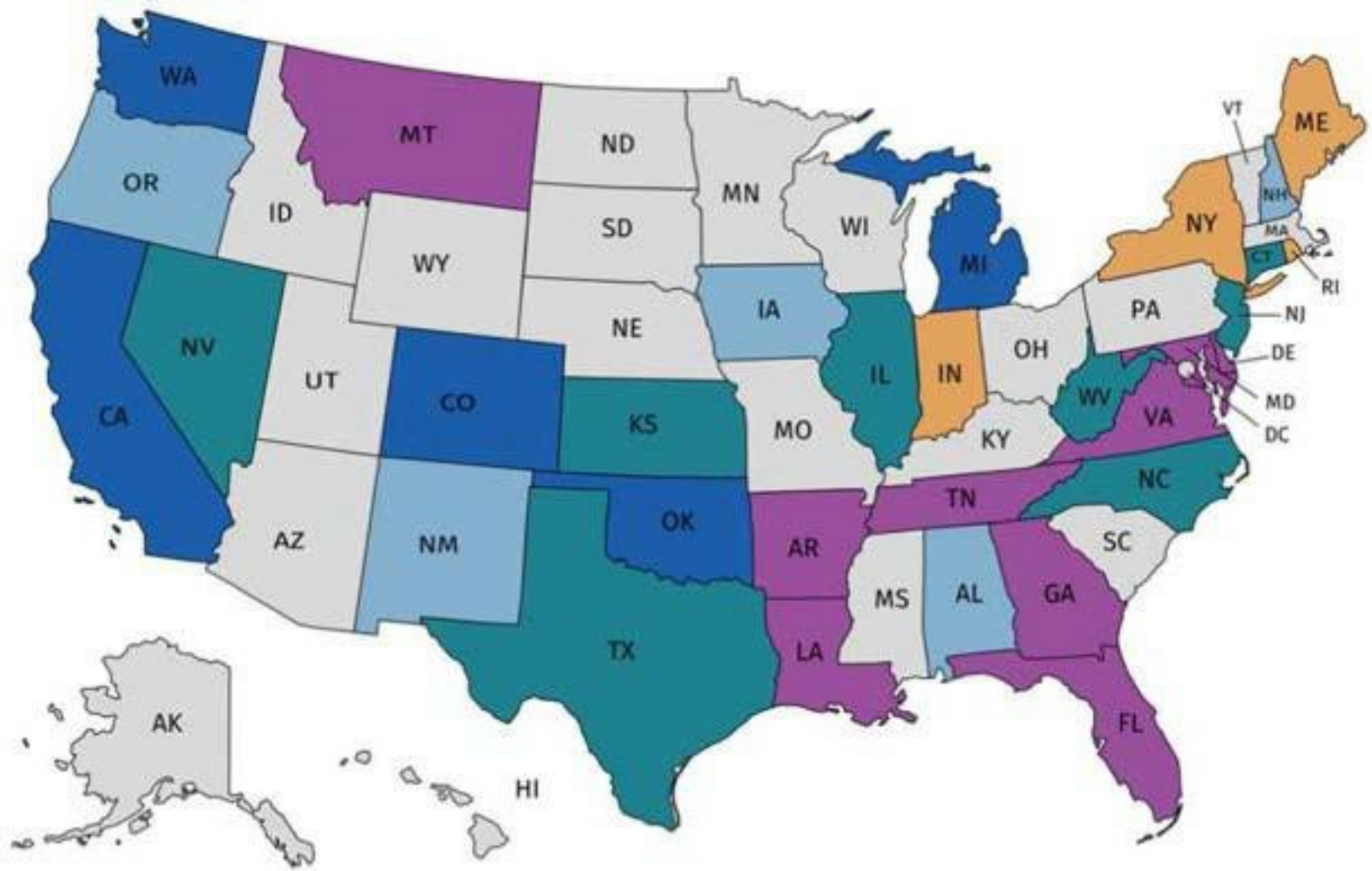
Maternal HIV Testing and Identification of Perinatal HIV Exposure | NIH (1/2024)

- HIV testing is recommended for all sexually active women and a routine component of preconception care.
- All women should be tested as early as possible during each pregnancy.
- Partners of all pregnant women should be referred for HIV testing when their status is unknown.
- Repeat HIV testing in the third trimester is recommended for pregnant women who are at increased risk of acquiring HIV*.
- Repeat HIV testing is recommended for pregnant women with a STI or with signs and symptoms of acute HIV infection, or ongoing exposure to HIV, as well as referral for initiation of PrEP if HIV testing is negative.
- Expedited HIV testing should be performed during labor or delivery for women with undocumented HIV status and for those who tested negative early in pregnancy but are at increased risk of HIV infection* and were not retested in the third trimester.

*Women at increase risk of HIV…

- Those who are injection drug users or have sex with people who inject drugs
- Those who exchange sex for money or drugs
- Those who are sex partners of individuals with HIV
- Those who have had a new sex partner or more than one sex partner during the current pregnancy
- Those who have a suspected or diagnosed STI during pregnancy

…**should have repeat HIV testing during the third trimester, before 36 weeks gestation.**



Statutes for HIV Testing During Pregnancy BUT NOT Specific to 3rd Trimester, Labor & Delivery, or for Newborns (N=5)

Statutes for HIV Testing During Labor & Delivery BUT NOT Specific to 3rd Trimester or for Newborns (N=5)

Statutes for HIV Testing During the 3rd Trimester and for Newborns (N=8)

Statutes for HIV Testing During the 3rd Trimester BUT NOT Specific for Newborns (N=9)

Statutes for HIV Testing for Newborns BUT NOT Specific to 3rd Trimester (N=4)

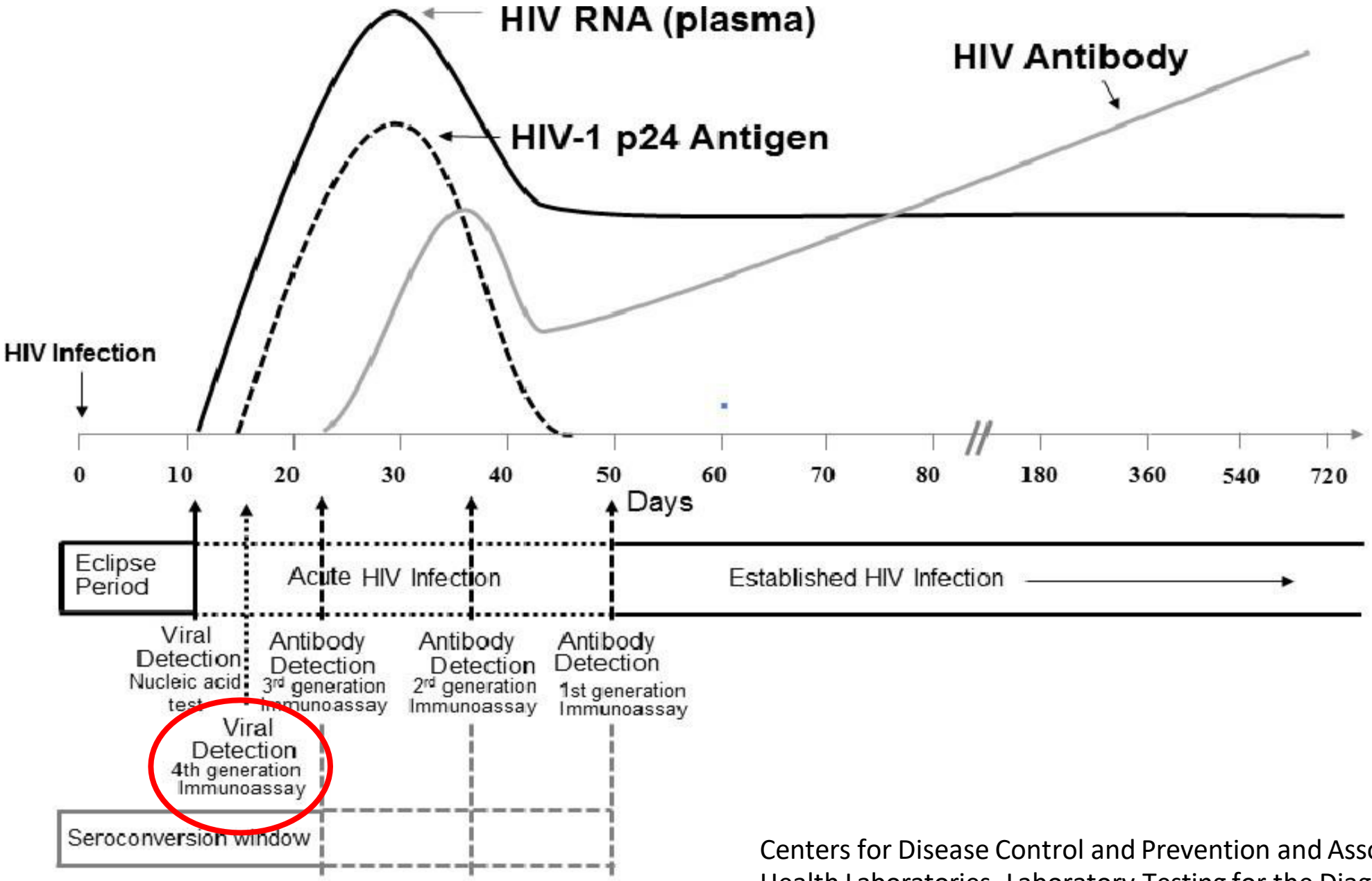
No Statutes for HIV Testing During Pregnancy (N=20)

Public Health Reports 2018, Vol. 133(5) 601-605.

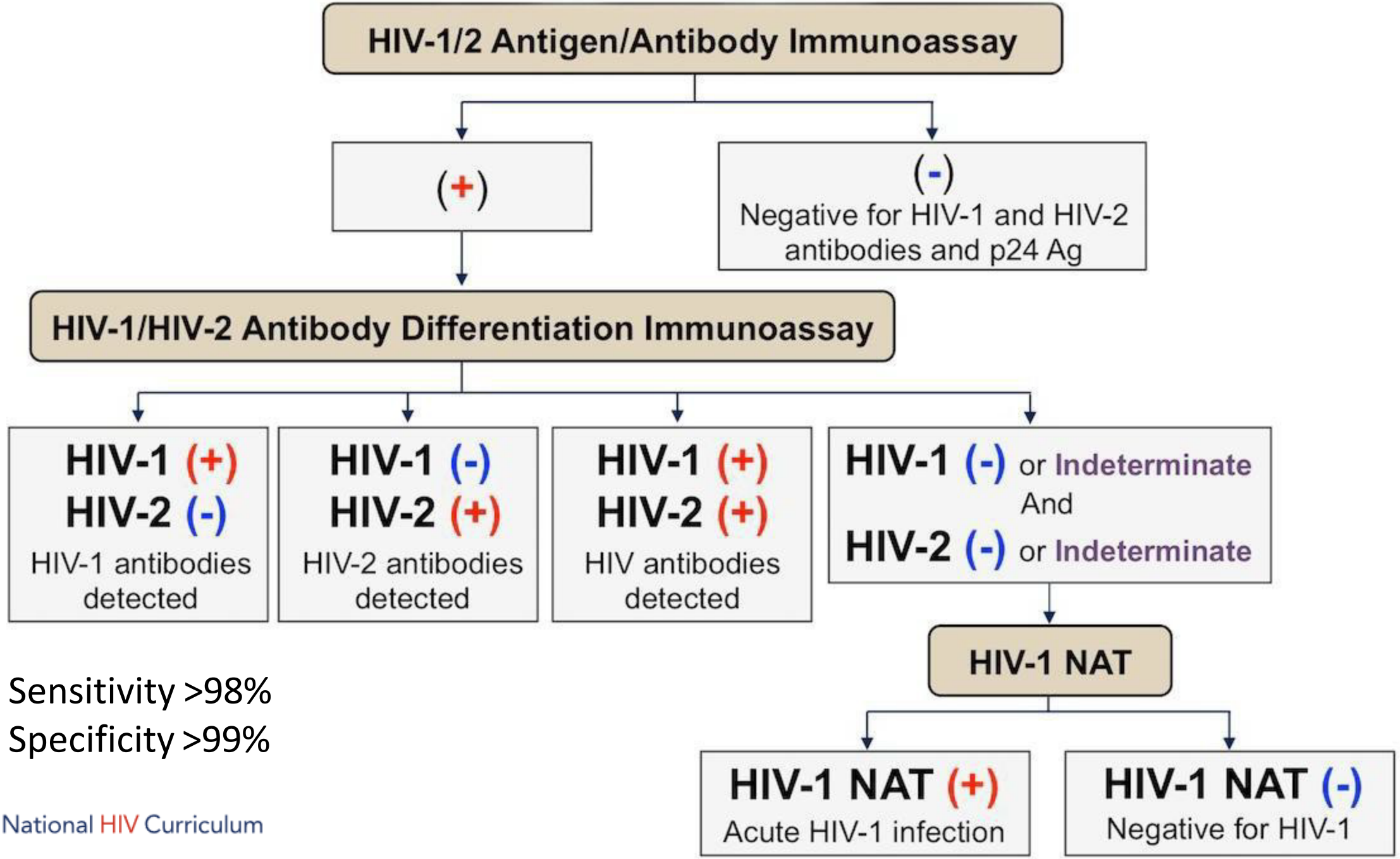
Serologic tests

- Screening tests
  - HIV antigen-antibody laboratory-based tests
  - *HIV antigen-antibody point-of-care tests*
  - HIV antibody laboratory-based tests
  - *HIV antibody point-of-care tests*

- Diagnostic tests
  - HIV-1/2 differentiation assays
  - HIV nucleic acid diagnostic tests



Centers for Disease Control and Prevention and Association of Public Health Laboratories. Laboratory Testing for the Diagnosis of HIV Infection



Sensitivity >98%

Specificity >99%

National HIV Curriculum

False negatives

- A false-negative HIV antibody (or antigen-antibody) test result most often occurs when performing testing in:
  - A person with acute HIV
  - Laboratory error
  - Following receipt of potent antiretroviral therapy very early after HIV acquisition
  - Persons who have defects in HIV-specific immunity and thus fail to generate certain antibodies
  - Persons who have acquired HIV while receiving preexposure prophylaxis
  - Persons with hypogammaglobulinemia
  - Persons who recently received potent immunosuppressant medications
- A false-negative p24 antigen test can occur in the first several weeks after HIV acquisition (usually positive by day 17)
- A false-negative HIV RNA tests can occur in the first week or two after HIV acquisition (typically positive by day 10) and in persons chronically infected with HIV who have inherently strong immunologic control of HIV and thus may have undetectable HIV RNA levels in the absence of antiretroviral therapy.

False positives

- A false-positive HIV test may occur due to polyclonal cross-reactivity, which is more common in the setting of pregnancy, recent inoculation with influenza vaccine, autoimmune disorders, receipt of an investigational HIV-1 vaccine, receipt of gamma globulin, prior blood transfusions, HTLV-1/2 infection, recent incident viral infection, collagen vascular diseases, and laboratory errors.
- A false-positive HIV NATs may occur in persons who received chimeric antigen receptor (CAR) T-cell therapy, due to the lentivirus used as the vector in manufacturing these individualized therapies; in these cases the lentivirus vector used had incorporated a transgene plasmid that contained part or all of the HIV *gag* sequence.[

Determining whether a person's HIV screening test result is accurate depends on the pretest probability and the prevalence of HIV in the testing community.

Summary

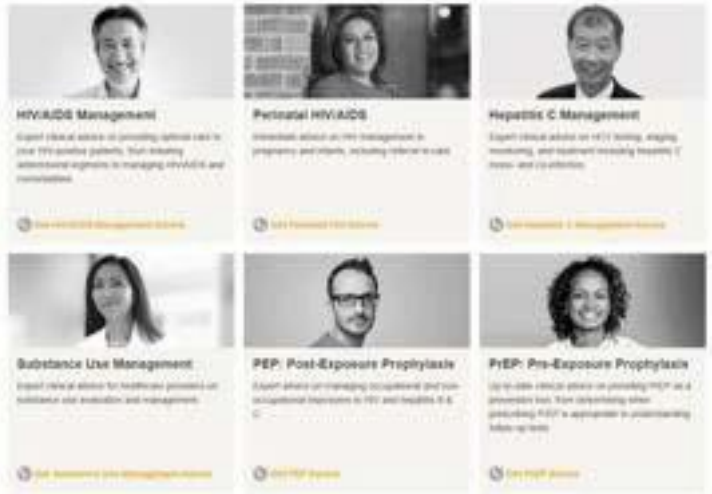
- In order to end both epidemics, syphilis and HIV screening should be done during each and every pregnancy at least once, and sometimes more than once.
- Those who test negative for HIV should be offered preventive services.
- Those who test positive for HIV should be immediately referred for treatment.

National Network of STD Clinical Prevention Training Centers

STD Clinical Consultation Network

https://www.stdccn.org/

NATIONAL CLINICIAN CONSULTATION CENTER



National Clinician Consultation Center

Maternal Care in Rural Areas

Screening and Management of Hepatitis B and C

David de Gijsel, MD

Section of Infectious Diseases & International Health

May 20th, 2025

Dartmouth Health

Hepatitis B virus

Epidemiology

Prevalence

HBcAb positive

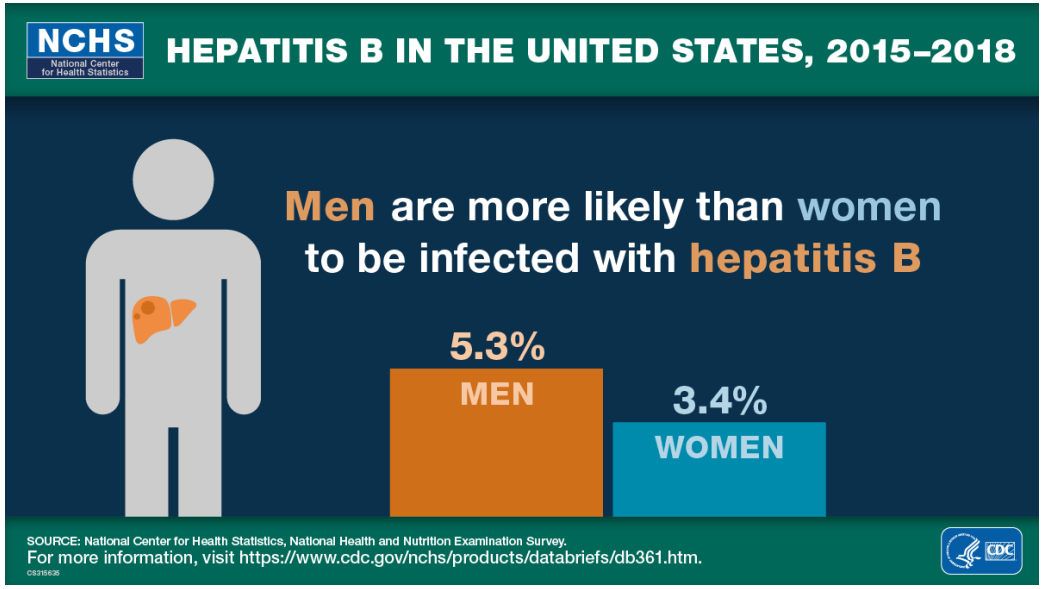
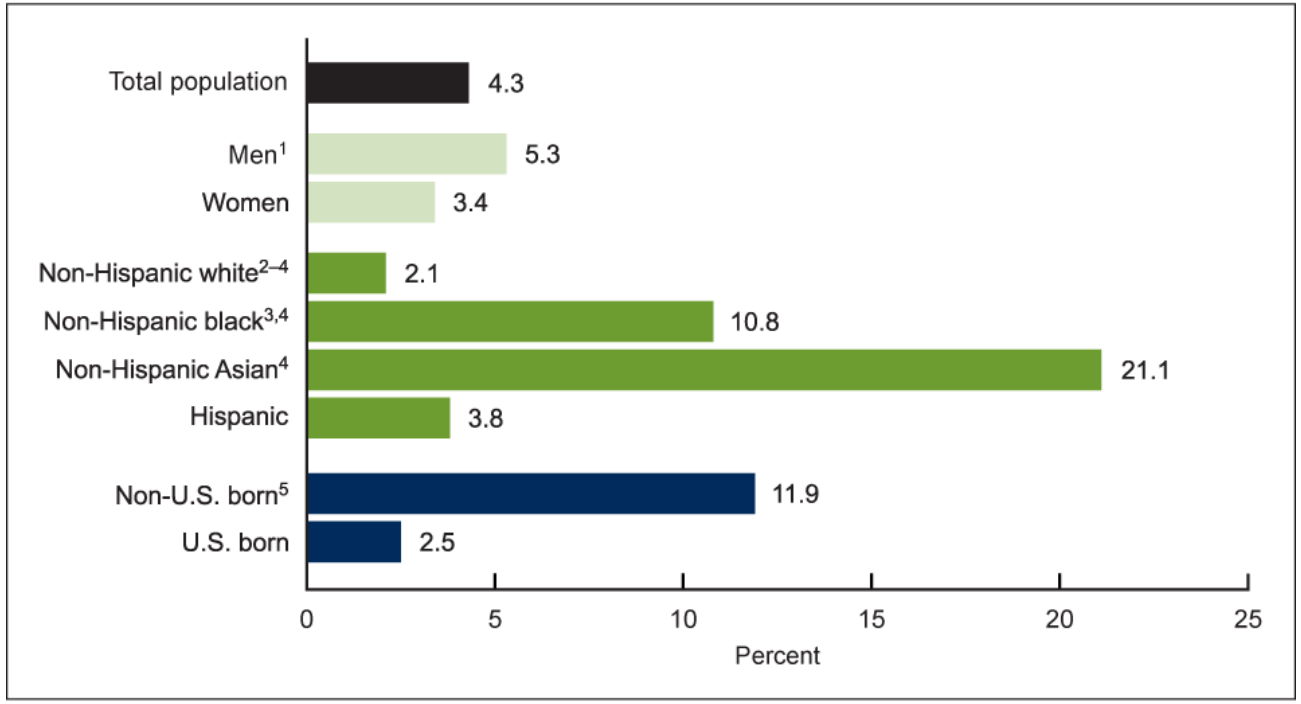


Figure 1. Age-adjusted prevalence of past or present hepatitis B virus infection among adults aged 18 and over, by sex, race and Hispanic origin, and U.S. birth status: United States, 2015–2018



[1]Significantly different from women.
[2]Significantly different from non-Hispanic black persons.
[3]Significantly different from non-Hispanic Asian persons.
[4]Significantly different from Hispanic persons.
[5]Significantly different from U.S.-born persons.
NOTES: The presence of antibody to hepatitis B core antigen is evidence of past or present infection. Percentages are age adjusted by the direct method to the 2000 projected U.S. population using age groups 20–29, 30–39, 40–49, 50–59, and 60 and over. U.S. born includes persons born within the 50 United States and the District of Columbia. Access data table for Figure 1 at: https://www.cdc.gov/nchs/data/databriefs/db361-tables-508.pdf#1.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 2015–2018.

Kruszon-Moran D at al. Prevalence and trends in hepatitis B virus infection in the United States, 2015–2018. NCHS Data Brief, no 361. Hyattsville, MD: National Center for Health Statistics. 2020.

Screening

HBsAg

Hepatitis B *surface antigen*

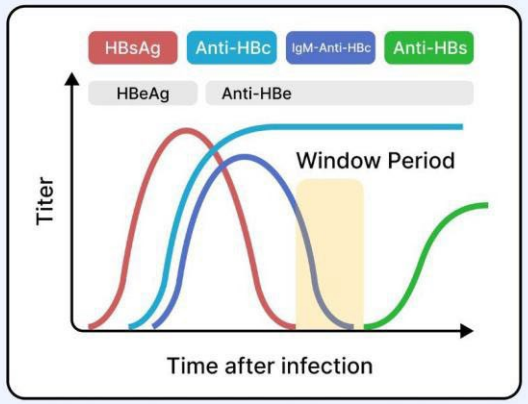
HBsAb

Hepatitis B *surface antibody*

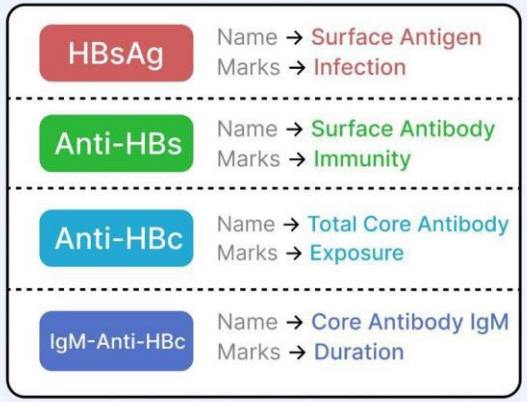
HBcAb

Hepatitis B core antibody

COURSE



MARKERS



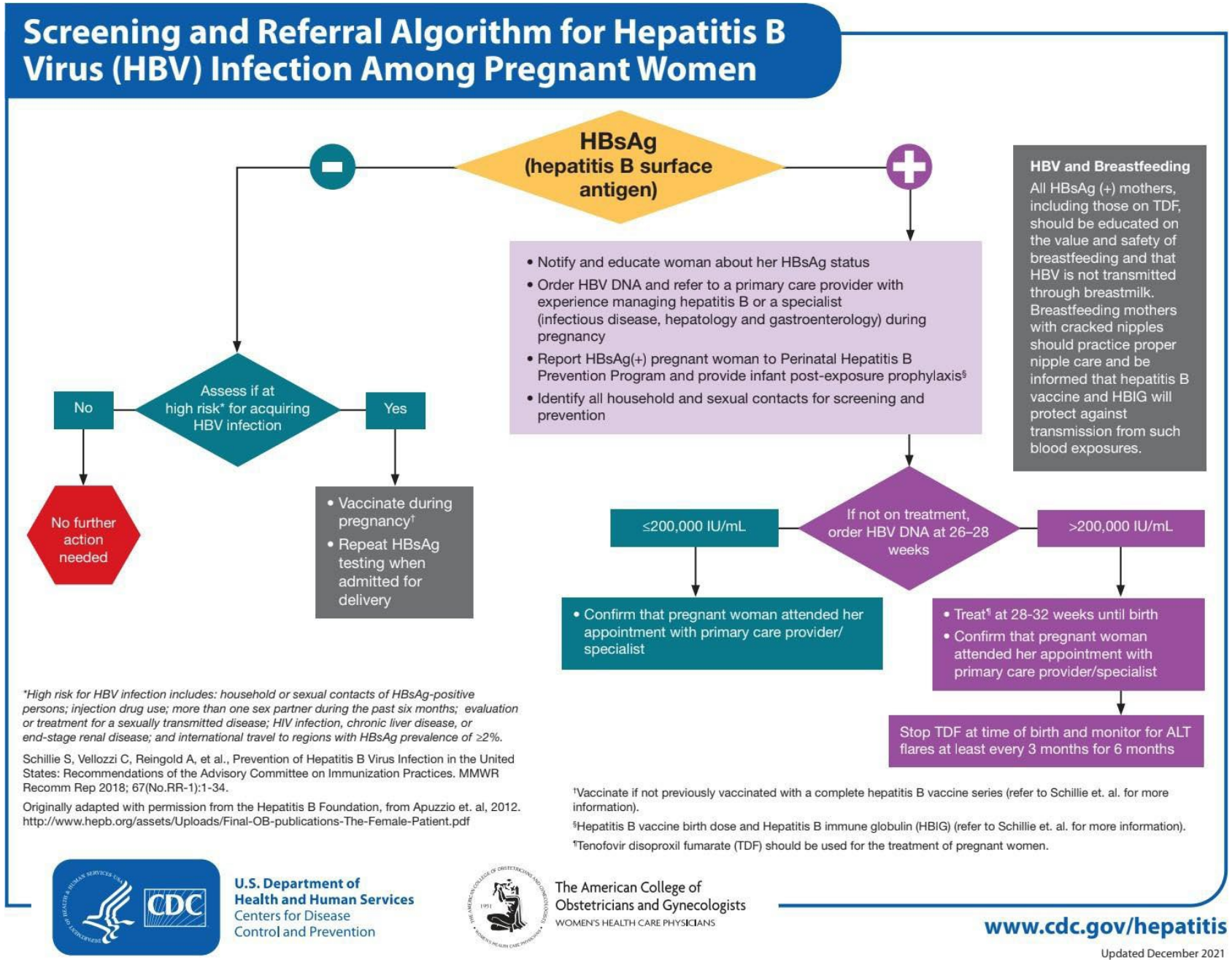
Interpretation of Hepatitis B Serologic Test Results

HBsAg	Anti-HBc	IgM Anti-HBc	Anti-HBs	Interpretation
–	–	–	–	Susceptible to HBV infection
–	+	–	+	Immune due to natural hepatitis B infection
–	–	–	+	Immune due to hepatitis B vaccination
+	+	+	–	Acute HBV
+	+	–	–	Chronic hepatitis B infection
–	+	–	–	Interpretation unclear; four possibilities: 1. Resolved infection (most common) 2. False-positive anti-HBc, thus susceptible 3. "Low level" chronic infection 4. Resolving acute infection

https://www.hiv.uw.edu/go/co-occurring-conditions/hepb-coinfection/core-concept/all
https://emupdates.com/523-hepatitis-b-pep-exposed-is-known-vaccine-responder-source-is-hbsag-negative-other-combinations-for-unvaccinated-exposed-known-nonresponder-hep-c-pep/

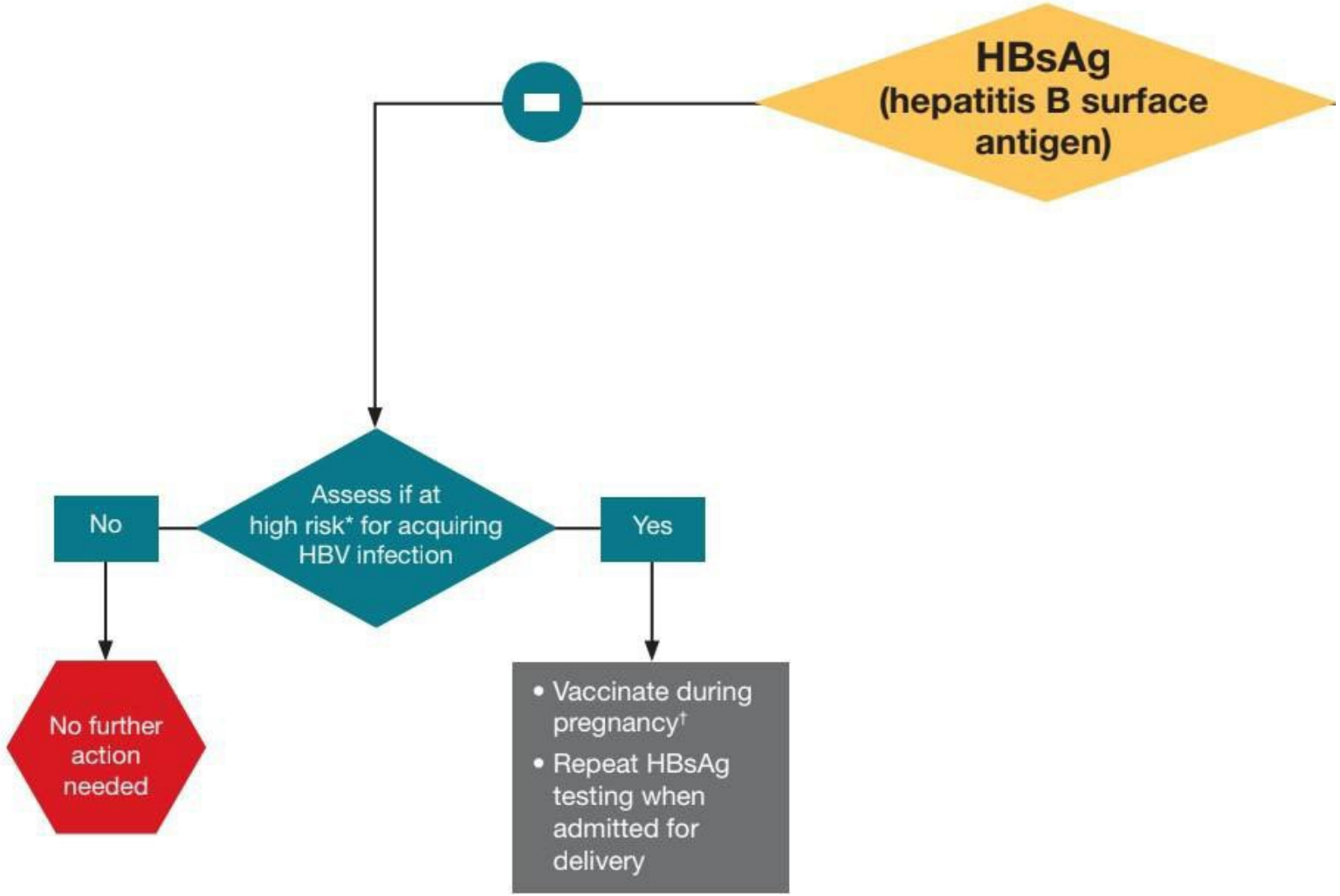
Screening

Pregnant people



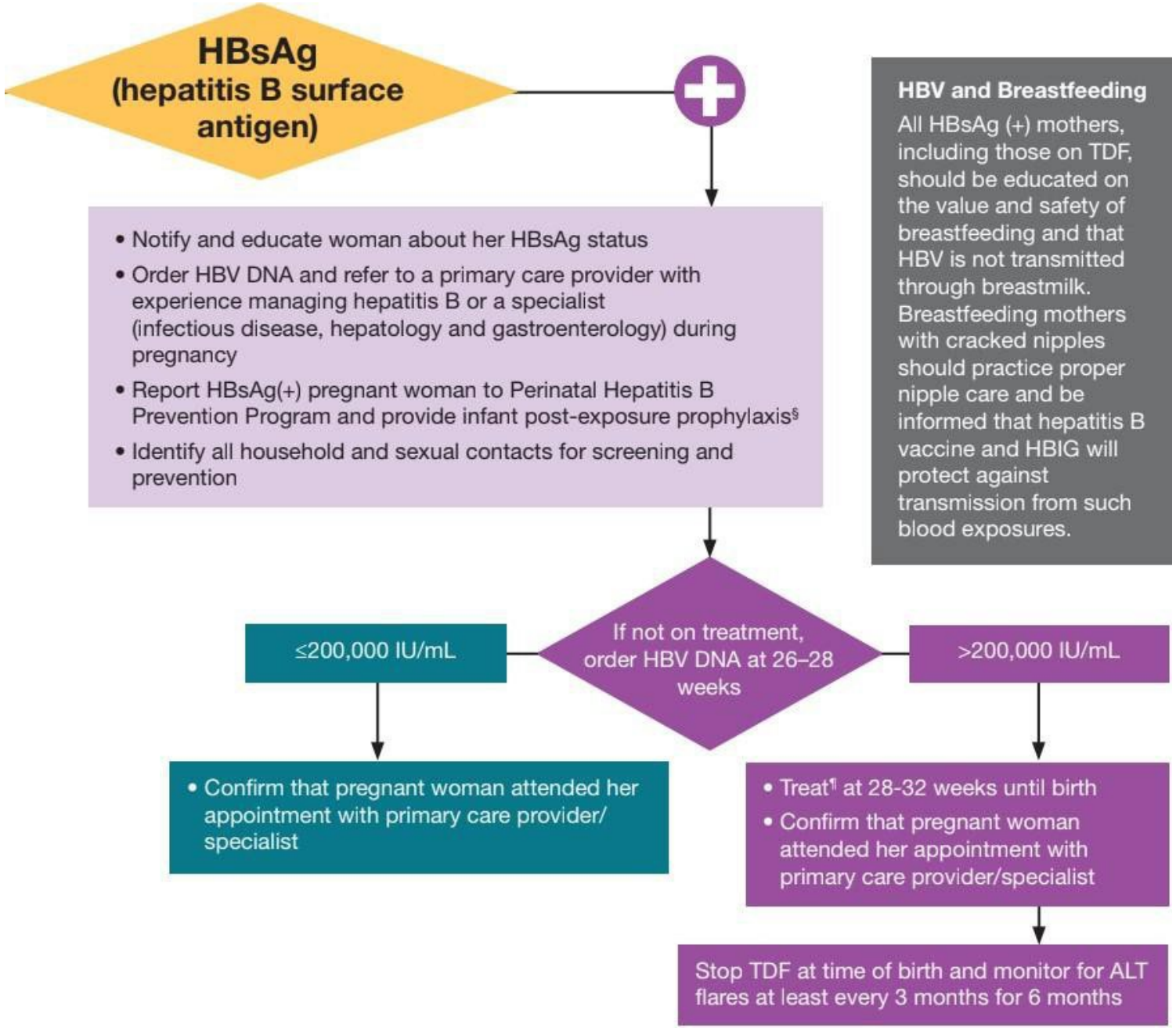
HBsAg

negative



HBsAg

Positive



Prevention

Vaccinate and give HBIG to infants born to people with active HBV

MMWR, January 12, 2018, Vol 67,(1);1–31, Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. https://www.cdc.gov/mmwr/volumes/67/rr/rr6701a1.htm

Management of Infants Born to Women with Hepatitis B Virus Infection for Pediatricians

Management of Perinatally Hepatitis B Virus (HBV)-Exposed Infants with Birth Weights ≥2,000 grams (≥4.4 lbs)

Administer hepatitis B immune globulin (HBIG) and single-antigen vaccine in separate limbs at birth (≤12 hours).
Complete vaccine series with 2 additional doses of single-antigen vaccine (3 total doses) OR with 3 additional doses of combination vaccine (4 total doses).

	≤12 hours of birth	1 mo	2 mos	4 mos	6 mos
Single-Antigen Vaccine Series*	1st dose	2nd dose			3rd dose
Single-Antigen and Combination Vaccine Series*	1st dose (*single-antigen vaccine*)		2nd dose	3rd dose	4th dose

*Administer the final dose no earlier than 6 months of age (minimum age 164 days includes 4-day grace period). Complete postvaccination serologic testing (PVST) at 9–12 months of age (or 1–2 months after final dose, if series delayed) by testing for ONLY hepatitis B surface antigen (HBsAg) and antibodies to hepatitis B surface antigen (anti-HBs). Do NOT test for antibodies to hepatitis B core antigen (anti-HBc).

Management of Perinatally Hepatitis B Virus (HBV)-Exposed Infants with Birth Weights <2,000 grams (<4.4 lbs)

Administer HBIG and single antigen vaccine in separate limbs at birth (≤12 hours).
Complete vaccine series with 3 additional doses of single antigen or combination vaccine (4 total doses).

	≤12 hours of birth	1 mo	2 mos	3 mos	4 mos	6 mos
Single-Antigen Vaccine Series*	1st dose	2nd dose	3rd dose			4th dose
Single-Antigen and Combination Vaccine Series*	1st dose (*single-antigen vaccine*)		2nd dose		3rd dose	4th dose

*Administer the final dose no earlier than 6 months of age (minimum age 164 days includes 4-day grace period). Complete postvaccination serologic testing (PVST) at 9–12 months of age (or 1–2 months after final dose, if series delayed) by testing for ONLY hepatitis B surface antigen (HBsAg) and antibodies to

Prevention - vaccines

U.S. Children and Adult Hepatitis B Vaccine Schedules

For children ≥ 1 and adults

Note: the first dose should be given as soon as possible. Additional doses require minimum time intervals required between doses in order for the vaccine to be effective.

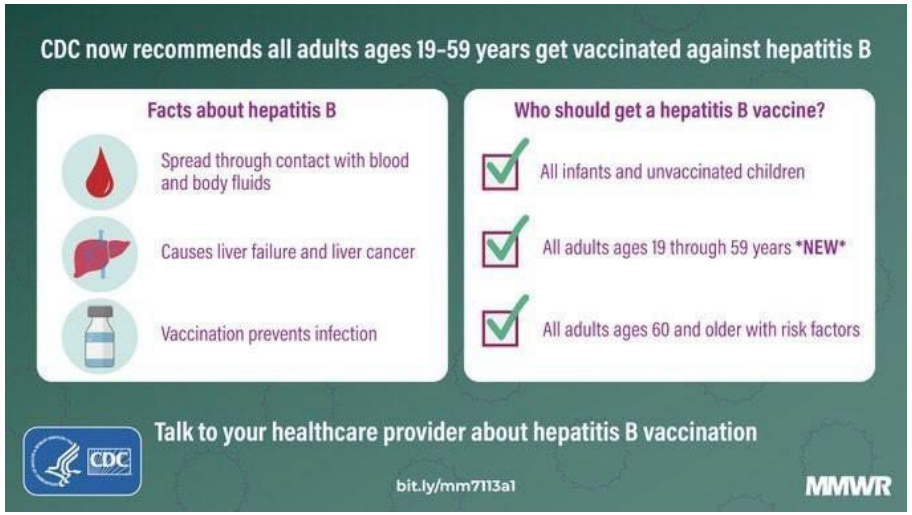
Vaccine	Dose 1	Dose 2	Dose 3
3 dose vaccine series Brand names: Engerix-B, Recombivax HB, Twinrix (hepatitis A and B - Adults ≥ 18 Years)	Now ✓	1 month after dose 1 ✓	6 months after dose 1 ✓
2 dose vaccine series Adults ≥ 18 Years Brand name: Heplisav-B	Now ✓	1 month after dose 1 ✓	

Key

✓ = Monovalent hepatitis B vaccine (protection against hepatitis B only)

= Approved for adults

= Approved for children



https://www.hepb.org/prevention-and-diagnosis/vaccination/guidelines-2/

Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. MMWR Morb Mortal Wkly Rep 2022;71:477–483.

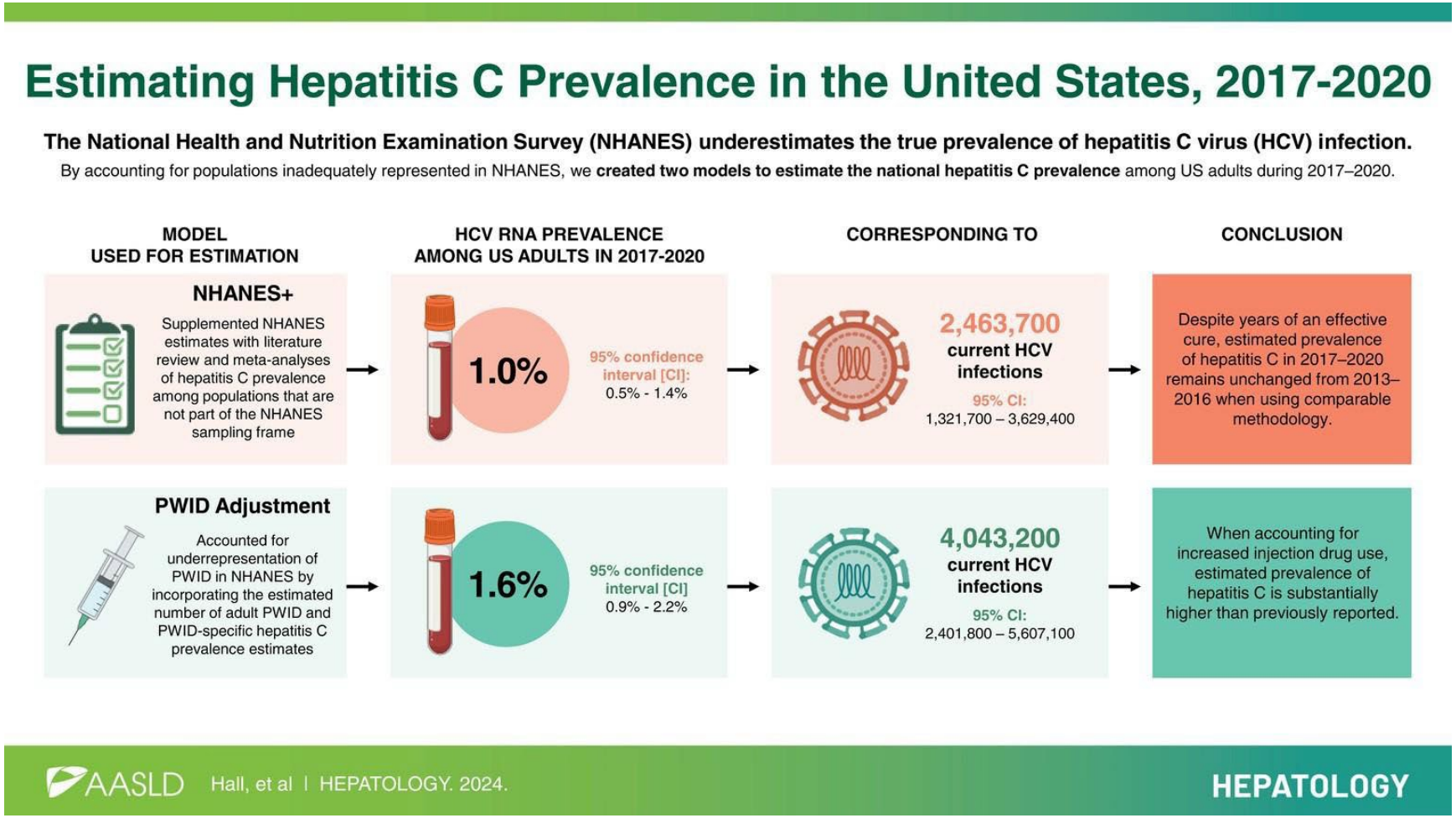
Dartmouth Health

Hepatitis C virus

Epidemiology

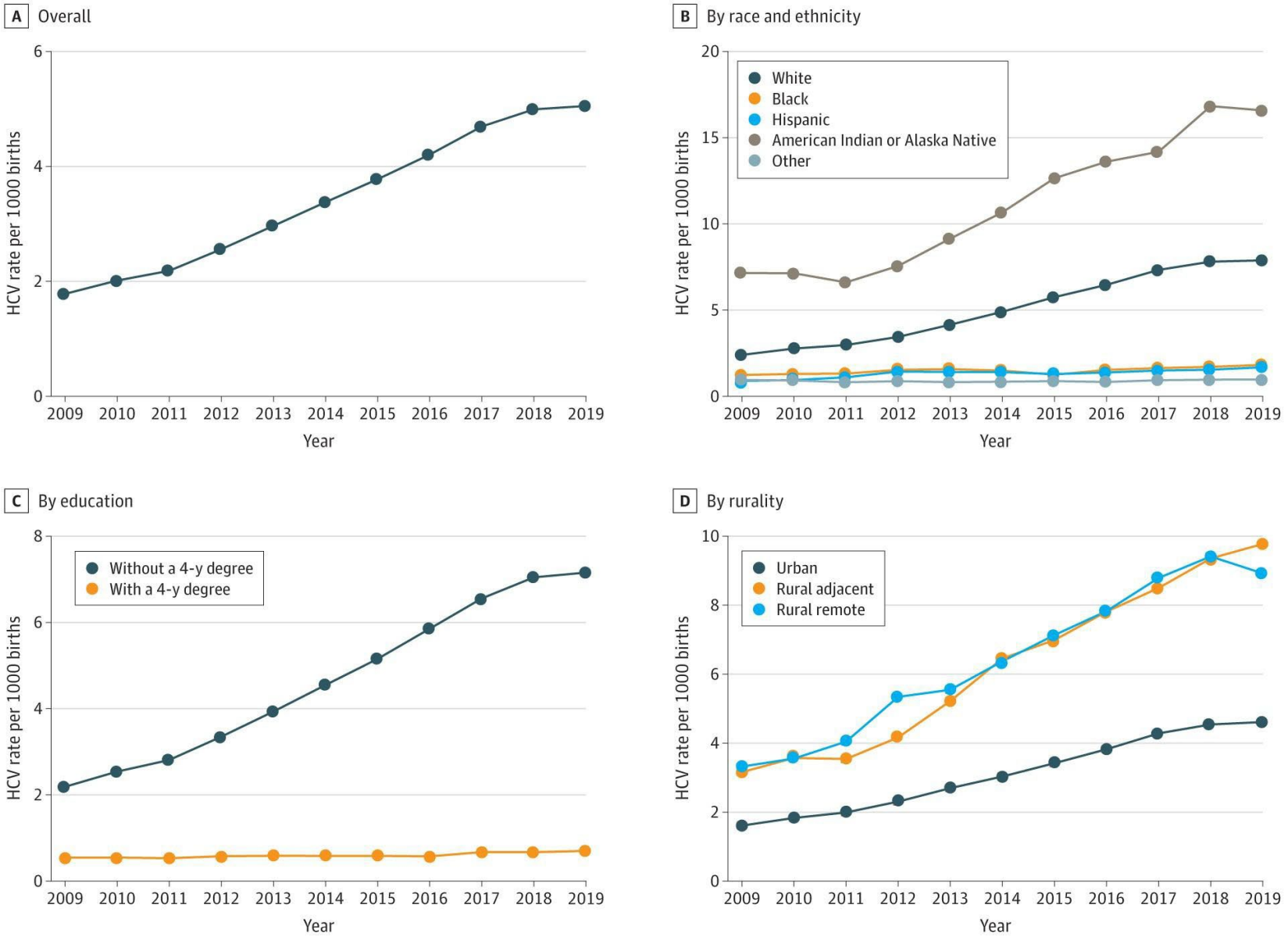
Prevalence

HCV RNA = viremic



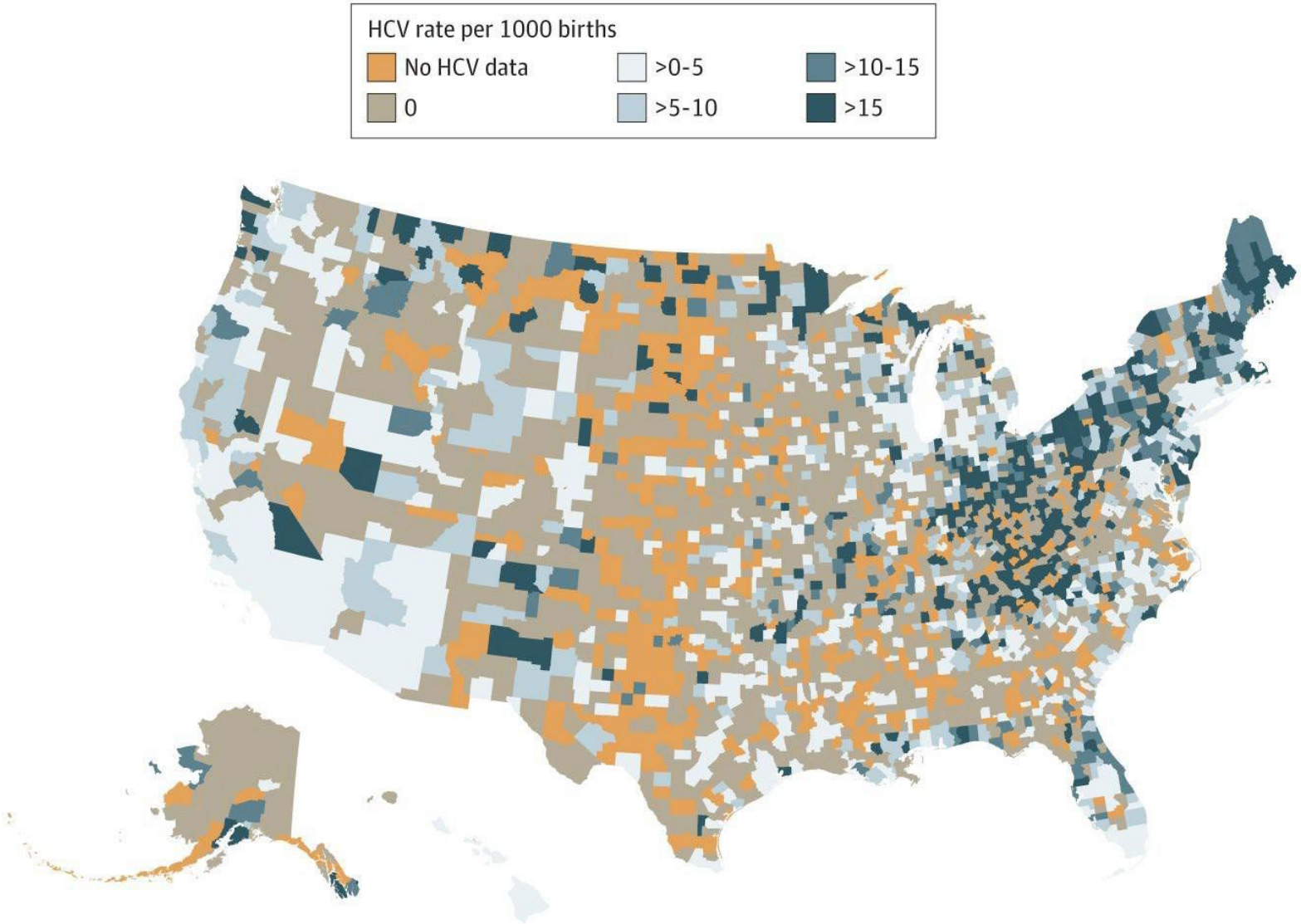
Hall, Eric W et al. Estimating hepatitis C prevalence in the United States, 2017–2020. Hepatology ():10.1097/HEP.0000000000000927, May 13, 2024.

Hepatitis C Infections Among Pregnant People Delivering Live Births in the US, 2009 to 2019



JAMA Health Forum. 2021;2(10):e213470

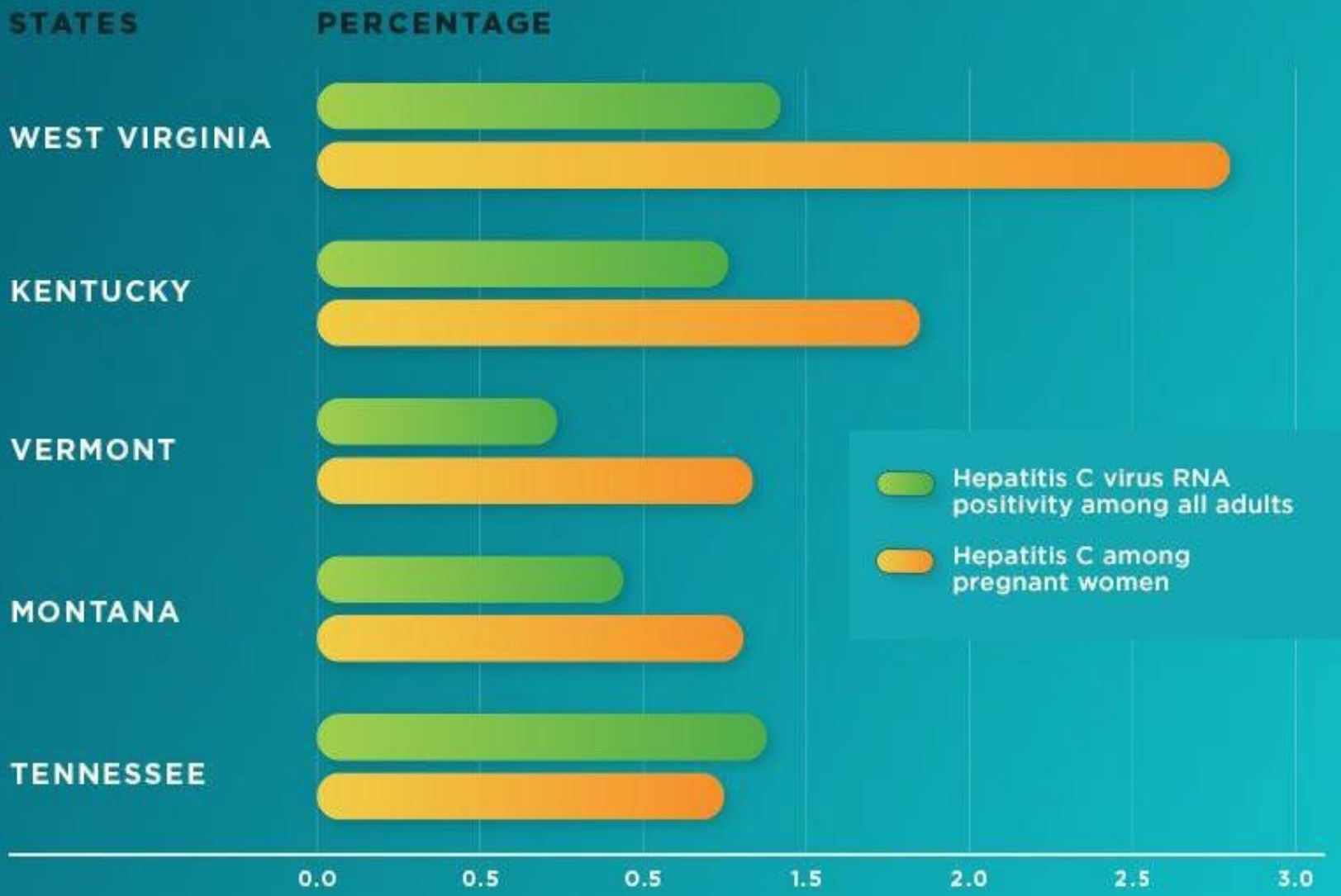
County Geographic Variation in Hepatitis C Infections Among Pregnant People in the US, 2019



JAMA Health Forum. 2021;2(10):e213470

According a 2015 analysis, **West Virginia**, **Kentucky**, **Vermont**, **Montana**, and **Tennessee** had the **highest prevalence of Hepatitis C among pregnant women**.

CDC now recommends testing for **all pregnant women** during each pregnancy.

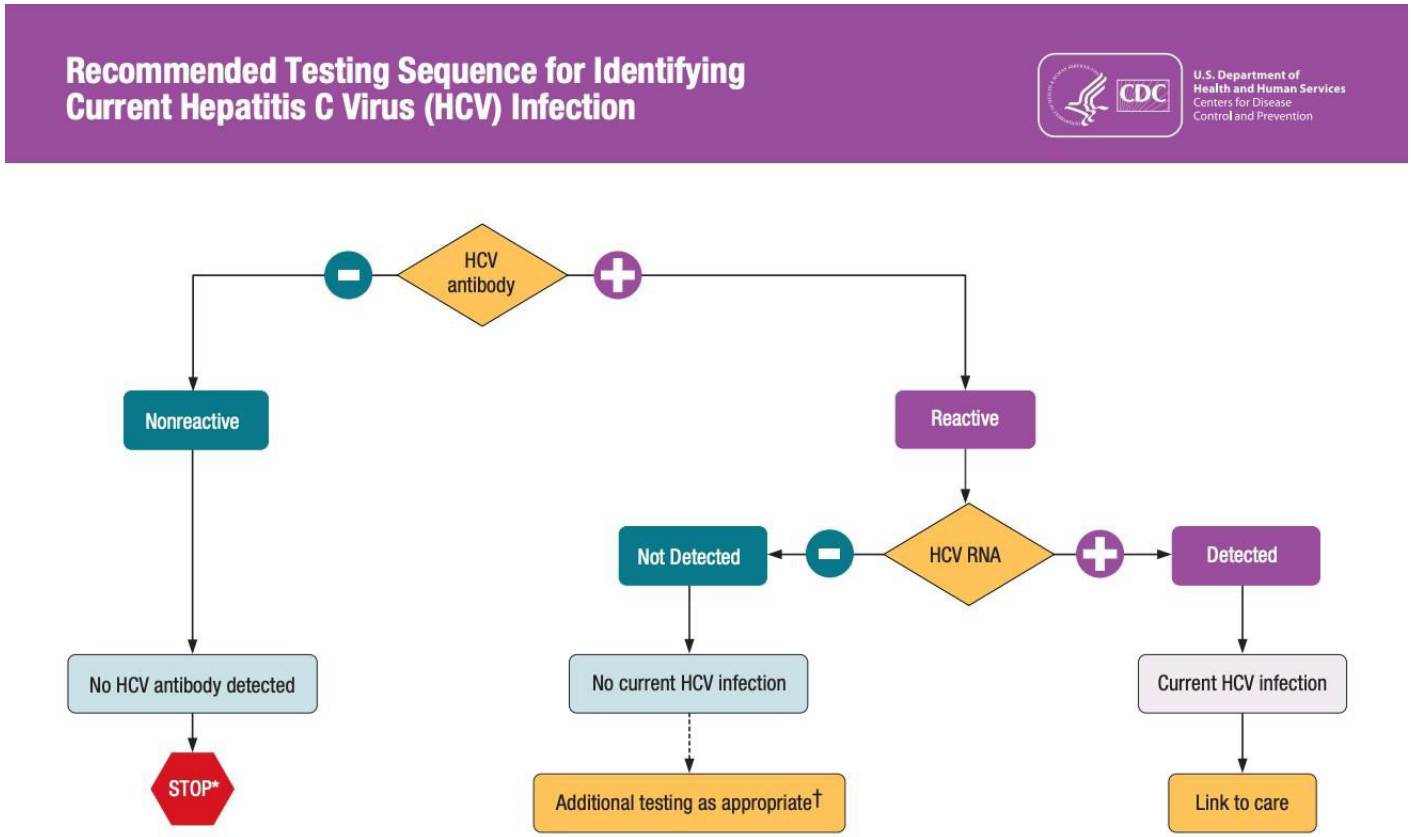


ESTIMATED PREVALENCE OF HEPATITIS C VIRUS RNA POSITIVITY AMONG ALL ADULTS AND HEPATITIS C AMONG PREGNANT WOMEN, BY STATE

SOURCE: SCHILLIE S, ET AL. CDC RECOMMENDATIONS FOR HEPATITIS C SCREENING AMONG ADULTS — UNITED STATES, 2020. MMWR RECOMM REP 2020;69(NO. RR-2):1-17.

Screening

SOURCES: CDC Recommendations for Hepatitis C Screening, MMWR, April 2020
CDC Vital Signs, April 2020



* For persons who might have been exposed to HCV within the past 6 months, testing for HCV RNA or follow-up testing for HCV antibody is recommended. For persons who are immunocompromised, testing for HCV RNA can be considered.

† To differentiate past, resolved HCV infection from biologic false positivity for HCV antibody, testing with another HCV antibody assay can be considered. Repeat HCV RNA testing if the person tested is suspected to have had HCV exposure within the past 6 months or has clinical evidence of HCV disease, or if there is concern regarding the handling or storage of the test specimen.

Source: CDC. Testing for HCV infection: An update of guidance for clinicians and laboratorians. MMWR 2013;62(18).

ACOG
The American College of Obstetricians and Gynecologists

CLINICAL PRACTICE GUIDELINE

NUMBER 6

SEPTEMBER 2023

(REPLACES PRACTICE BULLETIN 86, OCTOBER 2007)

Viral Hepatitis in Pregnancy

Committee on Clinical Practice Guidelines–Obstetrics. This Clinical Practice Guideline was developed by the ACOG Committee on Clinical Practice Guidelines–Obstetrics in collaboration with Brenna L. Hughes, MD, MSc; and Denise J. Jamieson, MD, MPH; with consultation from Kathleen F. Brookfield, MD, PhD; Gweneth B. Lazenby, MD, MSCR; and Rhoda S. Sperling, MD.

ACOG recommends that all patients be screened for hepatitis C virus antibodies in each pregnancy. **(STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)**

ACOG recommends prepregnancy screening for hepatitis C virus infection and treatment, when possible, before pregnancy. **(STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)**

ACOG The American College of Obstetricians and Gynecologists
CLINICAL PRACTICE GUIDELINE
NUMBER 6
SEPTEMBER 2023
(REPLACES PRACTICE BULLETIN 86, OCTOBER 2007)

Management of Hepatitis C Virus Infection for Pregnant, Intrapartum, and Postpartum Patients

The risk of vertical transmission of hepatitis C virus associated with amniocentesis is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. **(GOOD PRACTICE POINT)**

The risk of vertical transmission of hepatitis C virus associated with chorionic villus sampling is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. **(GOOD PRACTICE POINT)**

Breastfeeding is not discouraged among individuals with hepatitis C virus infection. **(GOOD PRACTICE POINT)**

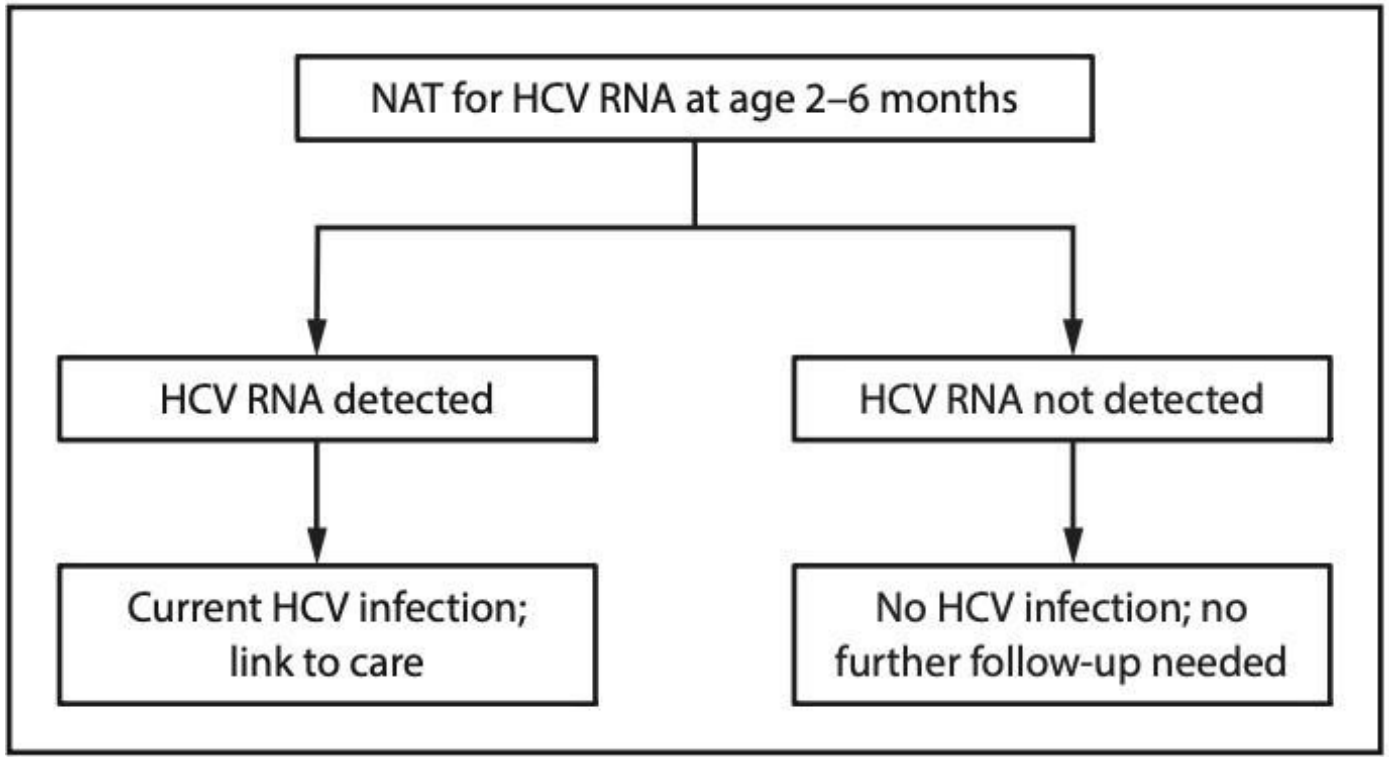
Viral Hepatitis in Pregnancy

Committee on Clinical Practice Guidelines–Obstetrics. This Clinical Practice Guideline was developed by the ACOG Committee on Clinical Practice Guidelines–Obstetrics in collaboration with Brenna L. Hughes, MD, MSc; and Denise J. Jamieson, MD, MPH; with consultation from Kathleen F. Brookfield, MD, PhD; Gweneth B. Lazenby, MD, MSCR; and Rhoda S. Sperling, MD.

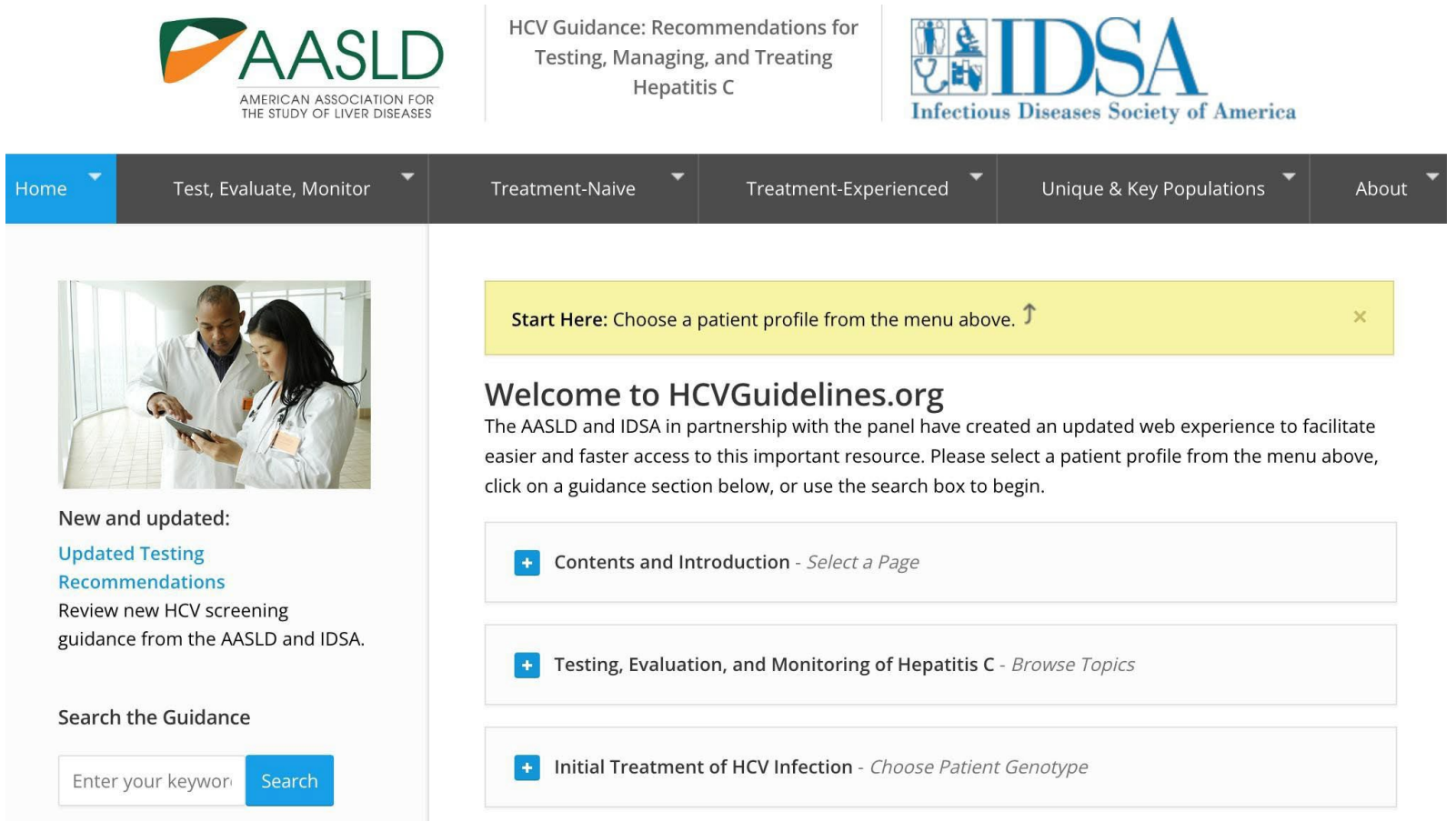
Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 72 / No. 4
November 3, 2023

CDC Recommendations for Hepatitis C Testing Among Perinatally Exposed Infants and Children — United States, 2023

FIGURE 3. Algorithm for hepatitis C virus testing of perinatally exposed children — United States, 2023*,†,§,¶



Treatment



https://www.hcvguidelines.org/

Treatment

Simplified HCV Treatment* for Treatment-Naive Adults Without Cirrhosis

Who Is *NOT* Eligible for Simplified Treatment (Without Cirrhosis)

Patients who have any of the following characteristics:

- Prior hepatitis C treatment
- Cirrhosis (see simplified treatment for treatment-naive adults with compensated cirrhosis)
- HBsAg positive
- Current pregnancy
- Known or suspected hepatocellular carcinoma
- Prior liver transplantation

(see HCV guidance for treatment recommendations for these patients)

Who Is Eligible for Simplified Treatment

Adults with chronic hepatitis C (any genotype) who do not have cirrhosis and have not previously received hepatitis C treatment

Simplified HCV Treatment Algorithm for Treatment-Naive Adults With Compensated Cirrhosis

Who Is *NOT* Eligible for Simplified Treatment (With Cirrhosis)

Patients who have any of the following characteristics:

- Current or prior episode of decompensated cirrhosis, defined as Child-Turcotte-Pugh (CTP) score ≥7 (ascites, hepatic encephalopathy, total bilirubin >2.0 mg/dL, albumin ≤3.5 g/dL, or INR ≥1.7)
- Prior hepatitis C treatment
- End-stage renal disease (ie, eGFR <30 mL/min/m^2) (see Patients with Renal Impairment section)
- HBsAg positive
- Current pregnancy
- Known or suspected hepatocellular carcinoma
- Prior liver transplantation

(see HCV guidance for treatment recommendations for these patients)

Who Is Eligible for Simplified Treatment

Adults with chronic hepatitis C (any genotype) who have compensated cirrhosis (Child-Pugh A) and have not previously received hepatitis C treatment
Liver biopsy is not required. For the purpose of this guidance, a patient is presumed to have cirrhosis if they have a FIB-4 score >3.25 **or** any of the following findings from a previously performed test.

- Transient elastography indicating cirrhosis (eg, FibroScan stiffness >12.5 kPa)
- Noninvasive serologic tests above proprietary cutoffs indicating cirrhosis (eg, FibroSure, Enhanced Liver Fibrosis Test, etc)
- Clinical evidence of cirrhosis (eg, liver nodularity and/or splenomegaly on imaging, platelet count <150,000/mm^3, etc)
- Prior liver biopsy showing cirrhosis

https://www.hcvguidelines.org/

HEPATITIS FREE NORTHERN NEW ENGLAND

> A tri-state initiative providing evidence-based, localized, and actionable strategies that will free NNE (New Hampshire, Maine and Vermont) from hepatitis B and hepatitis C.

Hepatitis Free Northern New England (HFNNE) is a broad, community-based coalition with members and participants from all over the three states, who are living with, affected by, or work in the field of viral hepatitis. This initiative formed in 2021, and we welcome new participants to join the journey toward viral hepatitis B and C elimination at any time.

A primary goal of HFNNE is to bring the widest range of voices to the table as the Northern New England 2025 Viral Hepatitis Elimination Plan is created. The Planning Group meets once every other month, starting in February 2024. The plan will be published in January 2025.

WELCOME to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Session 6, Risk Appropriate Care for Perinatal Substance Use Disorders

June 17, 2025

Risk Appropriate Care for Perinatal Substance Use Disorders

Daisy Goodman, DNP, MPH, CNM, CARN-AP

Learning Objectives

- Describe substance use disorders (SUD) as chronic, treatable medical conditions
- Differentiate maternal, fetal and neonatal risks associated with nonprescribed opioid and stimulant use during pregnancy and postpartum
- Explain recommended treatment for opioid use disorder during pregnancy

Acknowledgements

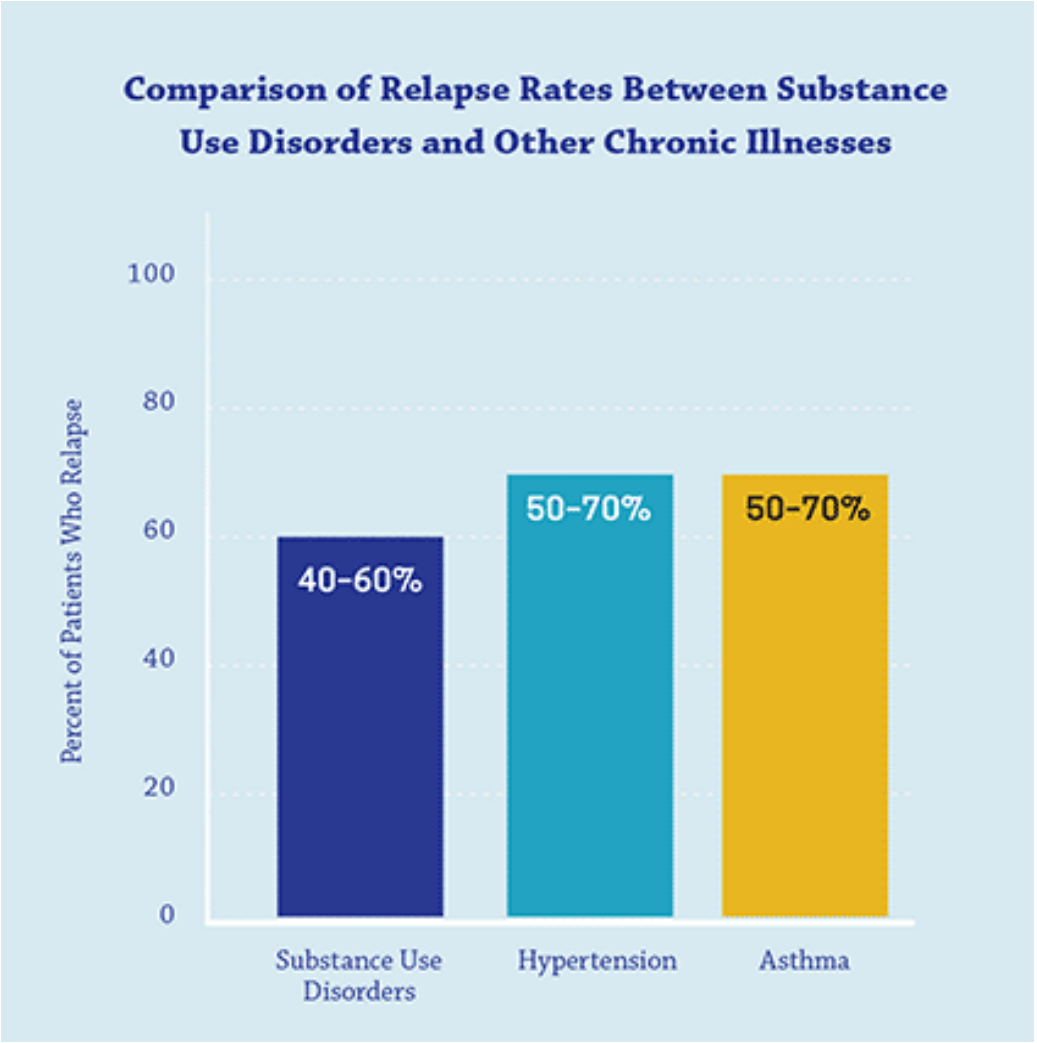
- Our patients and the inspiring multidisciplinary teams whom I have the privilege to work with

Perinatal Substance Exposure in NH

- 14.2% of births at DHMC had documented substance exposure during 2024
- 5.5% of NH births Using a substance does not constitute having a substance use disorder, although it creates risk for that
  - Substance "exposure" during pregnancy therefore does not necessarily mean the pregnant person has a substance use *disorder*
- Federal CAPTA legislation requires a Plan of Safe Care be established for infants "affected by" prenatal substance use
  - The Plan of Safe Care requirement does not require a child protection report

Similarity Between Substance Use Disorders And Other Chronic Conditions

- Chronic illnesses, including SUD, follow a similar trajectory
  - Can progress from early stage to life threatening severity unless treated
  - Self-management is key to success
  - The ability to stick to a treatment plan depends on many factors
  - Periods of non-adherence to treatment plans are common, and in the case of SUD are considered to be a part of the recovery process



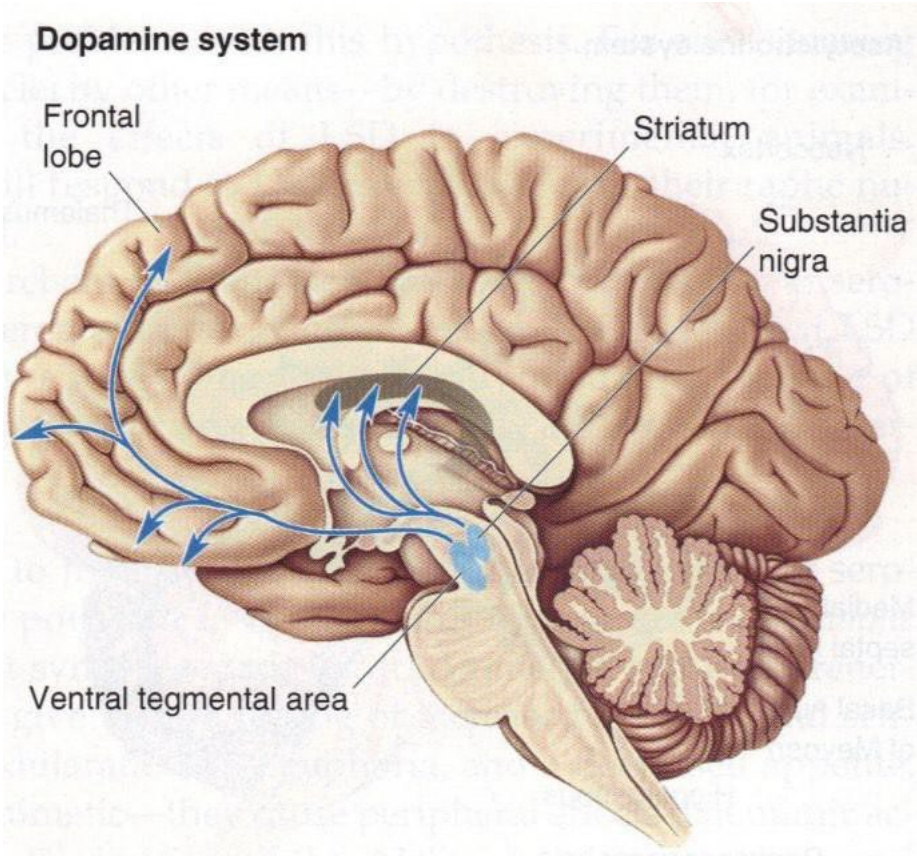
(JAMA, 284:1689-1695, 2000; http://www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction/treatment-recovery)

Understanding Substance Use Disorders as Chronic Disease

Frontal Lobe
Executive decision-making for long-term well-being

Limbic System
Natural rewards necessary for survival
- Food
- Water
- Sex

Rewarding drugs act at same site



- Reward pathways in the brain adapt in response to repeated use of substance
- Psychological and sometimes physiological dependence and tolerance develop
- Treatment must be aligned with the pathophysiology of the disease

Adapted from NIDA Neurobiology of Drug Addiction, https://nida.nih.gov/sites/default/files/1922-the-neurobiology-of-drug-addiction.pdf by Kate Stokes, RN, MPH. Used with permission.

DSM-5 Diagnostic Criteria for Substance Use Disorder

1. [The Substance] is often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful efforts to cut down or control use.
3. A great deal of time is spent in activities necessary to obtain the substance , use, or recover from its effects.
4. Craving, or a strong desire or urge to use.
5. Recurrent use resulting in failure to fulfill major role obligations at work, school, or home.
6. Continued use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of use.
7. Important social, occupational, or recreational activities are given up or reduced because of use.
8. Recurrent use in situations in which it is physically hazardous.
9. Continued use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. *Tolerance, as defined by either of the following:*
    a. *A need for markedly increased amounts of opioids to achieve intoxication or desired effect.*
    b. *A markedly diminished effect with continued use of the same amount.*
11. *Withdrawal, as manifested by either of the following:*
    a. *The characteristic withdrawal syndrome, or the substance (or a closely related one) is taken to relieve or avoid.*

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-V), 2013.

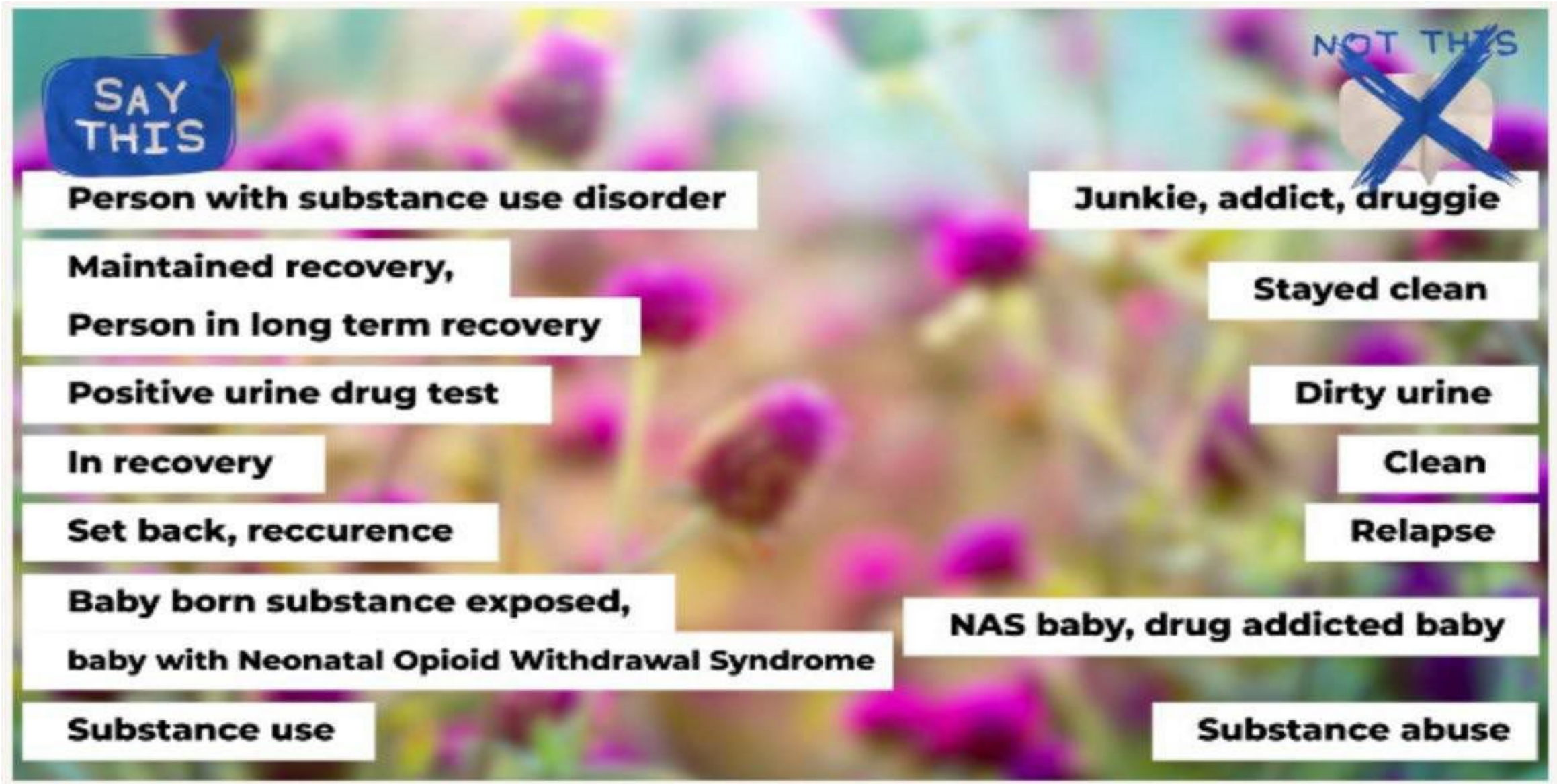
Substances Are Rarely The Only Exposure

- The true impact of substance exposure during pregnancy is difficult to distinguish from frequently associated factors: inadequate nutrition, unstable housing, infectious disease, involvement with the criminal-legal system, violence, and other causes of chronic and acute stress
- Each of these factors is independently associated with poor perinatal and neonatal outcomes, and with maternal morbidity and mortality
- Risks may be increased based on the action of the drug, route of administration, dose, frequency of exposure
- Our approach should focus on mitigating/reducing harm and providing support for social determinants which keep patients from being able to enter recovery

Taking A Person Centered Approach

- Create a welcoming space
- Convey respect for the person's autonomy
- Avoid bias and stigmatizing language or action
- Celebrate pregnancy as a time of healing and health-promoting change
- "*Equitable information sharing empowers parents and providers to create and build collaborative models of care.*" (perinatalharmreduction.org)

Words Matter



What does risk appropriate care look like?

Alcohol

- Prevalence of any alcohol use during pregnancy estimated at around 10.2% (1 in 10 reporting alcohol use within the last 30 days)
- Prevalence of binge drinking during pregnancy reported at 3.1% (1 in 33)
- A known teratogen, linked to miscarriage, stillbirth, IUGR, congenital anomalies and lifelong neurodevelopmental disabilities
- Although the CDC, ACOG, and the Canadian society for OBGYN all recommend complete abstinence during pregnancy, reducing use also reduces harm
- Severe alcohol withdrawal can be fatal- if physiologic dependence is suspected, patients should be referred for inpatient management

DeJong et al . Alcohol use in pregnancy. *Clin Obstet Gynecol*. 2019 March ; 62(1): 142–155

Stimulants

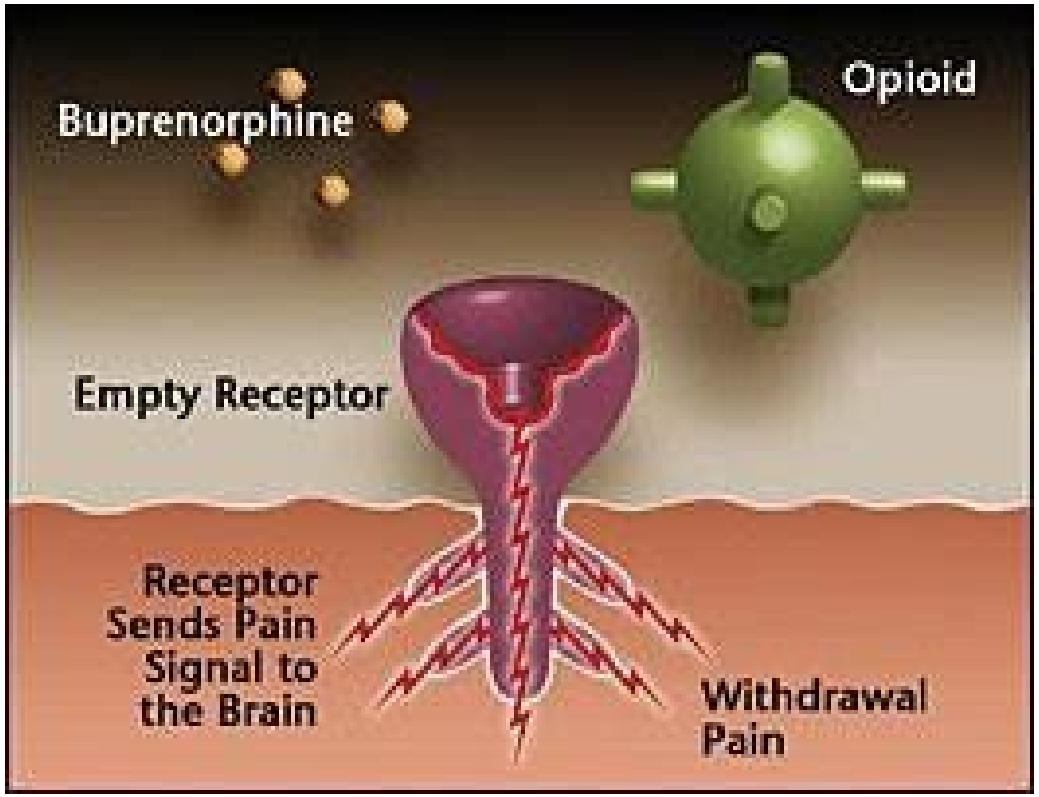
- Highly addictive due to its action on dopamine release
- Toxic in high doses, including psychosis and fatal cardiac arrhythmia
- Frequent use during pregnancy is associated with poor nutrition, dentition, weight loss, and fetal growth restriction
- Stimulant use disorder is difficult to treat
  - Contingency management is the best studied approach
  - Prescribed stimulants (eg amphetamines, dextroamphetamine) are not curative, although they may address underlying ADHD
  - Bupropion + naltrexone + mirtazapine emerging as treatment options, often in combination (Aziz, 2021)

Cocaine

- Highly prevalent in DHMC service area now
- Cocaine is associated with cardiovascular risk, including placental dysfunction
- Some research supports bupropion as helpful, due to its dopaminergic properties
- Disulfiram is emerging as a treatment, but not typically recommended during pregnancy or lactation

Opioid Use Disorder (OUD)

- Pharmacotherapy is the recommended treatment for OUD during pregnancy and lactation, as it is for non-pregnant people.
- Medical treatment allows return to function by eliminating withdrawal symptoms and cravings
- Supports self-management of disease and return to normal life
- Treatment with medication for OUD (MOUD) as early as possible during pregnancy to reduce harm and prevent return to use postpartum
- Prenatal and postpartum receipt of MOUD decreases overdose risk



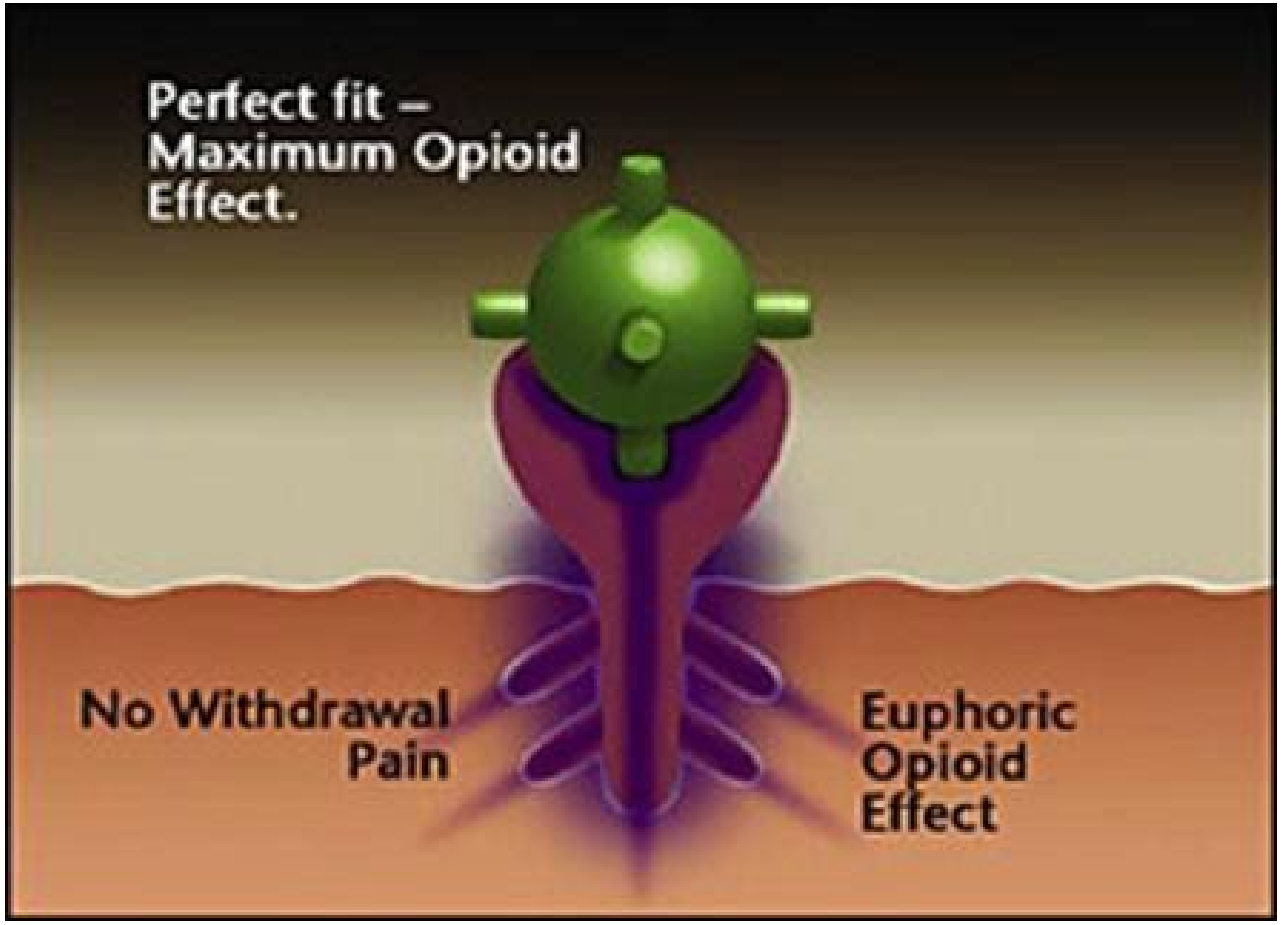
The National Alliance of Advocates for Buprenorphine Treatment

OUD Treatment Goals

- Goals include avoiding/treating withdrawal, reducing cravings and creating space for healing
- Choice of medication based on individual patient preference, prior MOUD experience, and life circumstances
  - Dose increases typical over the course of pregnancy due to metabolic changes
- In the context of fentanyl, transitioning to MOUD is challenging during pregnancy: hospitalization and referral to tertiary care should be considered
- Neonatal opioid withdrawal (NOWS) is associated with agonist and mixed agonist/antagonist MOUD
  - Eat, Sleep, Console (ESC) is an approach based supporting normal neonatal adaptation, with pharmacotherapy used only if needed
  - Breastfeeding optimizes neonatal tolerance of NOWS and decreases need for pharmacologic management

MOUD- Methadone

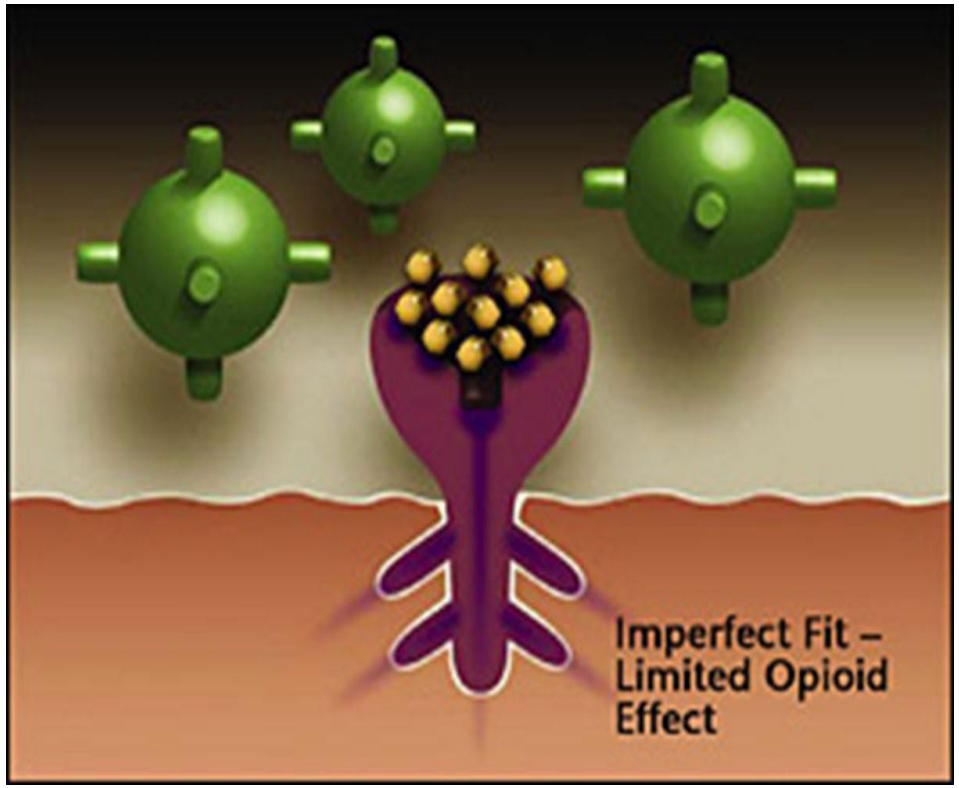
- Tightly federally regulated
- May only be prescribed in licensed outpatient treatment programs, or in the ED setting (3-day limit applies)
- May be initiated and/or continued during a hospital admission
- Long acting, leading to serum level accumulation which requires slow titration in outpatient settings and often subtherapeutic doses
- More rapid titration should be monitored for safety through direct observation, such as during hospital admission



The National Alliance of Advocates for Buprenorphine Treatment

MOUD-Buprenorphine

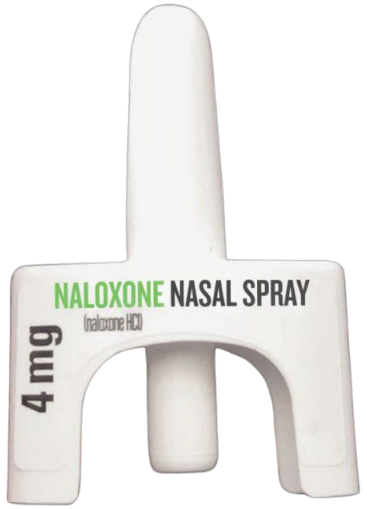
- Formulations and routes of delivery:
  - May be prescribed in outpatient setting by licensed providers with a DEA number
  - Sublingual tablets (buprenorphine monotherapy; bup/naloxone
  - Sublingual film (bup/naltrexone)
  - Injectable (buprenorphine monotherapy only)
- Microdosing approach decreases risk for precipitated withdrawal in the context of fentanyl use

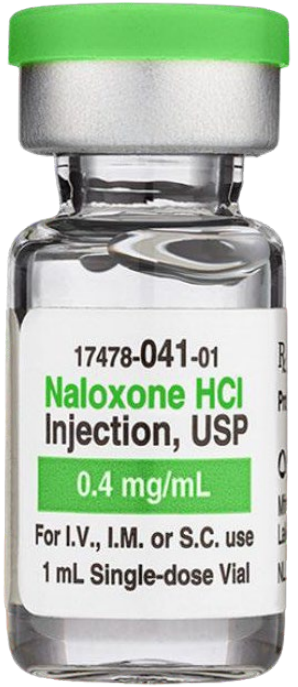


The National Alliance of Advocates for Buprenorphine Treatment

Opioid Antagonists

- Naltrexone: oral tablets or monthly injectable, used to treat AUD and as MOUD
- Naloxone: used for opioid overdose reversal
  - Must be administered intranasally or injected
  - Combined with buprenorphine in sublingual formulation or tablets, to prevent diversion of product but minimally absorbed
  - Nasal naloxone should be offered to any person at risk of experiencing or witnessing a drug overdose





Adulterants In NH-VT Drug Supply

- Qualitative drug testing in White River Junction VT this year identified between 3-12 chemical compounds in each sample
- High potency opioids included carfentanyl and nitazines
- Other adulterants included xylazine and medetomidine, both associated with intense withdrawal syndromes, medetomidine also with cardiac instability
- Xylazine associated with extensive and poorly healing wounds

Ostrowski SJ, Tamama K, Trautman WJ, Stratton DL, Lynch MJ. Notes from the Field: Severe Medetomidine Withdrawal Syndrome in Patients Using Illegally Manufactured Opioids — Pittsburgh, Pennsylvania, October 2024–March 2025. *MMWR Morb Mortal Wkly Rep* 2025;74:269–271.;

Zhua, D, Palamar, J. Responding to medetomidine: clinical and public health needs. *The Lancet* 2025; 44.

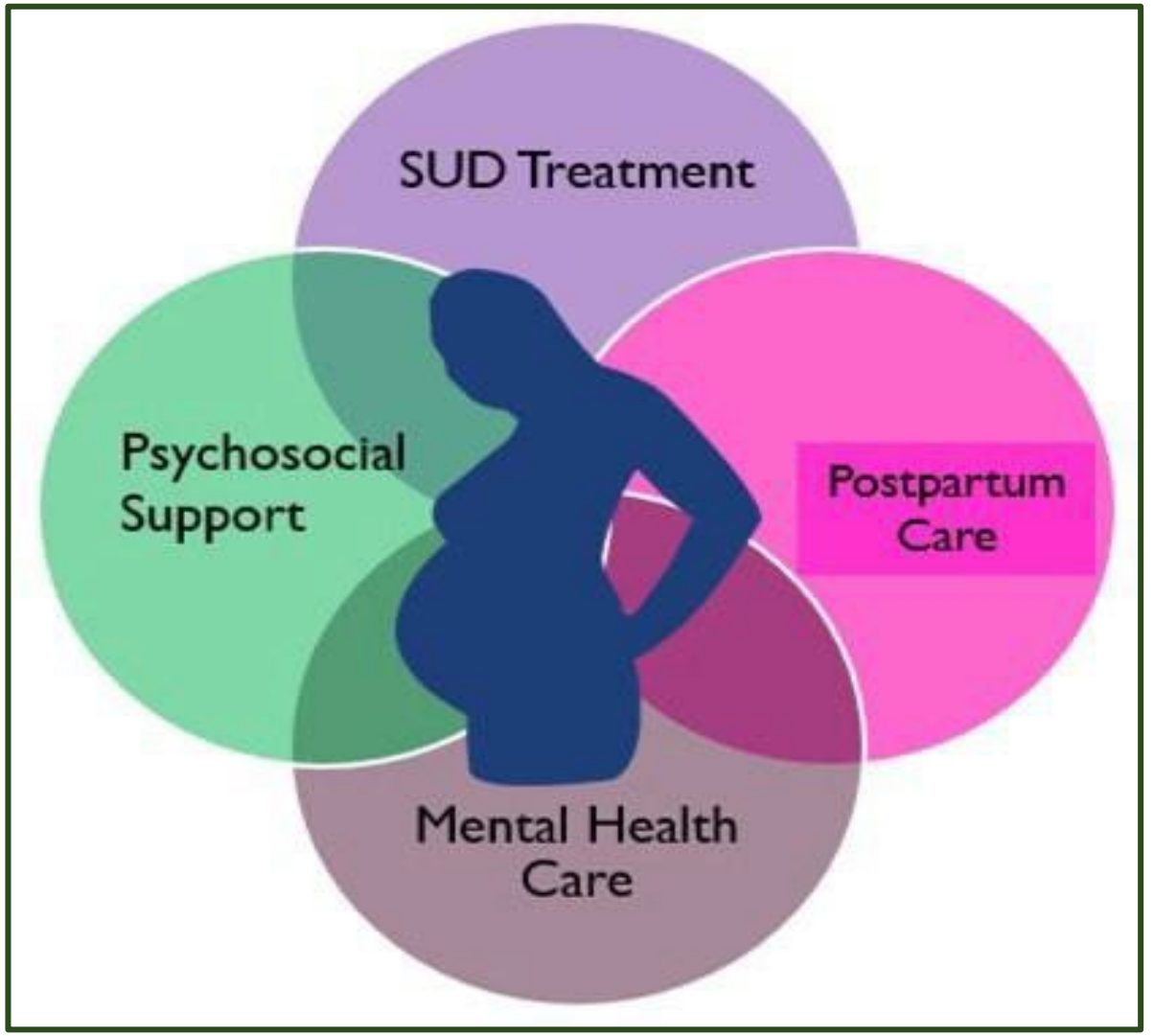
Concurrent Treatment Of Tobacco Use Disorder

- Highly prevalent among people with other SUD, both cigarettes and vaping
- Independently associated with poor fetal outcomes, including prematurity, placental abruption, growth restriction
- TUD Increases severity of NOWS as infants experience concurrent nicotine withdrawal
- Nicotine withdrawal increases experience of postoperative pain as well as overall anxiety
- Tobacco use decreases quantity and duration of lactation
- Nicotine replacement is an appropriate, harm-reducing strategy
  - Important to prescribe adequate dose to match nicotine receptor need
- Encourage patients to utilize NRT during hospitalization

Treatment Involves Much More Than Medication

Following withdrawal management and stabilization on a treatment medication, continuing treatment is critical, including

- Medications for OUD (if applicable)
- Psychiatric care
- SUD and mental health counseling
- Peer recovery support
- Addressing SDOH needs are all critical



Breastfeeding In the Setting Of Substance Use

- In 2023, the Academy of Breastfeeding Medicine published new protocols for supporting breastfeeding in the context of perinatal substance use
- General principals
  - Breastfeeding is a basic human right
  - Postpartum people will not intentionally harm their infants by exposing them to substances through breastmilk
  - Patient education and having a safety plan are critical in the event of return to active drug use during lactation

BREASTFEEDING MEDICINE
Volume 17, Number 8, 2022
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DOI: 10.1089/bfm.2022.29216.abm

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Academy of Breastfeeding Medicine Position Statement: Breastfeeding As a Basic Human Right

BREASTFEEDING MEDICINE
Volume 18, Number 10, 2023
© Mary Ann Liebert, Inc.
DOI: 10.1089/bfm.2023.29256.abm

ABM Protocol

Open camera or QR reader and scan code to access this article and other resources online.

Academy of Breastfeeding Medicine Clinical Protocol #21: Breastfeeding in the Setting of Substance Use and Substance Use Disorder (Revised 2023)

Miriam Harris,[1,2] Davida M. Schiff,[3,4] Kelley Saia,[2,5] Serra Muftu,[3,4] Katherine R. Standish,[6] and Elisha M. Wachman[2,7]

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Abstract

Background: The Academy of Breastfeeding Medicine (ABM) revised the 2015 version of the substance use disorder (SUD) clinical protocol to review the evidence and provide updated literature-based recommendations related to breastfeeding in the setting of substance use and SUD treatments.
Key Information: Decisions around breastfeeding are an important aspect of care during the peripartum period, and there are specific benefits and risks for substance-exposed mother–infant dyads.
Recommendations: This protocol provides breastfeeding recommendations in the setting of nonprescribed opioid, stimulant, sedative-hypnotic, alcohol, nicotine, and cannabis use, and SUD treatments. Additionally, we offer guidance on the utility of toxicology testing in breastfeeding recommendations. Individual programs and institutions should establish consistent breastfeeding approaches that mitigate bias, facilitate consistency, and empower mothers with SUD. For specific breastfeeding recommendations, given the complexity of breastfeeding in mothers with SUD, individualized care plans should be created in partnership with the patient and multidisciplinary team with appropriate clinical support and follow-up. In general, breastfeeding is recommended among mothers who stop nonprescribed substance use by the time of delivery, and they should continue to receive ongoing postpartum care, such as lactation support and SUD treatment. Overall, enhancing breastfeeding education regarding substance use in pregnancy and lactation is essential to allow for patient-centered guidance.

Keywords: breastfeeding, substance use disorder, opioids, alcohol, Cannabis

About ABM Protocols: *A central goal of the Academy of Breastfeeding Medicine (ABM) is the development of clinical protocols for managing common medical problems that may impact breastfeeding success. These protocols serve only as guidelines for the care of breastfeeding mothers and infants and do not delineate an exclusive course of treatment or serve as standards of medical care. Variations in treatment may be appropriate according to the needs of an individual patient. The ABM empowers health professionals to provide safe, inclusive, patient-centered, and evidence-based care. Women and others who are pregnant and lactating identify with a broad spectrum of genders, pronouns, and terms for feeding and parenting. There are two reasons ABM's use of gender-inclusive language may be transitional or inconsistent across protocols. First, gender-inclusive language is nuanced and evolving across languages, cultures, and countries. Second, foun-*

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[2]Grayken Center for Addiction, Boston Medical Center, Boston, Massachusetts, USA.
Divisions of [3]Newborn Medicine and [4]General Academic Pediatrics, Mass General Hospital for Children, Boston, Massachusetts, USA.
Departments of [5]Obstetrics and Gynecology, [6]Family Medicine, and [7]Pediatrics, Chobanian & Avedisian Boston University School of Medicine and Boston Medical Center, Boston, Massachusetts, USA.

Summary

- Widespread polysubstance use, including high doses of fentanyl in current drug supply make treatment initiation during pregnancy challenging
- Maternal Fetal Medicine and Addiction Psychiatry consultation recommended
- Consider admission for withdrawal management and treatment initiation during pregnancy
- Adulteration with xylazine and medetomidine is associated poorly healing wounds and more intense withdrawal symptoms

References

- Academy of Breastfeeding Medicine (2023). Protocol 21: Breastfeeding in the setting of substance use and substance use disorder. Accessed from: https://www.bfmed.org/assets/DOCUMENTS/PROTOCOLS/21-drug-dependency-protocol-english.pdf
- Academy of Perinatal Harm Reduction. Pregnancy and Substance Use: A Harm Reduction Toolkit. Accessed from: https://www.perinatalharmreduction.org/
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787
- Aziz, R. (2021). *Pharmacotherapy for Stimulant Use Disorders*. The Carlat Report. https://www.thecarlatreport.com/articles/3448-pharmacotherapy-for-stimulant-use-disorders
- Barber, C. M., & Terplan, M. (2023). Principles of care for pregnant and parenting people with substance use disorder: the obstetrician gynecologist perspective. *Frontiers in Pediatrics*, *11*, 1045745. https://doi.org/10.3389/fped.2023.1045745
- DeJong et al . Alcohol use in pregnancy. *Clin Obstet Gynecol*. 2019 March ; 62(1): 142–155
- Koenigs, K., Gray, J., Gale, E., Siegel, M., Schiff, D., & Bernstein, S. (2024). An Alternative Approach to Low-Dose Buprenorphine Induction in Pregnancy and Postpartum. *O&G Open Journal*, *1*(4), 037-037.
- Ostrowski SJ, Tamama K, Trautman WJ, Stratton DL, Lynch MJ. Notes from the Field: Severe Medetomidine Withdrawal Syndrome in Patients Using Illegally Manufactured Opioids — Pittsburgh, Pennsylvania, October 2024–March 2025. MMWR Morb Mortal Wkly Rep 2025;74:269–271.
- Schiff, D, Nielsen, T, Terplan, M et al. 2018. Fatal and nonfatal opioid overdose among pregnant and postpartum women in Massachusetts. *Obst and Gynecol* 132 (8), 466-474.
- Zhua, D, Palamar, J. Responding to medetomidine: clinical and public health needs. *The Lancet* 2025; 44.

Up Next

- Next session: July 15 –Doulas, Midwives, and Medical Providers
- Please submit your cases/questions, track your attendance for CME/CNE and view course resources at the: DH iECHO site
- Recordings will be posted on the D-H ECHO website https://www.dartmouth-hitchcock.org/project-echo/enduring-echo-materials

WELCOME to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Session 7, Models of Maternity Care: Doula's Midwives, and Medical Providers

July 15, 2025

Models of Care

For Rural Maternity Care Improvement

Objectives

1. Understand the importance of examining models of care
2. Learn about maternity care models of care
3. Explore ways to improve birth outcomes and experience in a rural setting using a case

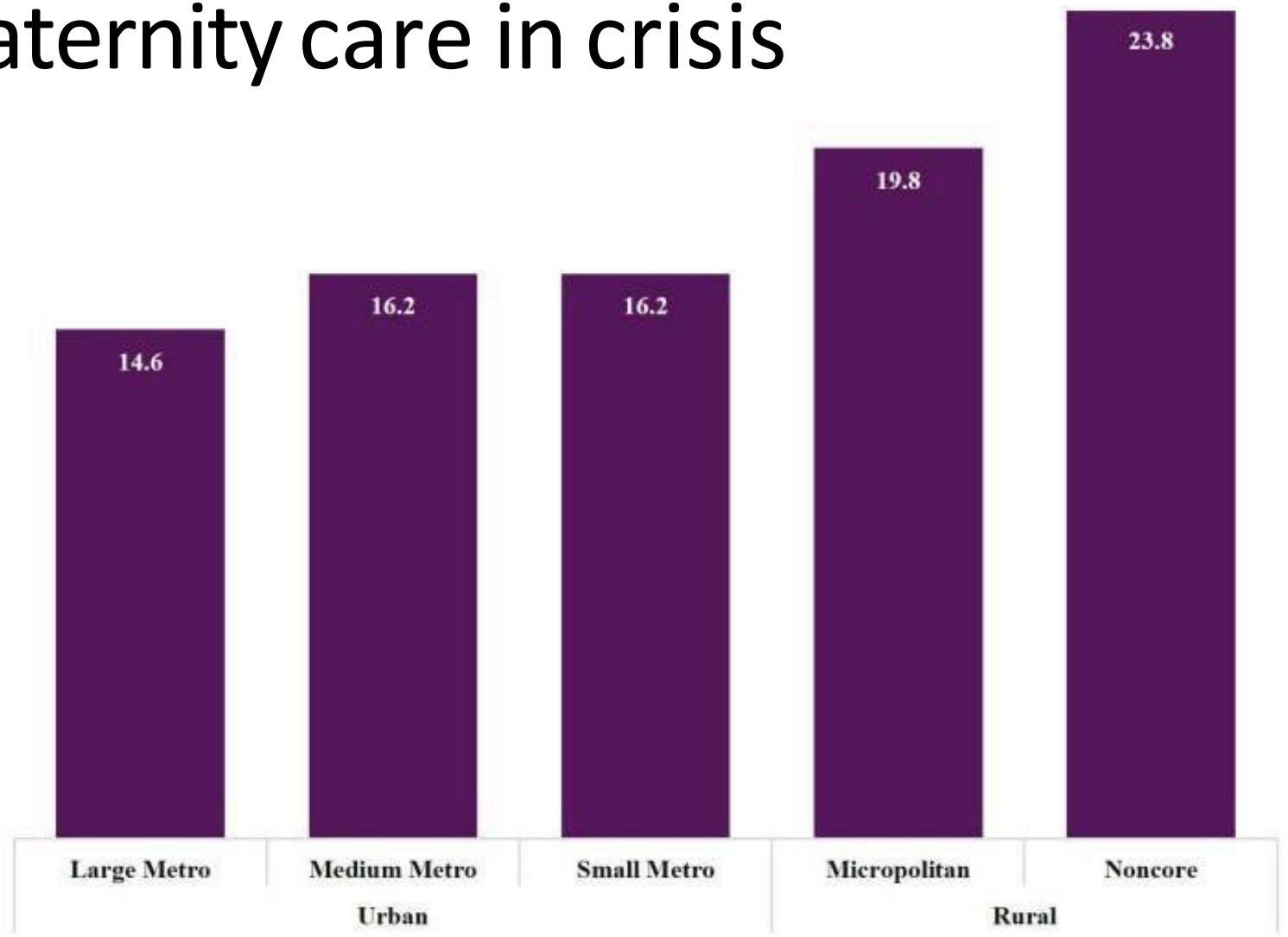
What is a model of care?

A model of care is a conceptualization and operationalization of how services are delivered, including the processes of care, organization of providers and management of services.

Who is delivering health services?
Where are the health services delivered?
How are health services organized?

https://www.emro.who.int/uhc-health-systems/access-health-services/phc-oriented-models-of-care.html

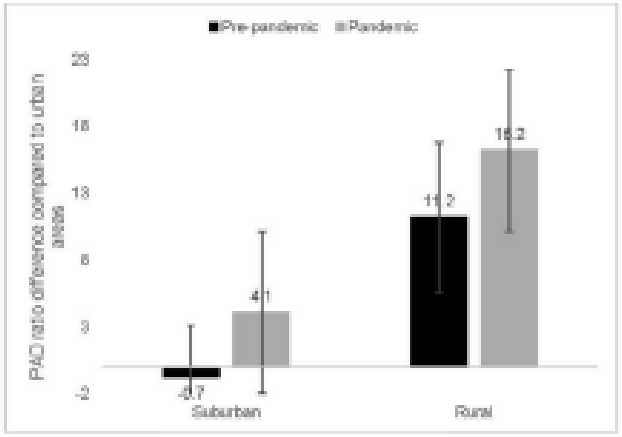
Rural maternity care in crisis



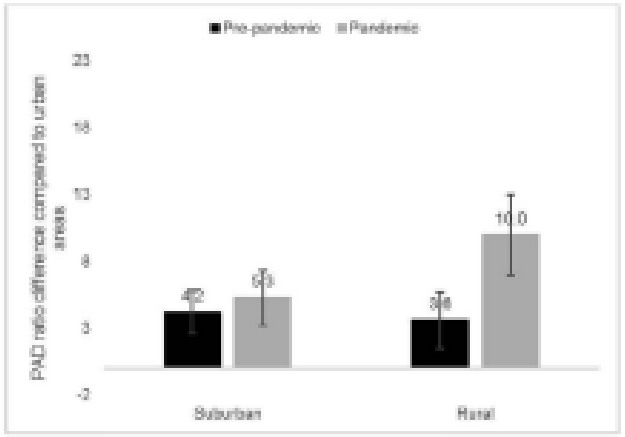
Pregnancy-related mortality ratios by urban-rural category

Urban-Rural Differences in Pregnancy-Related Deaths, United States, 2011–2016; Merkt et al

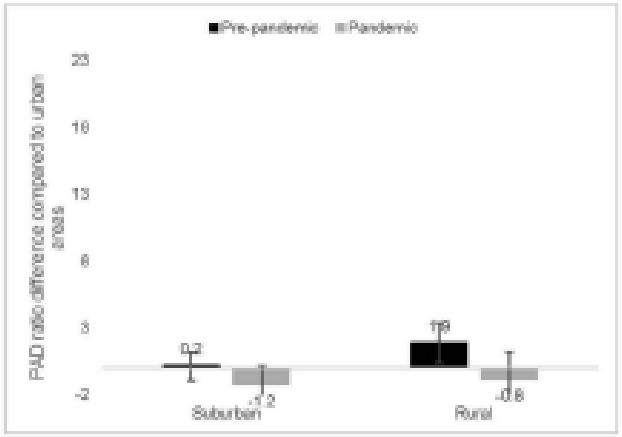
Difference in pregnancy-associated death ratio



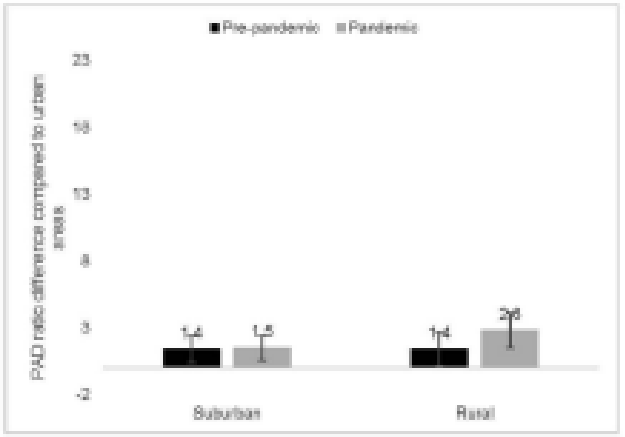
A. Obstetric Causes



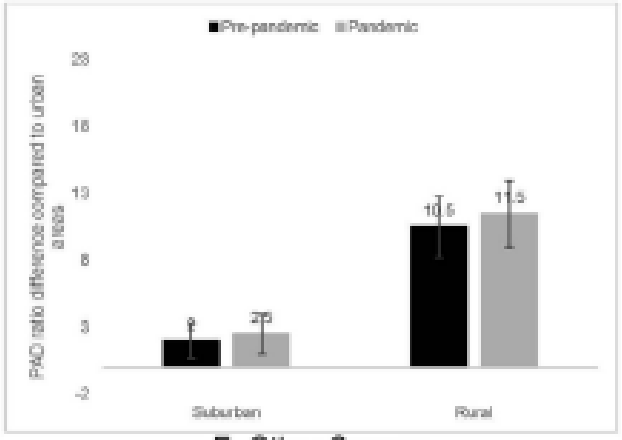
B. Drug-related Causes



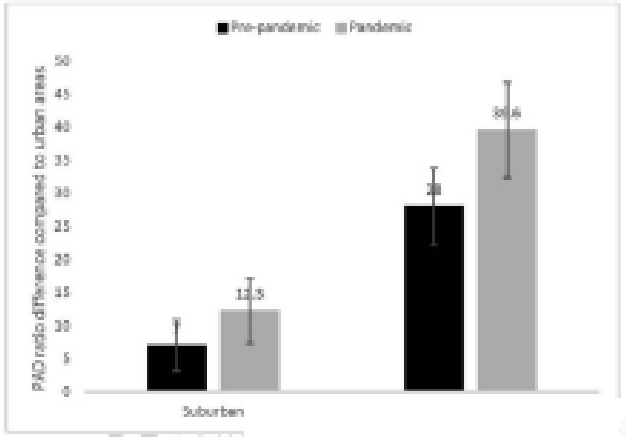
C. Homicide



D. Suicide



E. Other Causes

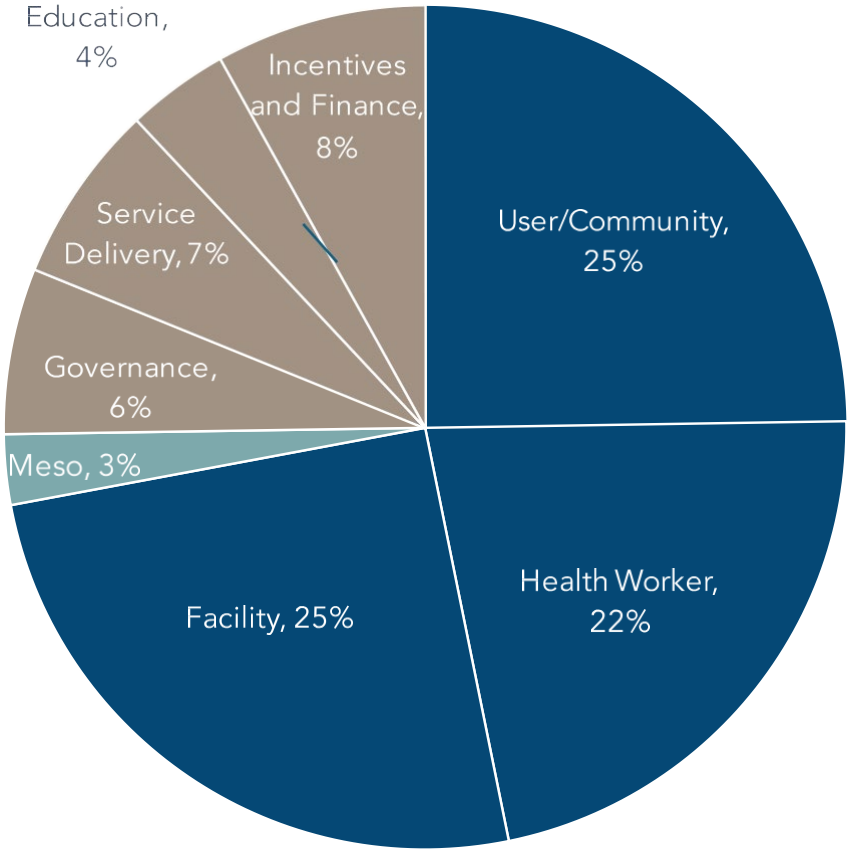


F. Total (Al

Margerison et al / Am J Prev Med 2025;68(1):176–181

Thinking outside the box

Most improvement targets the micro-level



Types of interventions and levels targeted to improve quality of primary healthcare in LMICs according to the published literature from 2008–2017

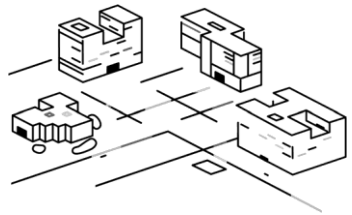
Kruk M, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S. et al 2018 High quality health systems in the sustainable development goals era: Time for a revolution. *The Lancet Global Health*

Micro-level approaches alone have modest effects on provider performance

	Training only	Training plus supervision	Supervision only	Printed information or job aid
Absolute percentage point change in provider performance	9.7	17.8	11.2	1.5
Total number of studies	76	26	16	8
Average number of health facilities in intervention group	6	7	7	8
Median duration of study follow-up	4.0 months	4.5 months	5.0 months	1.9 months

Rowe AK, Rowe SY, Peters DH, Holloway KA, Chalker J, Ross-Degnan D. 2018. Effectiveness of strategies to improve health-care provider practices in low-income and middle-income countries: a systematic review. *The Lancet Global Health*

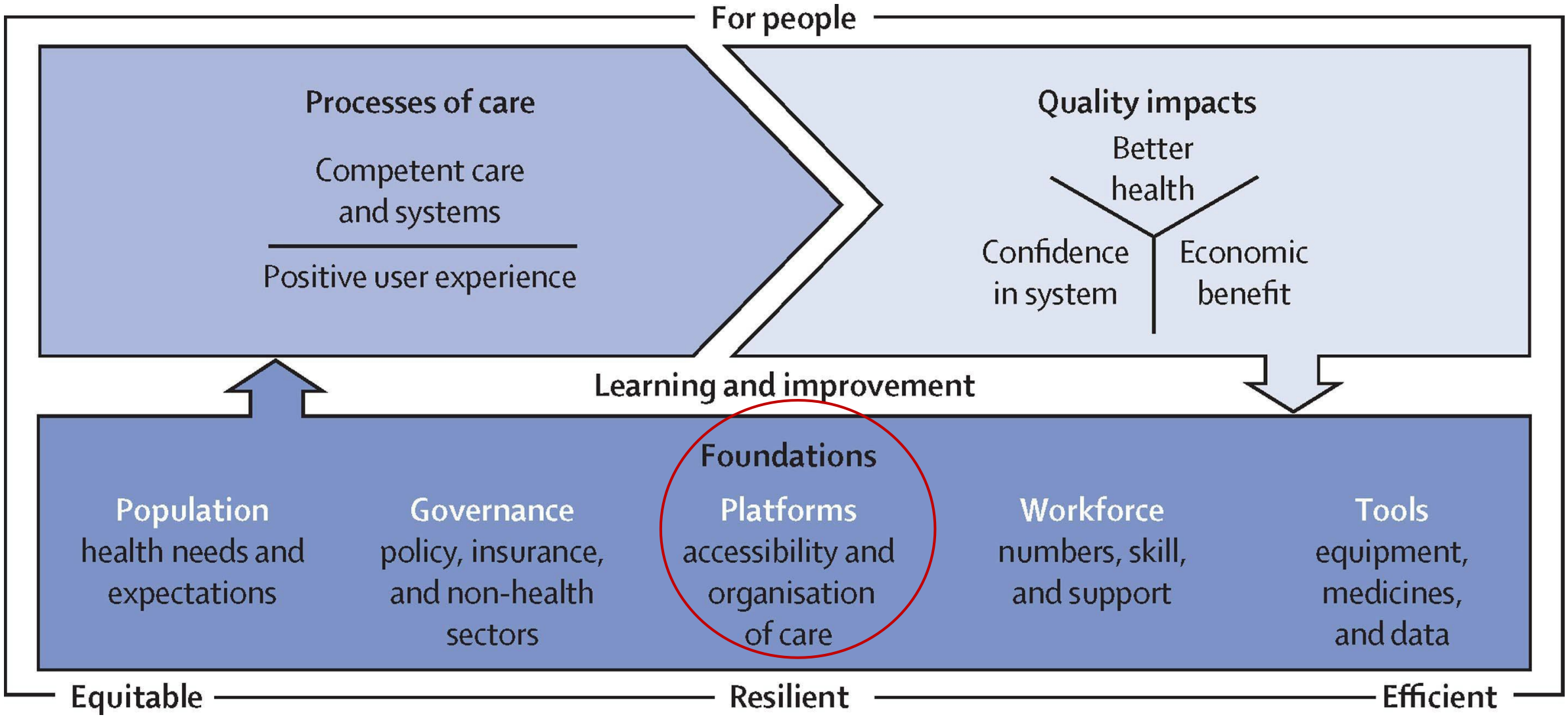
Expanding the solution space



Local (micro)
Facility level
Local scale
Behavior change

Structural (macro)
System level
Large scale
Foundational change

Images from: Provider in Chencha, Ethiopia. *Photo credit: IHI Ethiopia*



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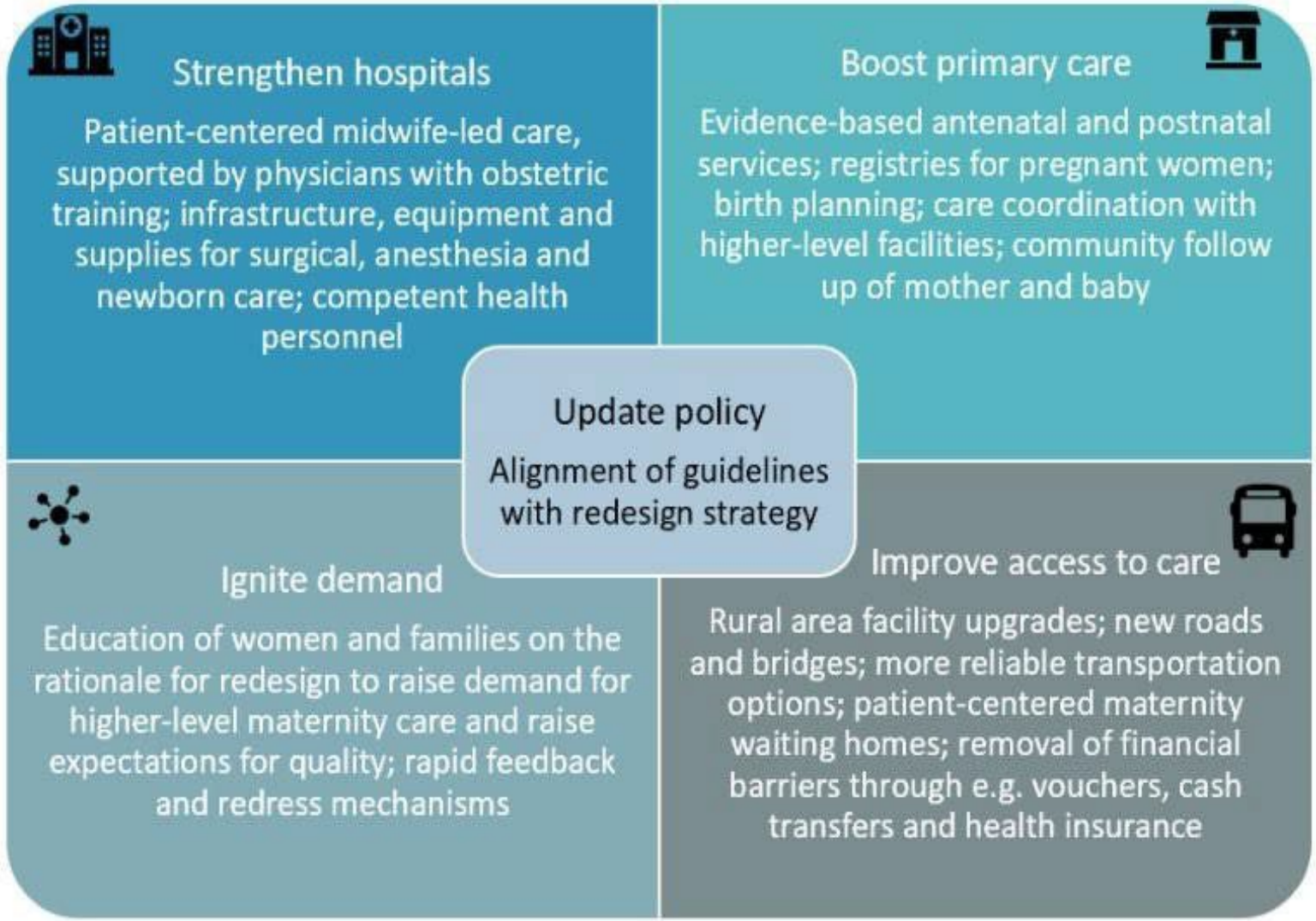

Strengthen hospitals
Patient-centered midwife-led care, supported by physicians with obstetric training; infrastructure, equipment and supplies for surgical, anesthesia and newborn care; competent health personnel
Boost primary care
Evidence-based antenatal and postnatal services; registries for pregnant women; birth planning; care coordination with higher-level facilities; community follow up of mother and baby
Update policy
Alignment of guidelines with redesign strategy
Ignite demand
Education of women and families on the rationale for redesign to raise demand for higher-level maternity care and raise expectations for quality; rapid feedback and redress mechanisms
Improve access to care
Rural area facility upgrades; new roads and bridges; more reliable transportation options; patient-centered maternity waiting homes; removal of financial barriers through e.g. vouchers, cash transfers and health insurance

Predominant obstetric model

- Hospital-centered: 98.4% of US births occur in a hospital
  - .52% occur in a birth center
  - .99% occur at home (85% were planned)
- Physician-centered: 90.6% of hospital births occur with a physician
- Most (90-94%) of US births do not occur with continuous support (i.e. Doula)

Birth Settings in America 2020

Variations on the dominant model of care

- **Who?**
  - Midwifery model of care
  - Family medicine model of care
  - Either of the above with the support of:
    - Doulas
    - Community Health Workers
    - Patient navigators
- **Where?**
  - Freestanding birth centers
  - Telehealth
- **How?**
  - Regionalization
  - Networks of care
  - Group models

Who?

The Surgeon General's Call to Action to Improve Maternal Health (2023) and the Whitehouse Blueprint for Addressing the Maternal Health Crisis (2022)

"Support additional training in obstetric care in residencies for family physicians, especially those who will practice in rural, remote or underserved areas."

"Leverage and incorporate midwives into hospital obstetric care and other community program."

"Ensure a wide range of healthcare professionals are included in a health plan's network: Also, consider coverage for supportive services, such as doulas, lactation support, and home visiting programs."

Family Medicine

- Family medicine specializes in common conditions across the lifecycle.
  - ACGME updated requirements to emphasize pregnancy care
  - Parent-baby care core part of outpatient curriculum
  - Every FM resident must perform 20 vaginal deliveries with option for more training (80 deliveries) and fellowship (12 months, including CS)
- The number of family docs practicing OB is declining in the US (44% in 1982% to 18% in 2018)
- Family doctors are more likely to serve in rural and remote areas
- Family docs are the only obstetric provider in about 40% of hospitals where FM deliver care.
- The number of babies delivered by FM in rural settings has remained stable at 50%.

VanGompel et al 2023, AAFP 2020

Outcomes

- Iowa study of Family Medicine Obstetrics (VanGompel 2023)
  - Births at FM-only hospitals had an adjusted 39% lower risk of cesarean (95% CI -0.16 to -0.62%; p<.01)
  - Nursing culture and norms around vaginal birth and safety were stronger at FM-only hospitals
- Penn State study of Social Inequities and Family medicine Outcomes (Partin 2021)
  - Family medicine patients were more likely to be young, Black, on Medicaid, be single, have a high school education or less, and smoke cigarettes
  - Family Medicine patients were also less likely to have a cesarean section (primary or repeat) – 23% vs. 32%
- Canadian study of FM vs. OB (Aubrey-Bassler 2015)
  - No difference in perinatal mortality or maternal morbidity

Midwifery models of care

WHO 2024

Midwifery Outcomes

- Cochrane review (Sandall 2016)
  - Midwifery patients were less likely to use epidurals, have an instrumental vaginal birth, a preterm birth, fetal loss.
  - Midwifery patients were more likely to have a spontaneous vaginal birth (average RR 1.05, 95% CI 1.03 to 1.07; participants = 16,687; studies = 12; *high quality*) and to be satisfied with care
  - There was a trend towards cost-savings
- Lancet Series on Midwifery (Homer 2014)
  - 82% of maternal deaths could be prevented with universal scaling up of midwifery care that included family planning

Integration of midwives strongly correlated with better outcomes

Table 4. Significant correlations between midwifery care, MISS scores, and birth outcomes, United States, 2014.

%	% of births attended by all types of midwives, hospital only	% of births attended by all types of midwives in community birth settings	Midwifery Integration State Scores
Spontaneous Vaginal Birth[1]	0.556**	0.435**	0.402**
Vaginal birth[1] after Cesarean[2]	0.483**	0.528**	0.330*
Induction[3]	-0.350*	-0.084	-0.275
Preterm birth[4]	-0.556**	-0.455**	-0.480**
Low birth weight[5]	-0.299*	-0.388**	-0.353*
Cesarean section[2]	-0.375**	-0.627**	-0.278*
Neonatal mortality rate[6]	-0.247	-0.364**	-0.545**
Breastfeeding at birth	0.474**	0.593**	0.584**
Breastfeeding[7] at 6 months	0.524**	0.533**	0.378**

Vedam 2018

Continuous Support in Childbirth

Cochrane review (n=15,858, 13 HIC, 13 MIC)

- Increase in spontaneous vaginal birth (RR 1.08, 95% CI 1.04 to 1.12)
- Decrease negative experience (RR 0.69, 95% CI 0.59 to 0.79)
- Decrease pain medication (RR 0.90, 95% CI 0.84 to 0.96)
- Shorter labor (MD -0.69 hours, 95% CI -1.04 to -0.34)
- Lower risk of caesarean birth (RR 0.75, 95% CI 0.64 to 0.88)
  - Especially when support comes from a doula
  - Especially in middle-income settings

North Country Maternity Network Doula Connect

- Implemented by North Country Health Consortium
- Cross trained doula community health workers (CHWs)
- Eligibility: anyone who is pregnant or within one year post partum and living in the North Country.
- Focus: education, advocacy and support during the pregnancy and postpartum. Doula CHWs can attend births, it is not the focus of this program.
- Doula CONNECT can continue to work with a client even if they experience a loss or have DCYF involvement.
- The doula CHWs can visit clients in their homes, at provider visits, in the hospital or in the community and provide support and education, along with assistance on needs such as housing, transportation, food security, mental health or infant needs.
- Doulas and CHWs are both professional non-clinical roles. They are certified CHWs and are working on doula and CLC certification.

Where?

Freestanding birth centers

- Not in a hospital or home
- Integrated into the healthcare system
- Midwifery model of care
- Home-like: “a maximized home rather than a mini-hospital”
- Perinatal outcomes similar to hospital setting and stable over time
- Strong Start for Mothers and Children (2020): Better experience, lower cost, and, in some cases better outcomes

AABC 2025, Neighborhood Birth Center 2025, Illuzzi et al 2015, Rooks et al 1989, Stapleton et al 2013 , Dubay et al 2020

Telehealth

- “the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, health administration, and public health” HRSA 2022
- Four types
  1. Live, two-way video or audio
  2. Sharing digital content
  3. Remote patient monitoring
  4. mHealth
- Outcomes are similar for low-risk pregnancies (Cantor 2022)
- Satisfaction is higher in an RCT of a hybrid model (Butler Tobah 2019)
- Several studies support hybrid models for hypertensive disorders of pregnancy and GDM

How?

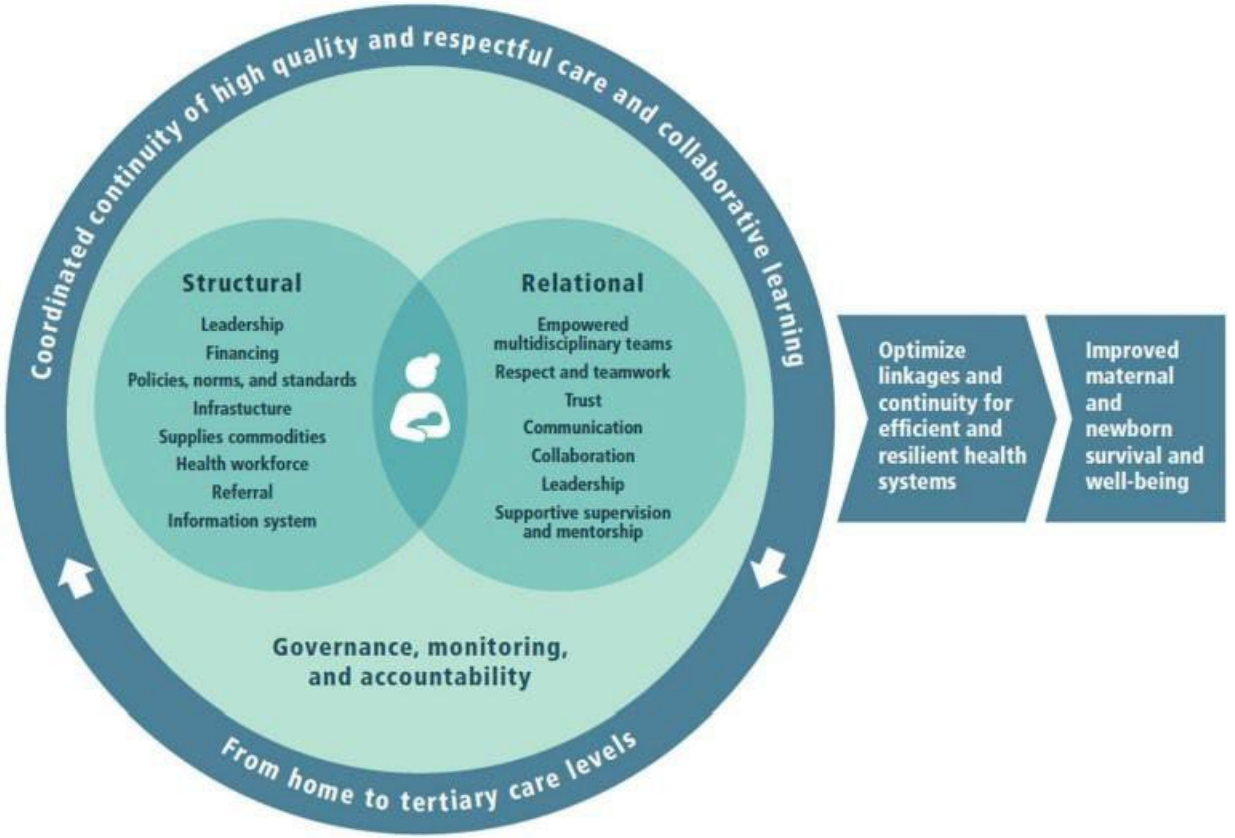
Regionalization (or centralization)

- Direct patients to risk-appropriate levels of care and link facilities together
  - Increase service utilization at high-quality, high-volume facilities
  - Improve coordination between facilities
  - (Reduce costs)
- Outcomes
  - Improves survival in adult and pediatric patients with trauma (8% reduction in mortality for motor vehicle accident patients)
  - Perinatal results positive but not as robust
    - California premature survival rates higher in regionalized system (and similar studies)
    - Systematic review unable to ascertain causality
  - Equity is a significant risk!

Roder-DeWan 2024,
Nathens et al 2000,

Networks of care

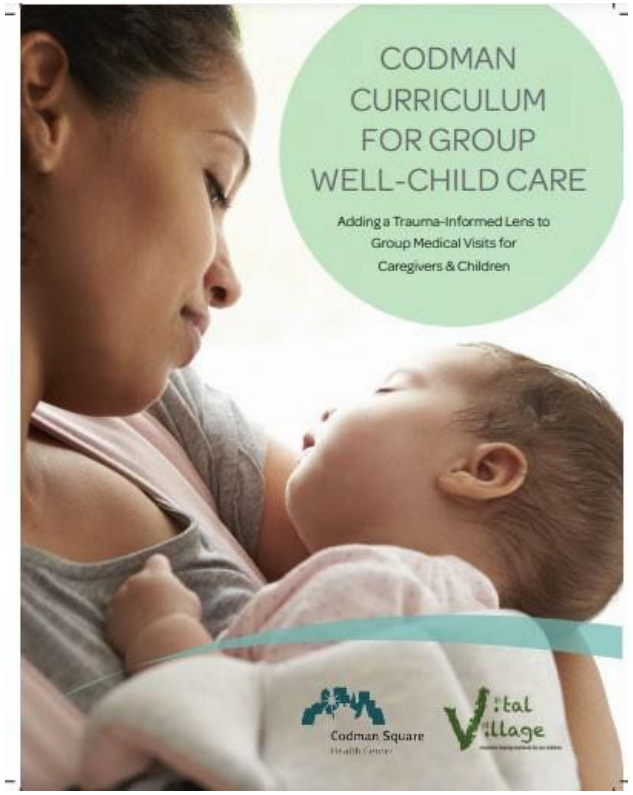
- Similar to regionalization though more flexible
  - Hub and spoke
  - Vertical integration
  - Horizontal integration



Group Care

- Centering Pregnancy
  - Integrated medical and social visit
  - 8-10 women
  - 10 prenatal visits, ~2 hours each
  - Multiple studies showing improved outcomes and reduction in disparities
- Group postpartum care
  - Integrated medical and social visit for mother and baby
  - 8-10 caregivers and babies
  - Usually starts at 1 month visit, monthly visits
  - Studies show greater parent satisfaction with care
  - Can encourage intentional parenting practices

Codman Curriculum



VISIT	SESSION NAME	TARGET ISSUE	WARM UP
1 Month	The Seed	Soothing & Safety	Introductions
2 Month	Trust Through Touch	Physical Attachment & Serve and Return	Baby's Personality
3 Month	The Mirror	Emotional Attachment & Baby Learning	Parenting Tip
4 Month	Flip Your Lid	Toxic Stress & Coping Mechanisms	Observations & "New Ingredients"
5 Month	Healthy Lifestyles	Exercise & Eating	Flip Your Lid Reflections
6 Month	Family Values	Reflective Parenting	Baby's Ingredients
8 Month	Brain Building Blocks	Play	Found Objects
10 Month	Building the House	Structure, Discipline & Understanding	Building the House
12 Month	Birthday Party	Language Development & Parent Empowerment	Little Seed

ACTIVITY	TEACHING TANGIBLES	CLOSER	COMMUNITY RESOURCES
Five S's	Swaddle and thermometer	My child is like a seed.	Baby Café
Baby Massage	Massage Oil	I am a ... mother.	Family Nurturing Center
The Mirror	Mirror	I am a mirror for my child.	Boston Public Library
Flip Your Lid	Brain Key Chain	Hands	Parental Stress 24 Hour Hotline
Making Baby Food	Pedometer and Silicone food trays	Mom/Baby Exercise	HealthWorks Gym & Daily Table
Being a Parent is Proactive	Picture Frames	I am a special parent because...	Healthy Baby/Healthy Child
Brain Building Blocks	Blocks	New Game	Integrated Behavioral Health Team
Understanding Your Child's Behavior	Board Books about Feelings	What have you learned?	Child Witness to Violence
One-Year Old Star	Birthday Presents	I hope for my child...	Early Intervention

Case

33 year-old G12P6

- Medical history
  - Substance Use Disorder, in sustained recovery
  - Back pain
  - Hypothyroid
- Psychiatric history: Bipolar Disorder, Depression, ADHD, PTSD
- Obstetric history
  - All vaginal deliveries, rapid, term
  - Preeclampsia with previous delivery (2021)
- Medication
  - Lamictal, SSRI, Adderall, Synthroid, Gabapentin, Robaxin, Mirtazapine, PNV
- Social history: lives with father of her children, has custody of 4 younger children, 2 older children are with family, does not have a car, experiences food insecurity
- Family History: Ventricular Septal Defect (VSD)

- Transferred care at 32 weeks from a large hospital to an academic center because she moved
  - Took the only section 8 housing available in the state in a rural area (near her children)
  - New community had a gas station and post office, but not grocery, no public transportation, no other services
  - During her care at the prior facility, she had been referred to MFM for possible VSD but never made it
  - No known psychiatric prescriber
- Care began at the academic center (2-hours from her new home)
  - Was able to come to appointments only 2 times
  - OB began prescribing psychiatric medications while waiting for psychiatry
  - Was often not able to come to appointments because Medicaid ride would not show up
    - Never had fetal echo
- Planned a 39wk induction due to remoteness and uncertainty about VSD

- At 36wks called with contractions and wanted her cervix checked
  - Had an appointment the next day; spoke with nurse and decided to wait
  - Next day, her scheduled Medicaid ride did not show up
  - That evening, called an ambulance
  - Delivered en-route and on the move
  - Arrived at a community hospital after the birth but academic center was full, so was re-routed to another hospital for cardiac evaluation. No VSD
- Postpartum appointment (included f/u for abnormal pap) missed due to lack of transportation

Up Next

- Next session: Advocating Current Standards in Pain Management
- Please submit your cases/questions, track your attendance for CME/CNE and view course resources at the: DH iECHO site
- Recordings will be posted on the D-H ECHO website https://www.dartmouth-hitchcock.org/project-echo/enduring-echo-materials

WELCOME to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Session 8, Models of Maternity Care: Advocating Current Standards in Pain Management

August 19, 2025

Labor Analgesia

Johanna Cobb MD

Medical Director Obstetric Anesthesia

Dartmouth-Hitchcock Medical Center

Lebanon NH

August 2025

Objectives

1. Describe non-pharmacologic, pharmacologic, and regional techniques for labor analgesia
2. Understand the advantages / disadvantages of these techniques

Disclosures

Financial - None

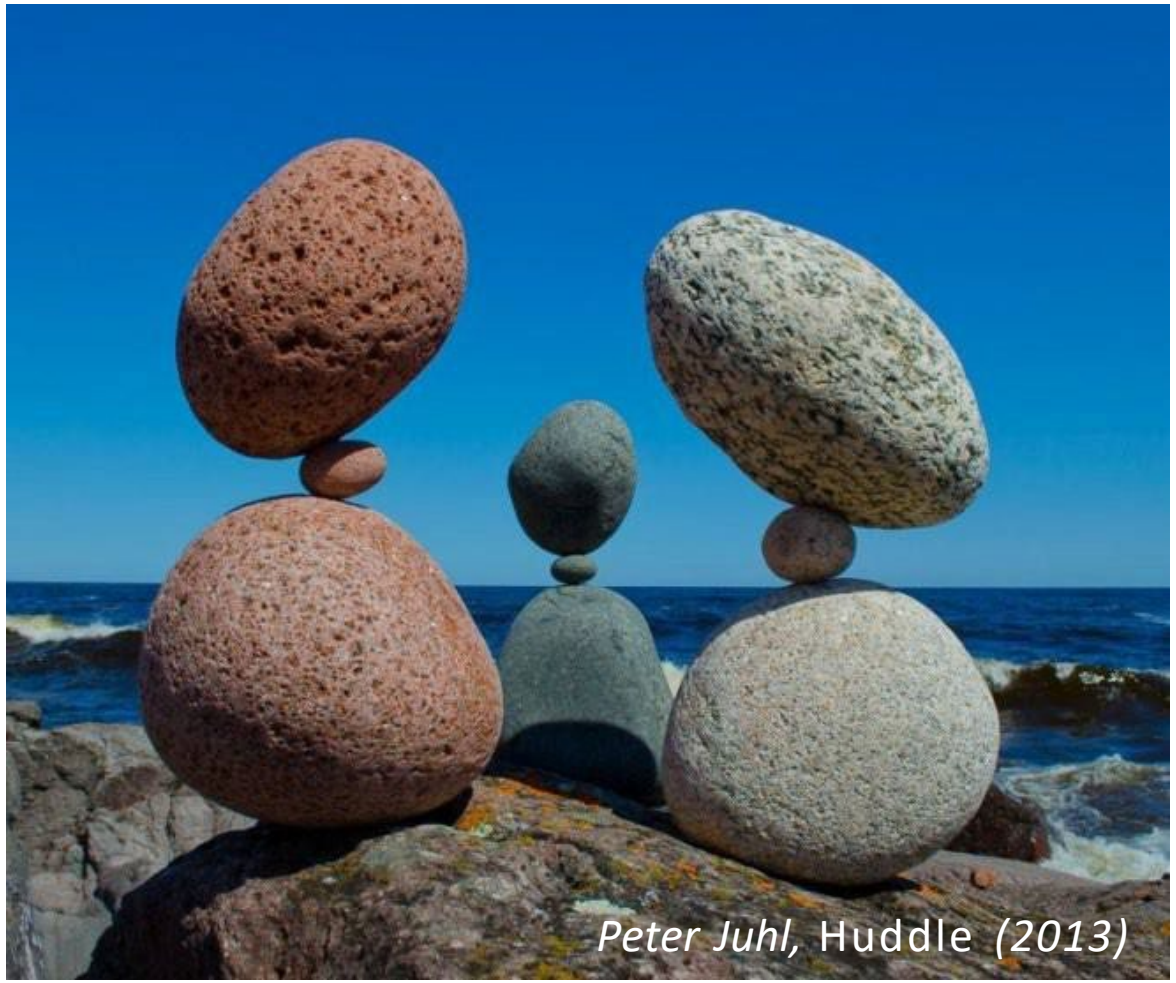
Pain as a Construct

"An unpleasant
sensory and emotional experience
associated with or resembling that associated with
actual or potential **tissue damage**"

2020 Definition

International Association For the Study of Pain

A Tricky Balance



- **Patient preferences**
- **Range of effectiveness** and utility
- Maternal and neonatal **side effects**
- All **require resources** to implement well

Anesthesia Consultation

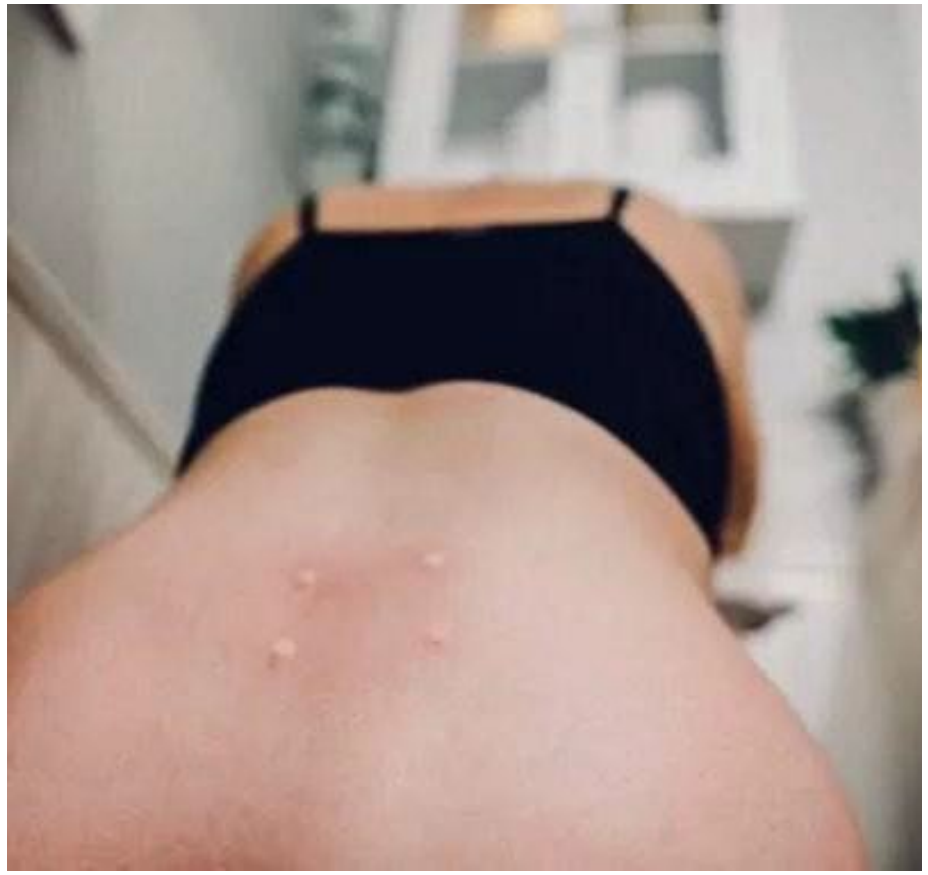
- **Discussion of goals** for pain management, patient preferences
- **Patient counseling,** opportunity to ask questions
- **Screening and planning** for high-risk characteristics

Non-Pharmacologic Analgesia

Non-Pharmacologic Analgesia

- Water Immersion
- Support person, doula
- Acupuncture
- TENS
- Sterile Water Injections
- Hypnosis

Non-Pharmacologic Analgesia



- **Modest, variable efficacy**
- **Safe** and well tolerated
- Minimal required monitoring

Systemic Analgesia

Intravenous or Intramuscular Opioids

- **Nurse administrated**
  - Fentanyl, morphine
  - Butorphanol, nalbuphine
- **Patient Controlled Analgesia (PCA)**
  - Remifentanil, fentanyl
  - Anesthesia oversight recommended

- Need for **close monitoring** and resuscitation capabilities
- Maternal **satisfaction less** than epidural

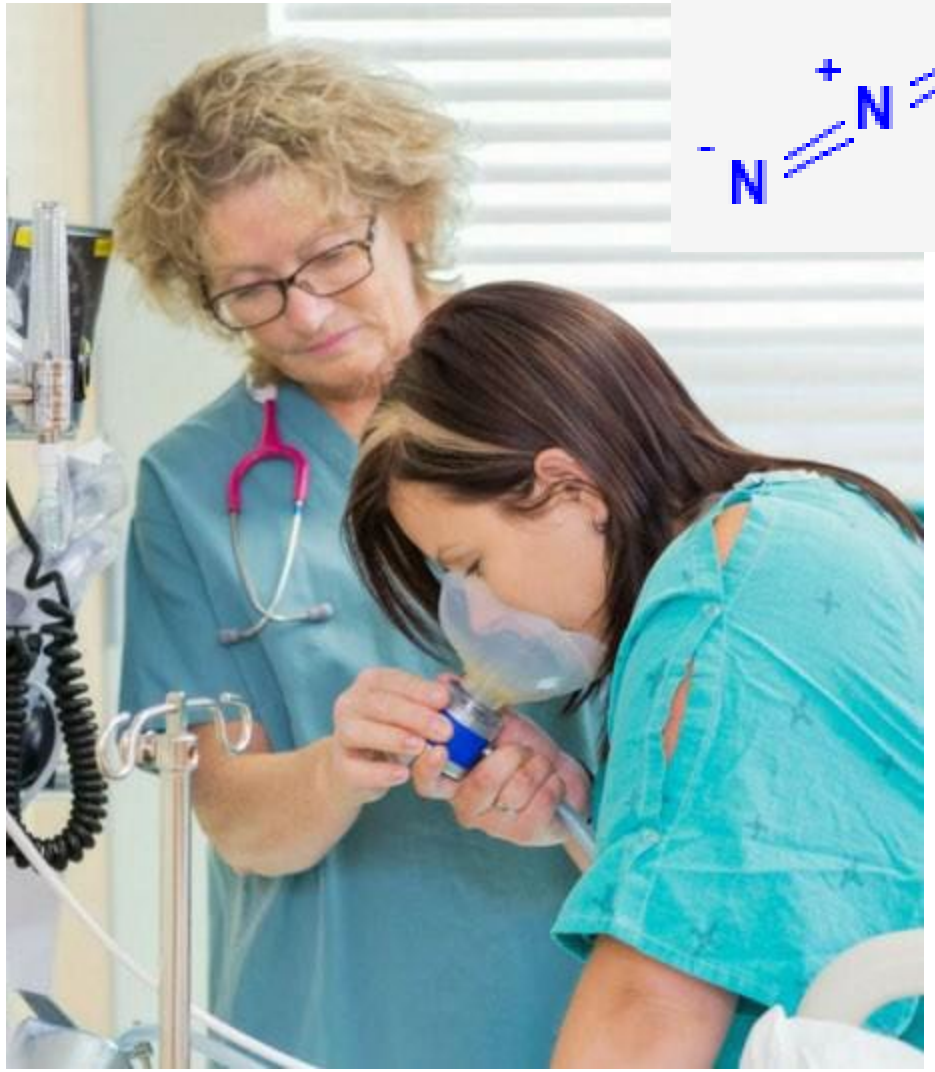
Intravenous or Intramuscular Opioids

- Nausea/vomiting
- **Sedation**
- Pruritus
- Impact on labor

- Maternal **respiratory depression**
- **Neonatal affects** (reduced APGAR, acidosis)

Nitrous Oxide

- **Modest analgesia**
- Sense of control
- Rare contraindications
- Quick on/off
- No apparent adverse neonatal outcomes



Nitrous Oxide

- Nausea/vomiting
- Potent **green house gas**
- Health care worker exposure

Local Analgesia

Paracervical Block

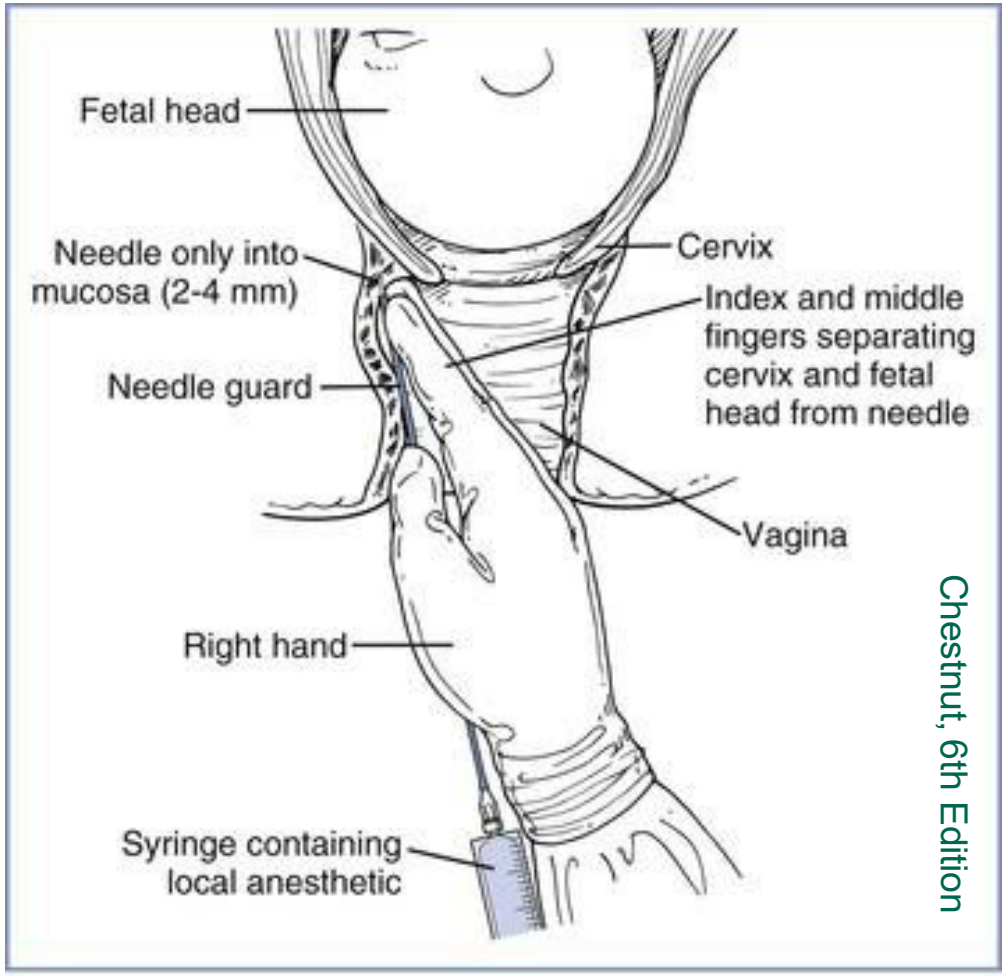
First stage labor

Needle guide advanced into lateral vaginal fornix at 4 and 8 o'clock position

- Needle advanced through mucosa 2-3 mm
- Inject a total of 5-10 cc local

Fetal bradycardia 15-30%

Lasts 30-60 min

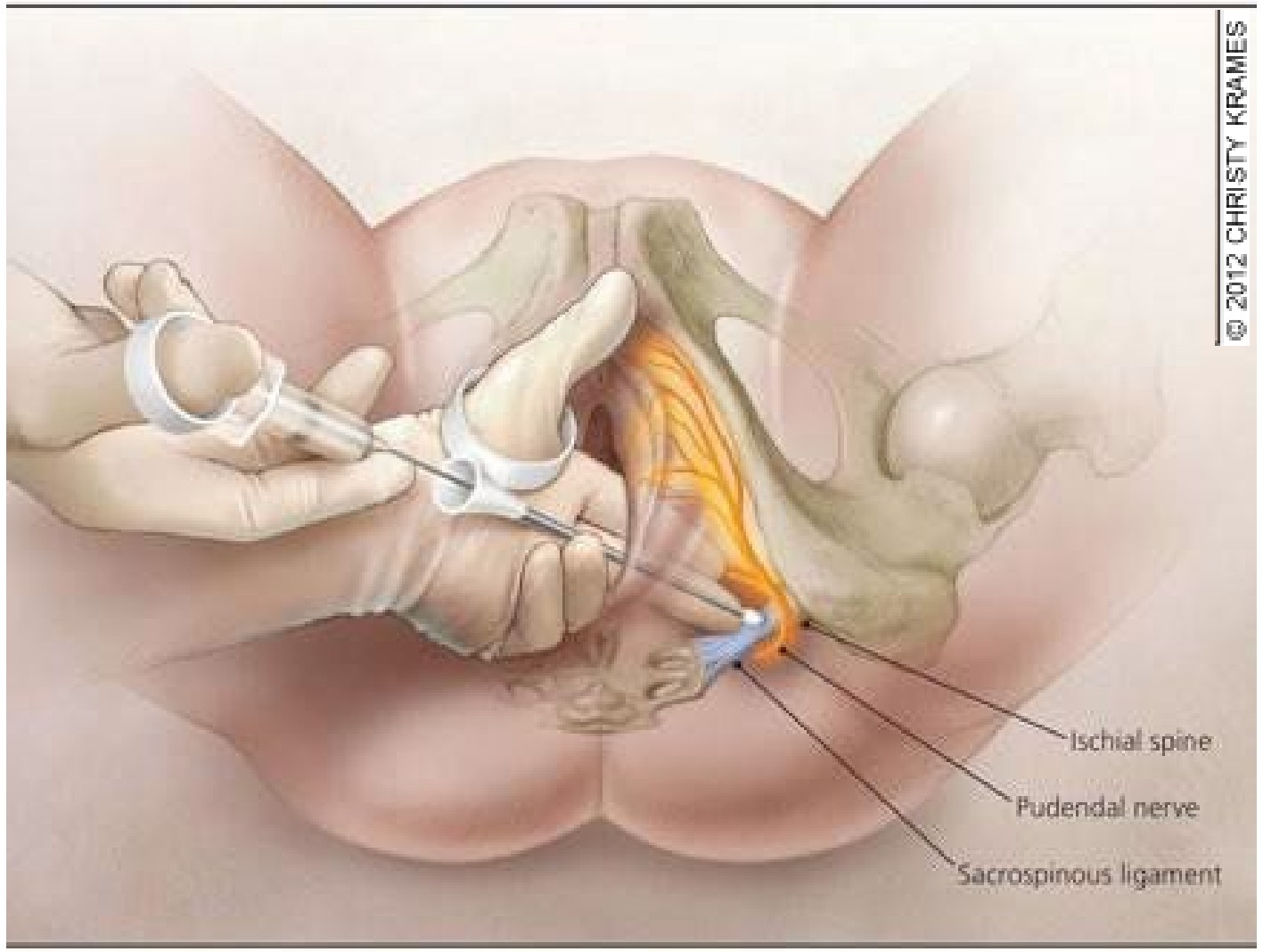


Pudendal Block

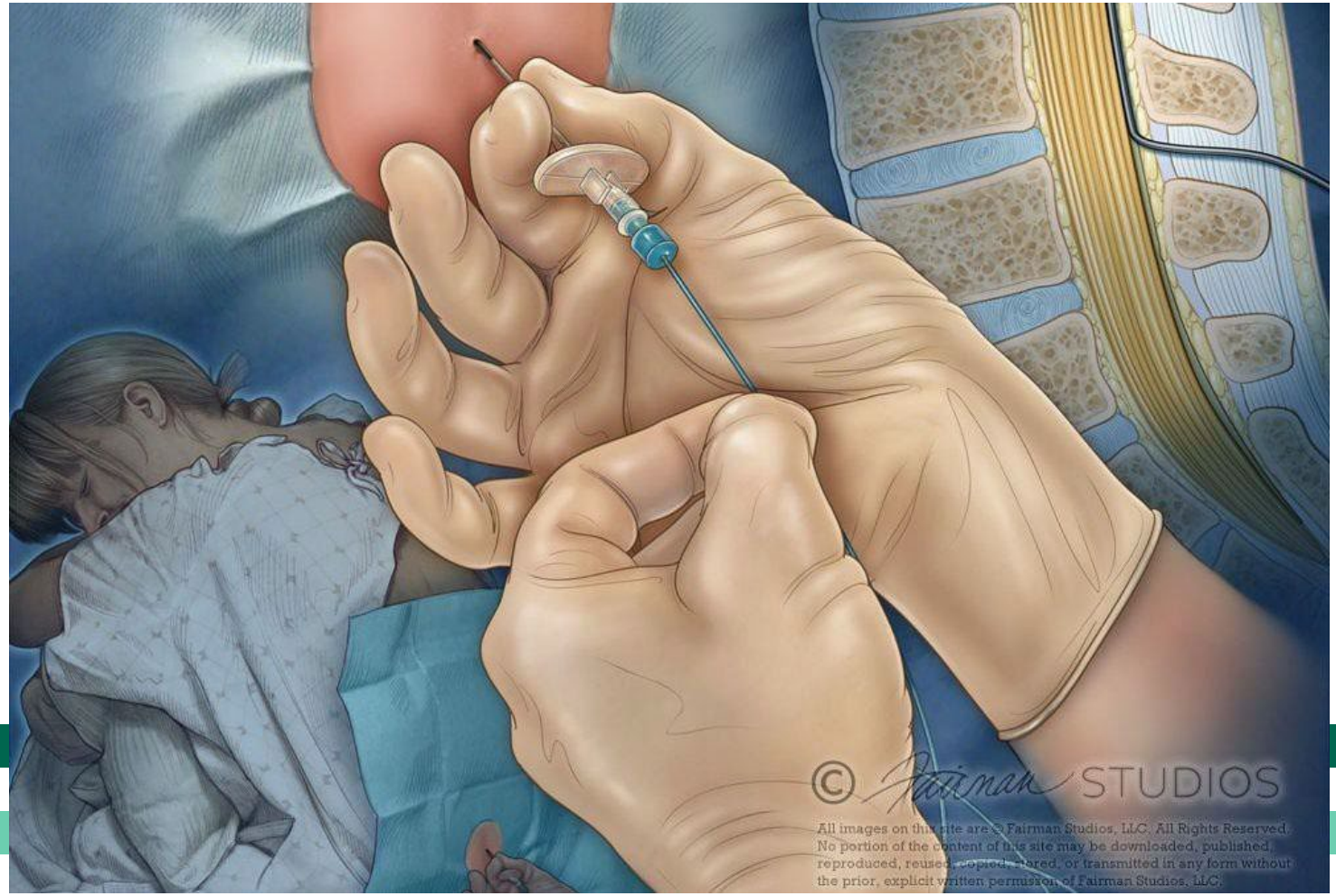
Second stage, perineal coverage

Place on **sacrospinous ligament**

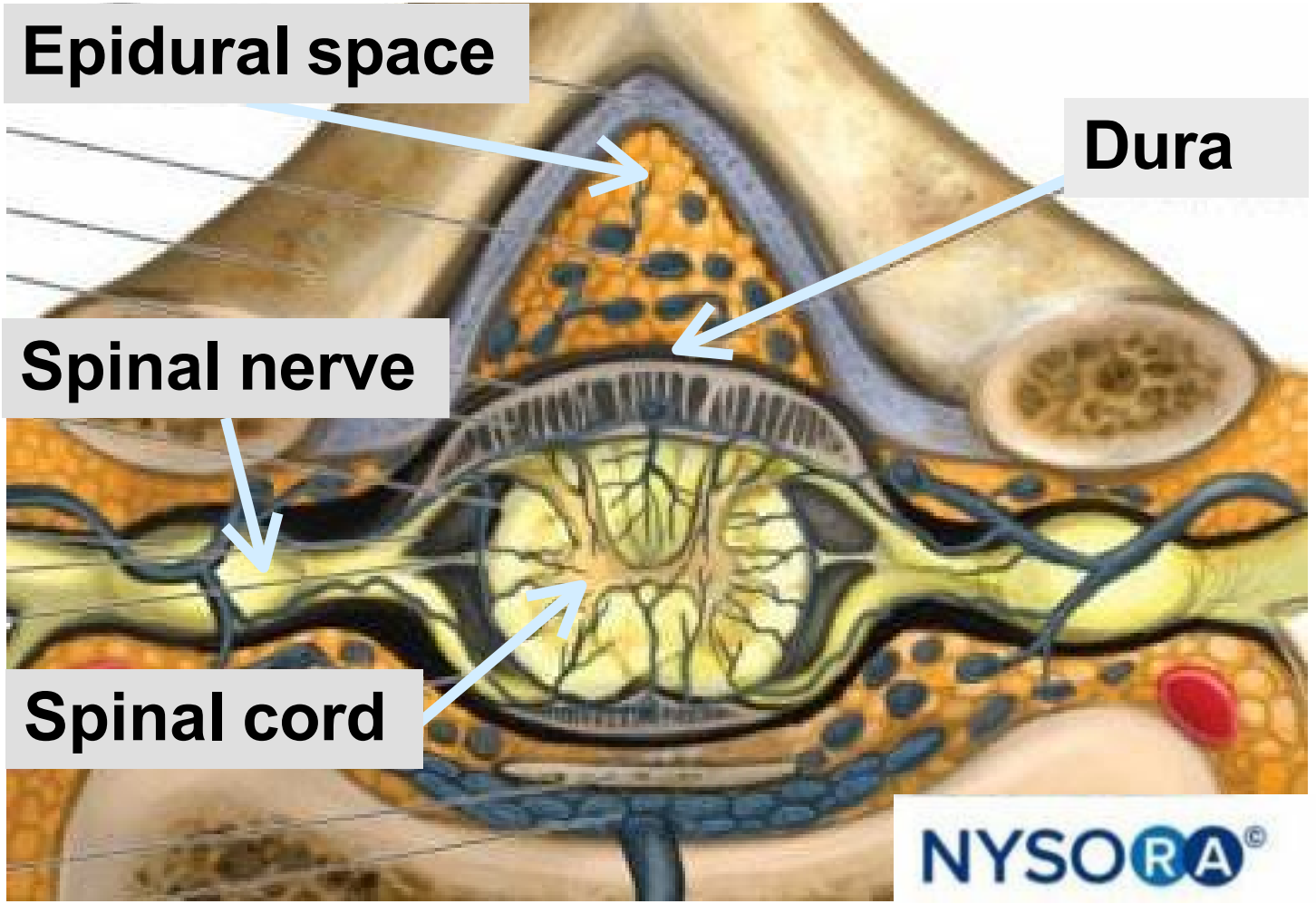
- 1cm medial and inferior to ischial spines; inject 3cc
- Push beyond ligament, once loss of resistance inject 7cc

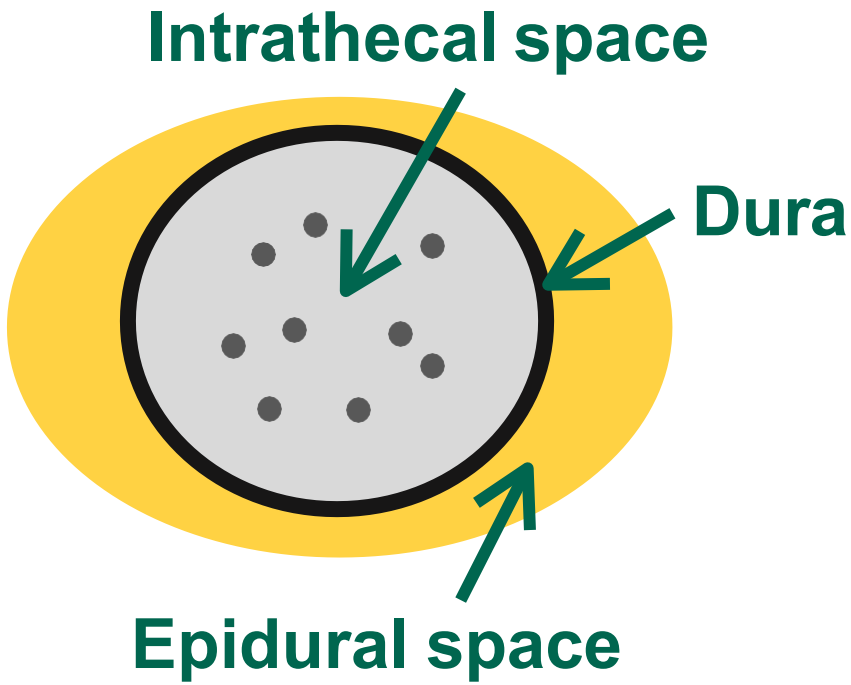


Neuraxial Analgesia



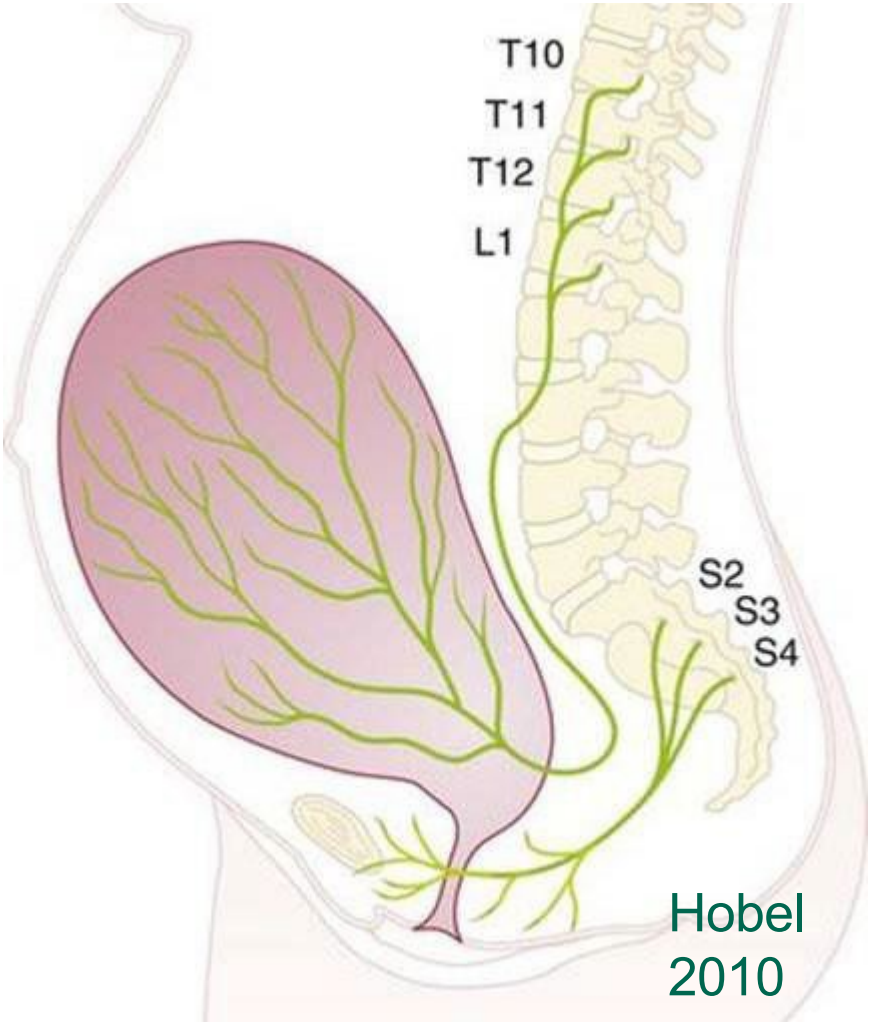
Basic Anatomy of the Neuraxial Space



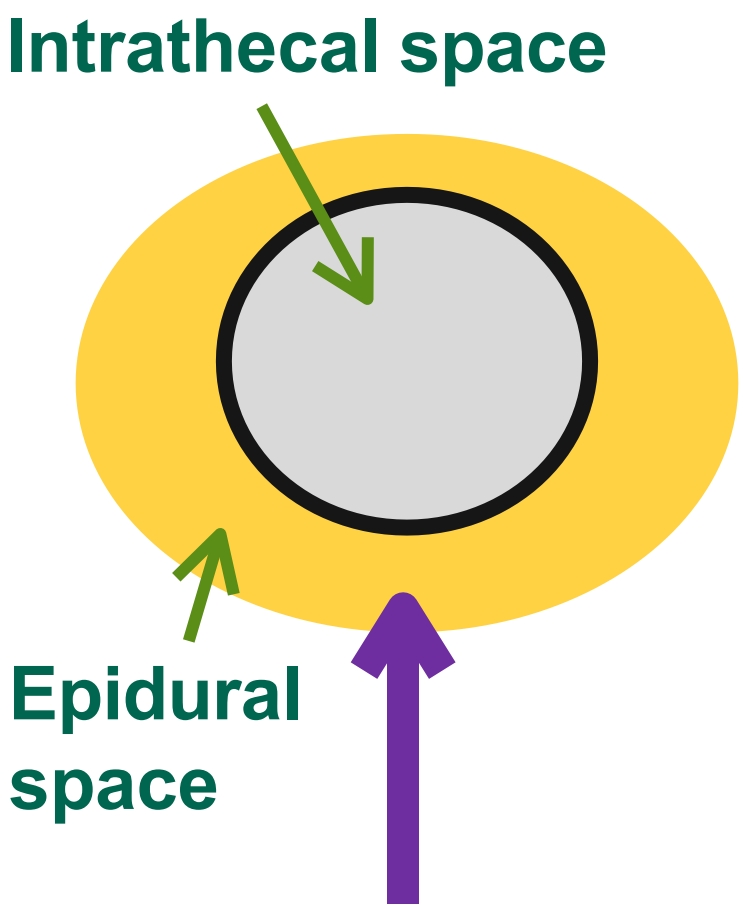


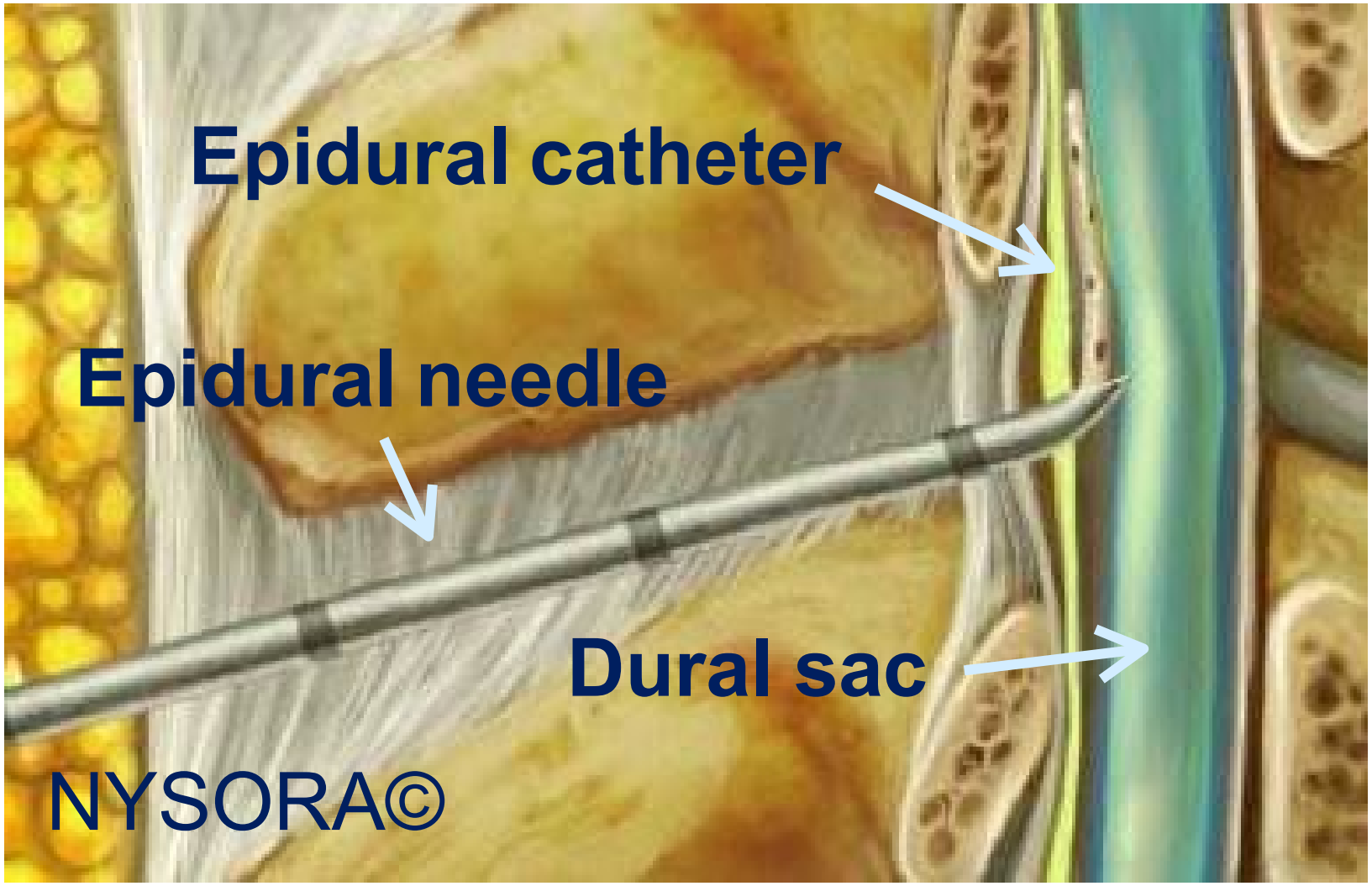
Goals for Neuraxial Labor Analgesia

- Adequate coverage
- T10 to sacral dermatomes
- Minimize side effects:
  - Motor block
  - Hypotension
  - Nausea/vomiting
  - Pruritis



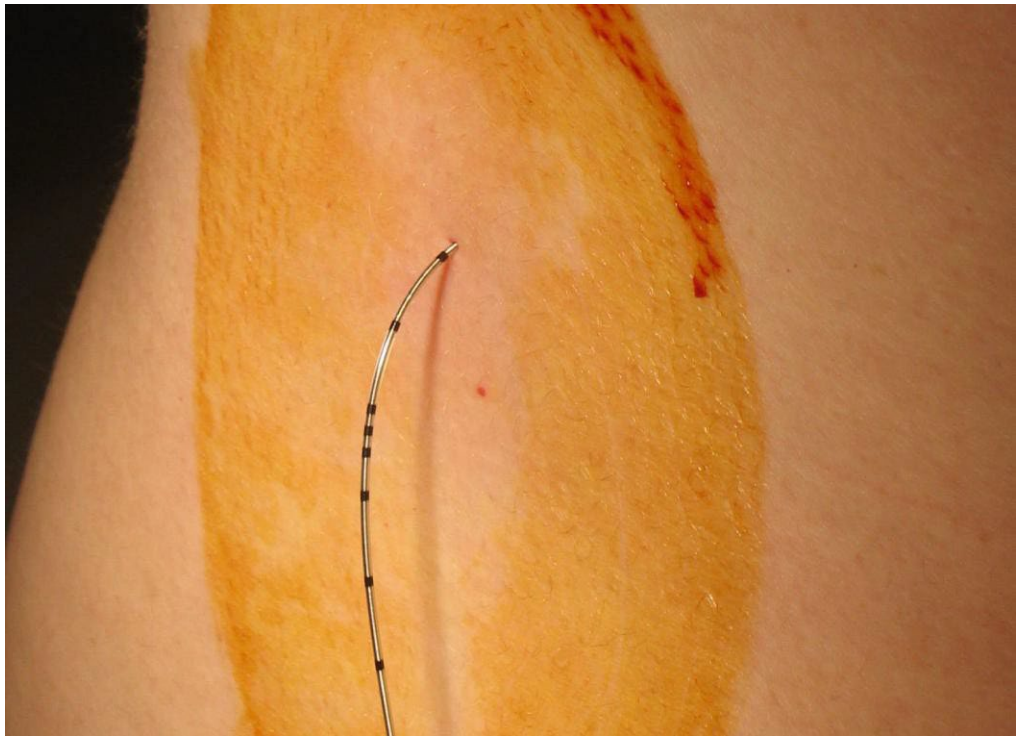
Conventional Epidural Placement





Epidural Analgesia

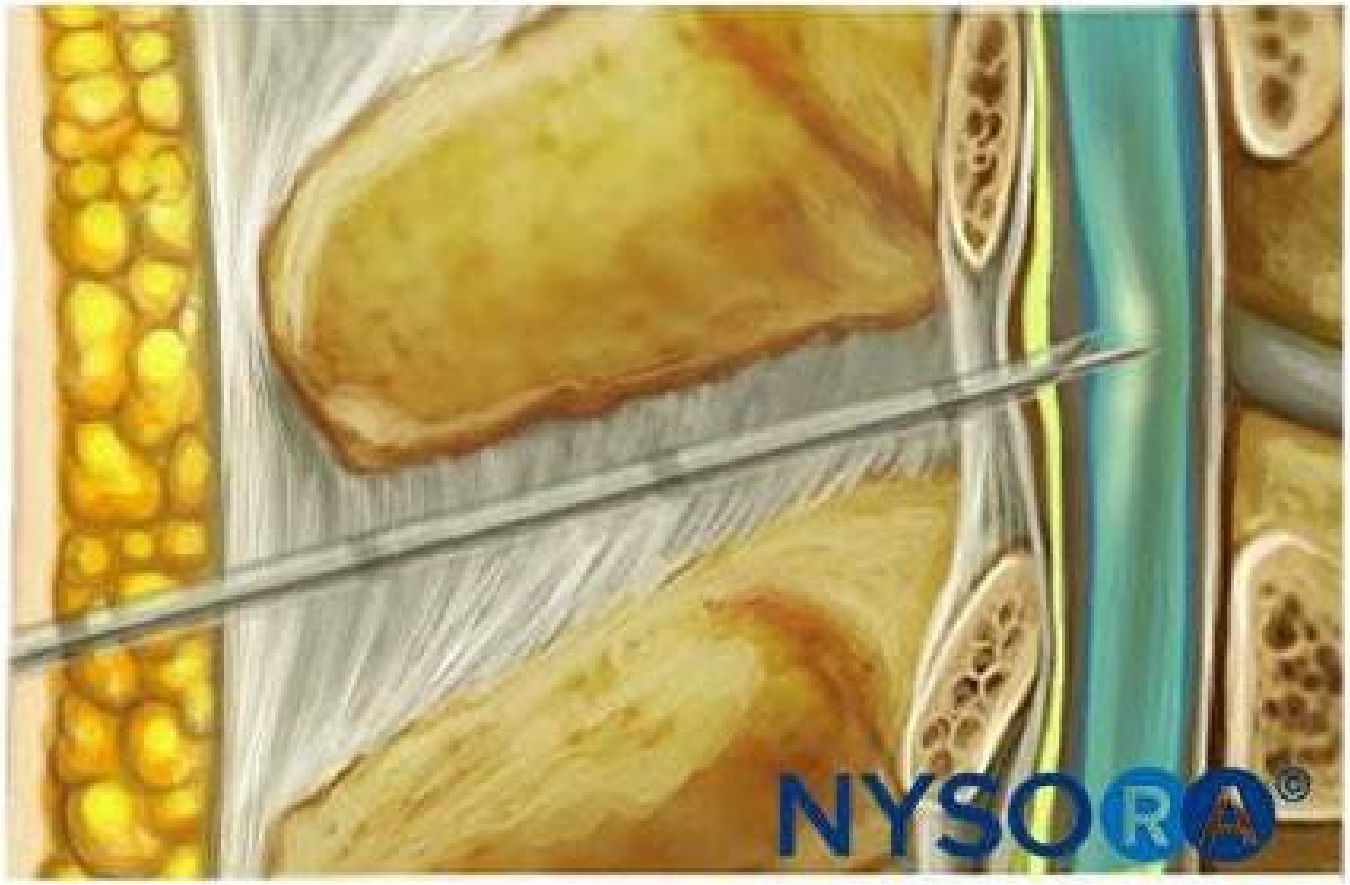
- **Most effective option**
- **Minimal neonatal impact**

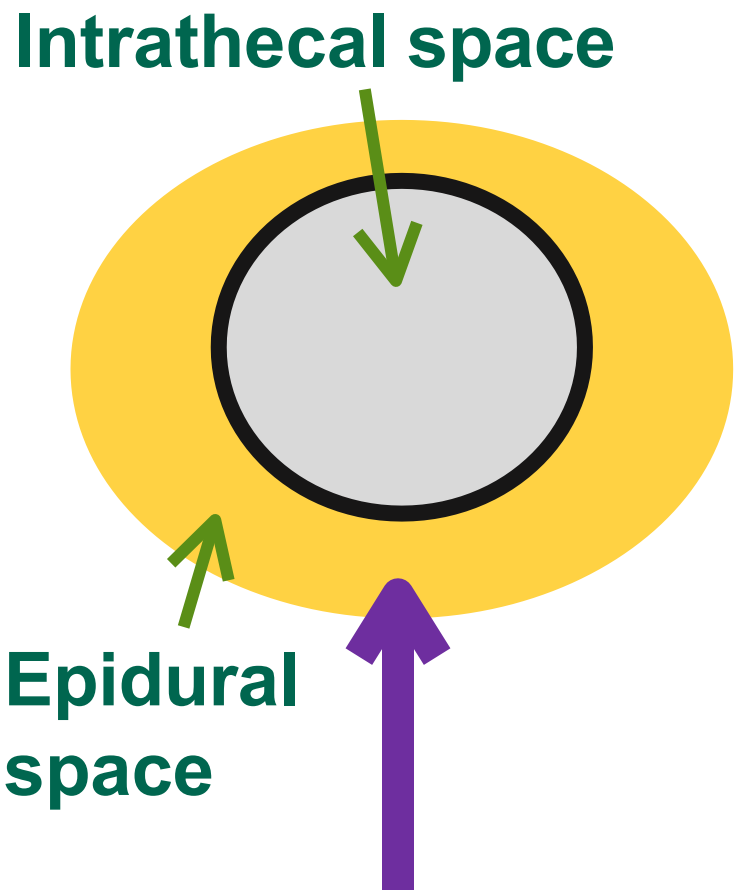


- **Risks**
  - –Failure (1/20 replacement)
  - –**Post-dural puncture headache (1/100)**
  - –Longer second stage
  - –Intrapartum fever
- Cost
- Requires skilled anesthesia provider

Combined Spinal Epidural (CSE)

Spinal needle *advanced through* epidural needle





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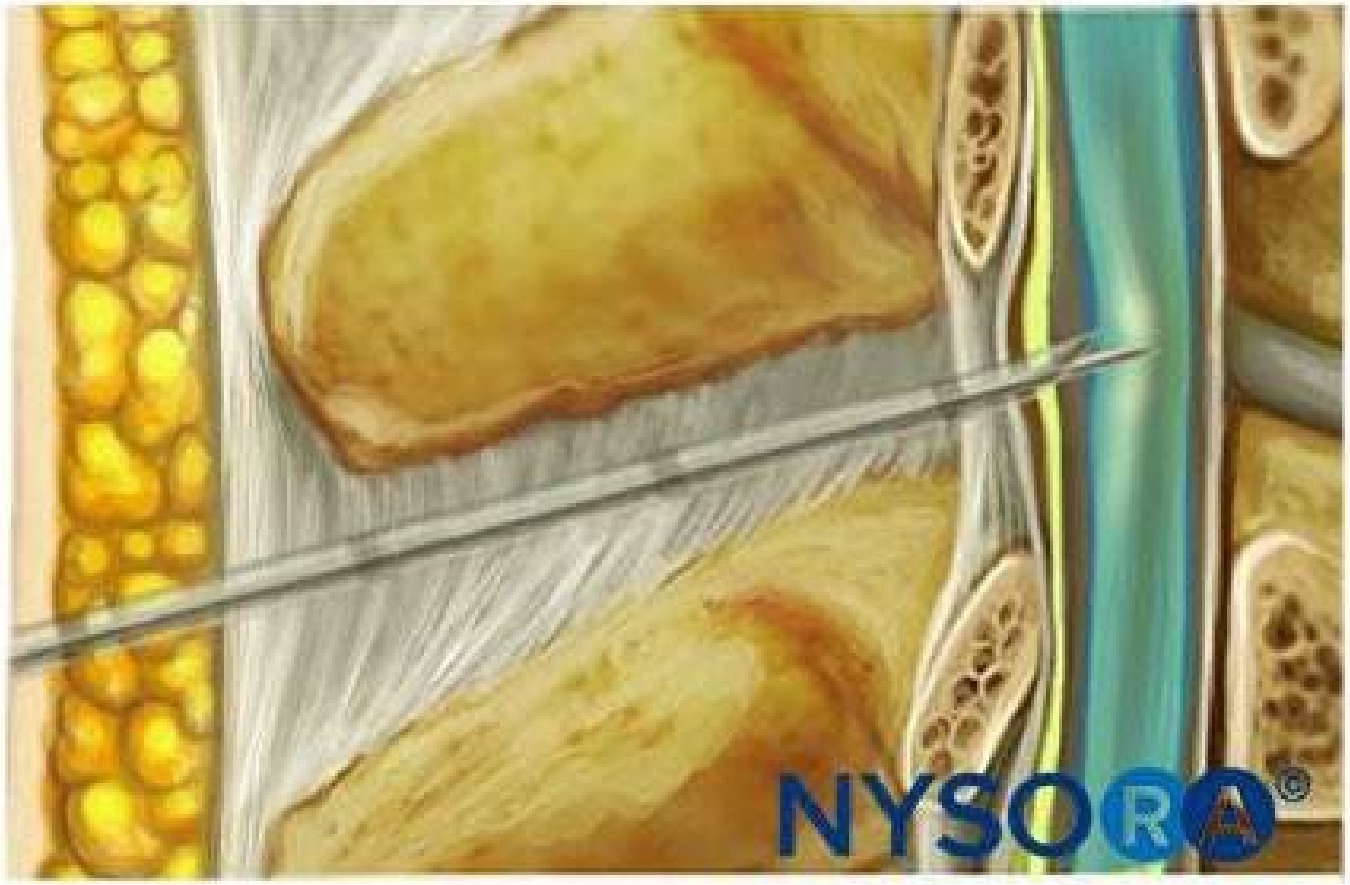

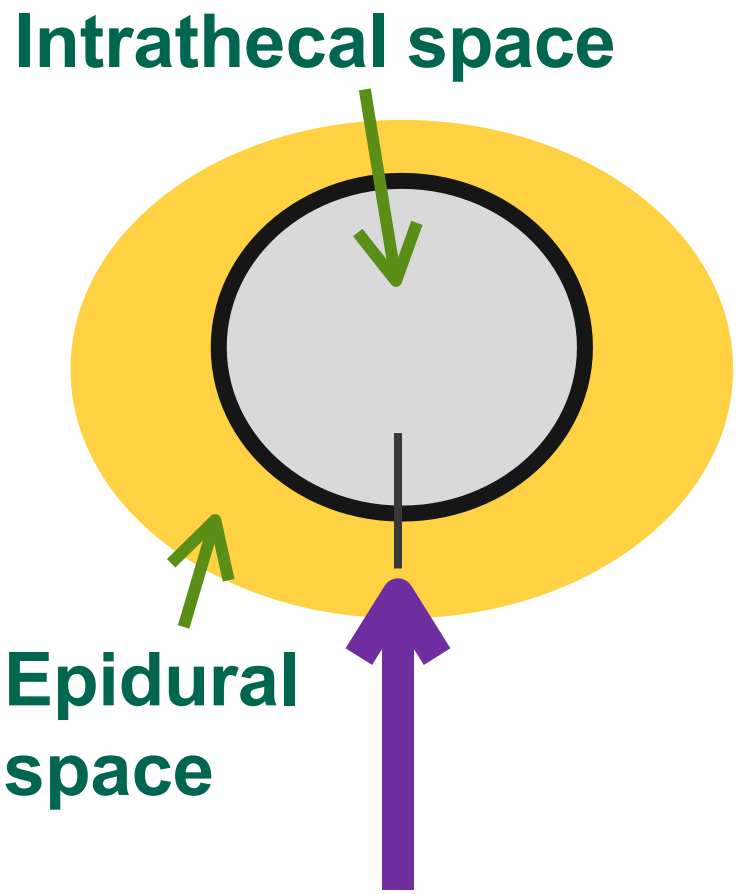

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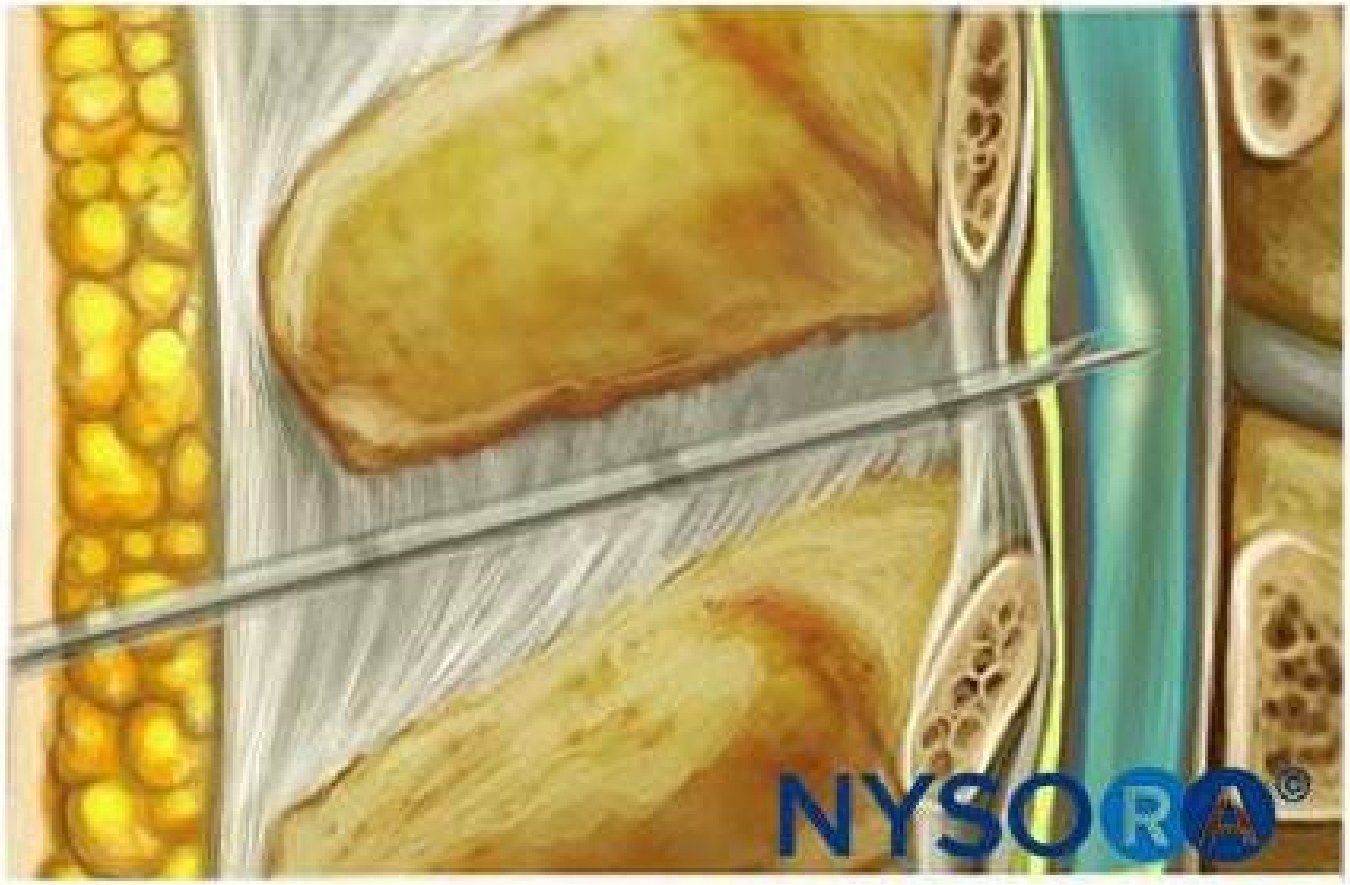
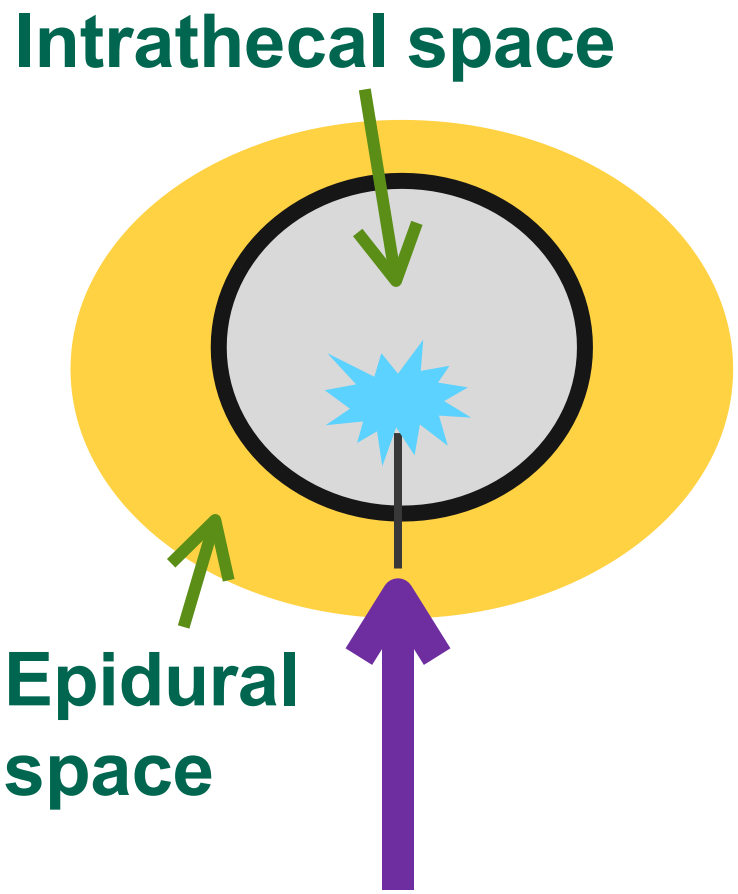
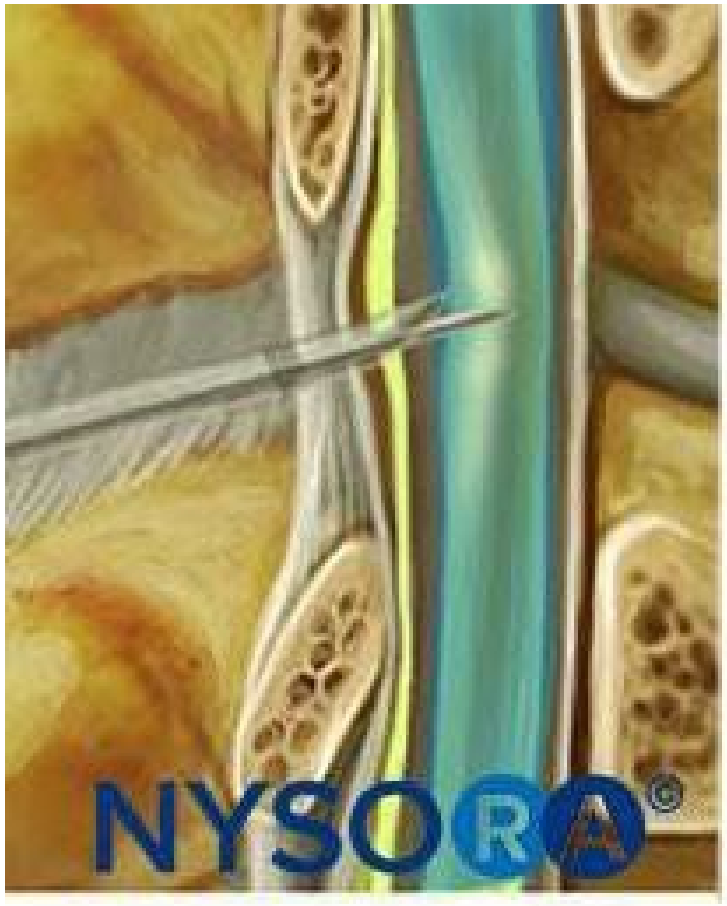


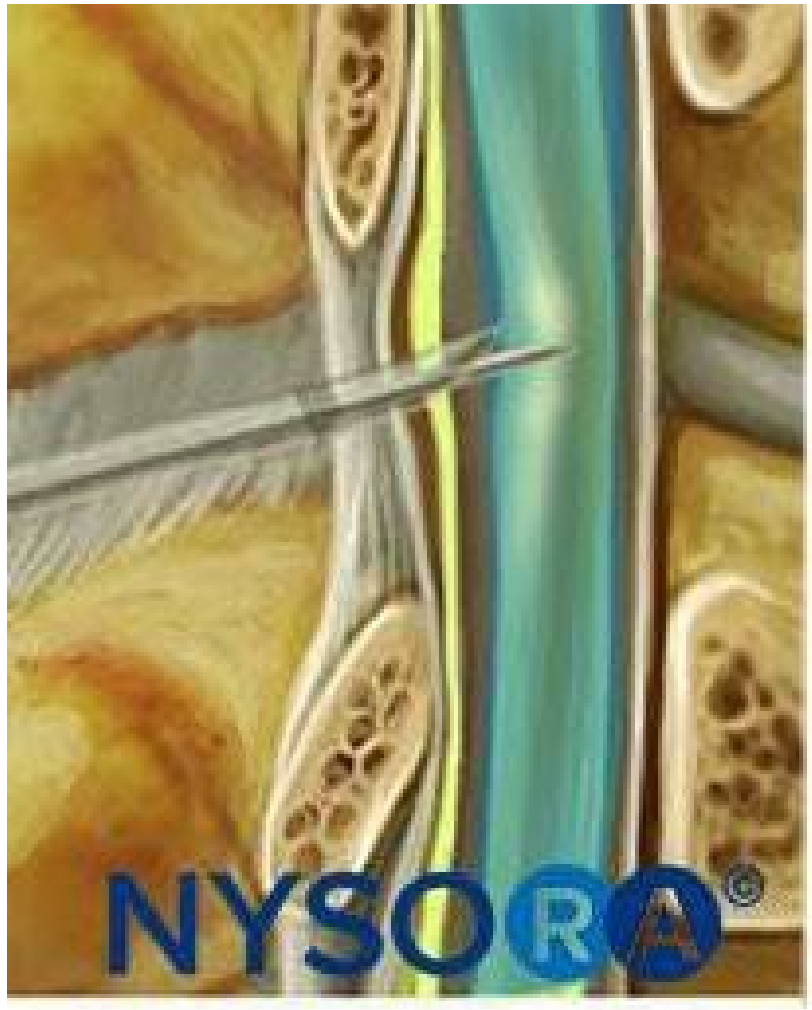


CSE for Labor Analgesia

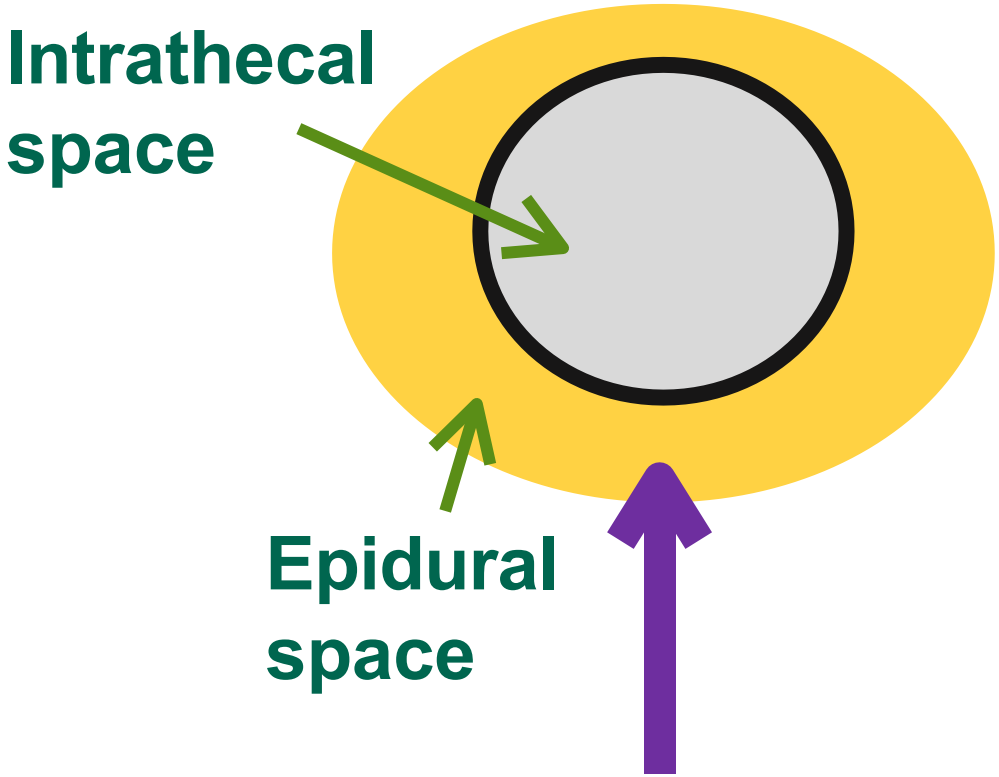
- **Advantages:**
  - Faster onset
  - More reliable block
- **Disadvantages:**
  - Pruritis, hypotension
  - Uterine hypertonicity and fetal heart rate changes



Dural Puncture Epidural (DPE)



Concept developed in late 1990s
No intrathecal meds given directly



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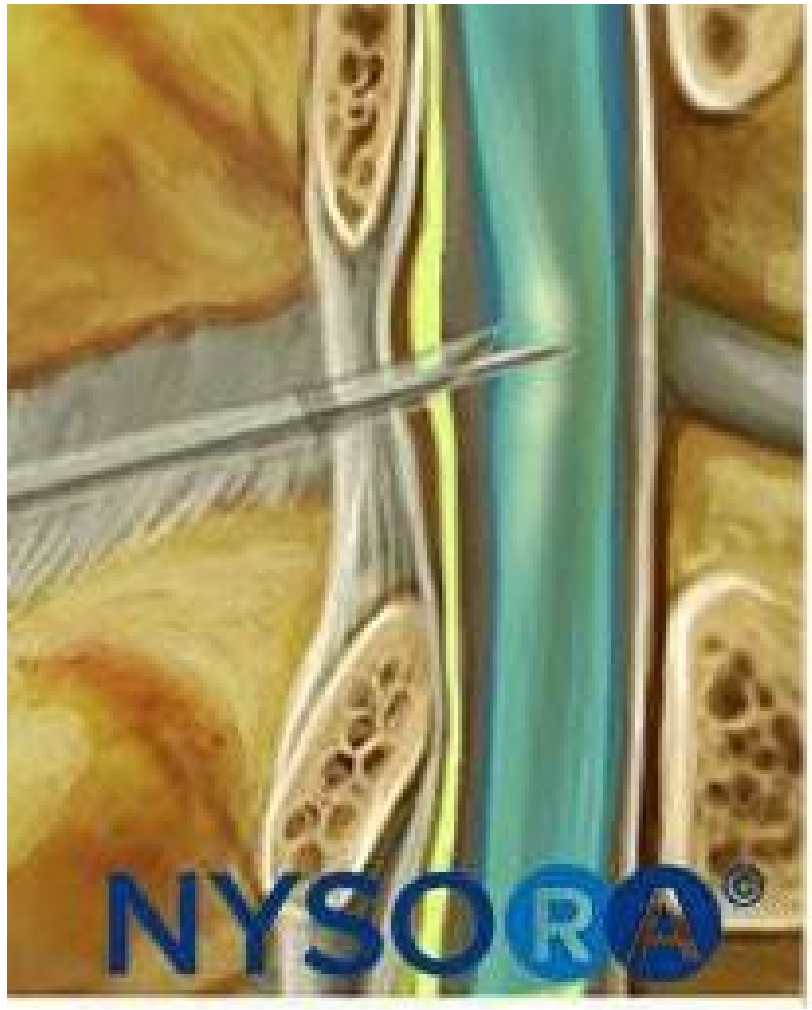

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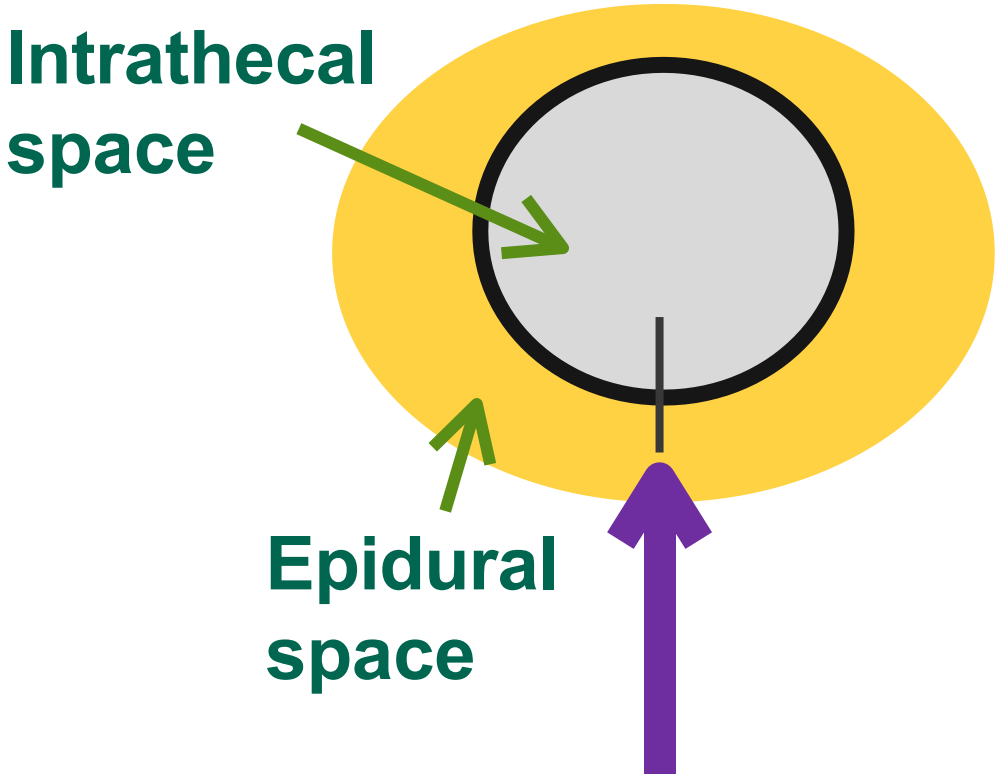
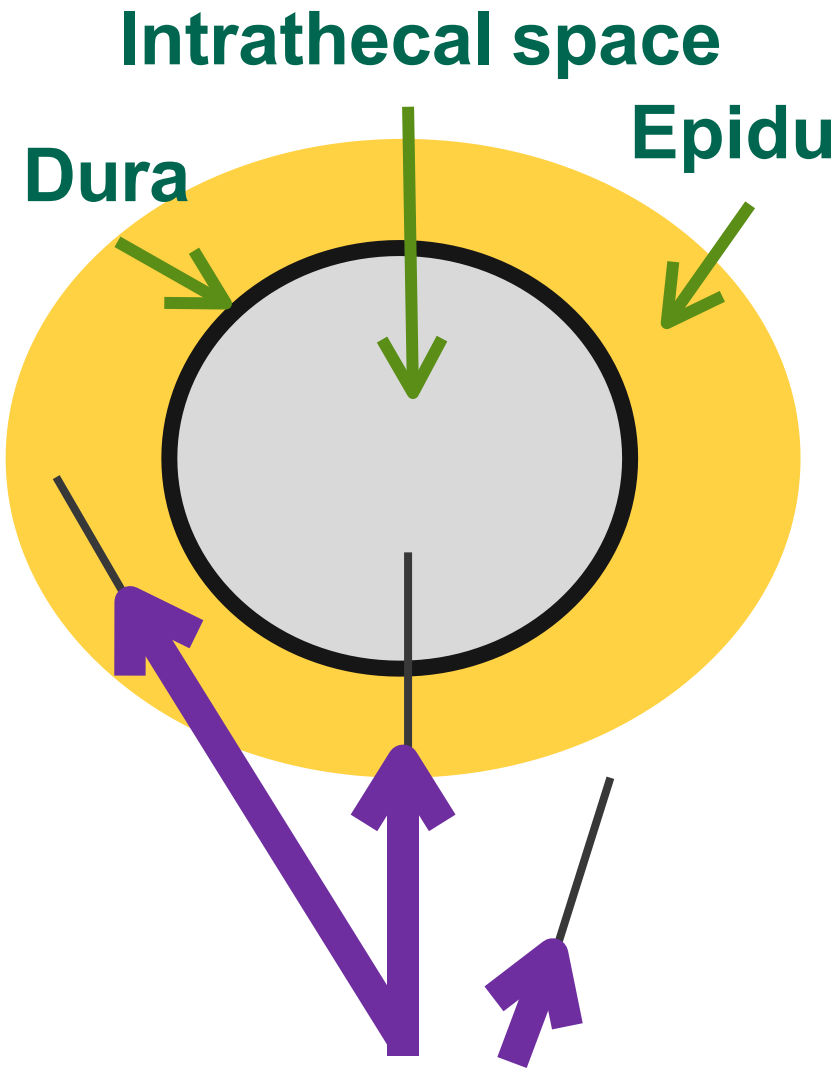
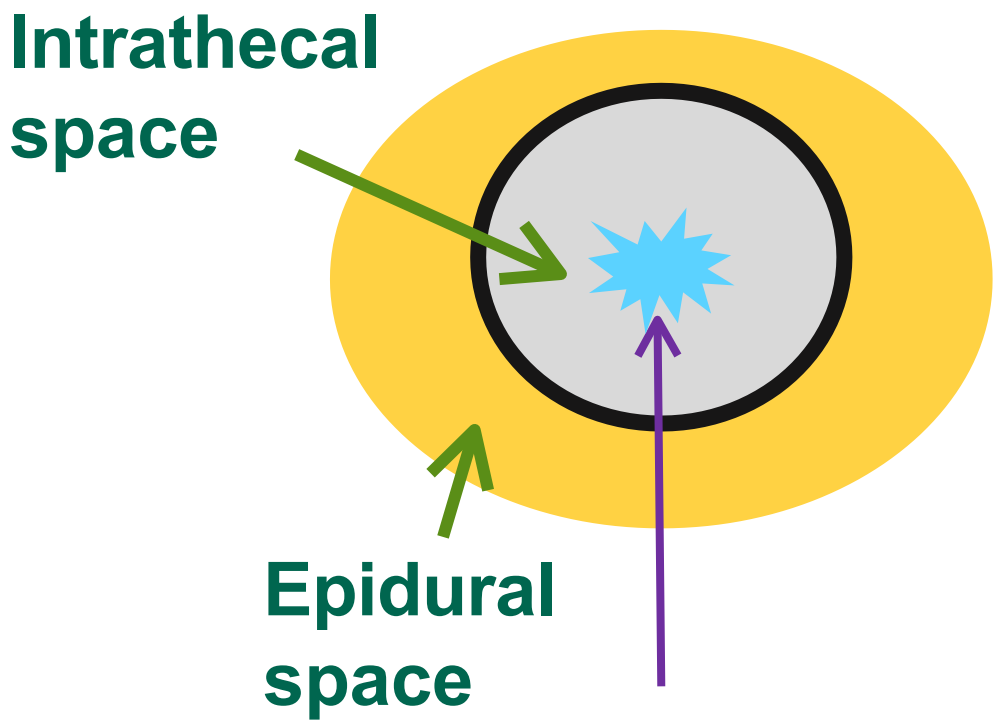


DPE Versus Conventional Epidural



- Confirmation of midline epidural space **can be very useful**
- **Faster onset** than conventional epidural
- Fewer side effects compared to CSE
- No clinically significant increase in risk of **post dural puncture headache**
- May be superior in other ways

Intrathecal (Spinal) Analgesia



- About 1/6 the dose of spinal for cesarean
- **Unable to position well** or **inadequate time** for epidural placement

- Labor analgesia **options vary widely** in their efficacy, advantages, side effects, and resource intensity
- There are many techniques that can be employed without an anesthesia provider
- **Neuraxial analgesia** implemented by an anesthesia provider is very safe and superior in its effectiveness and versatility

References

1. Chesnut D, et al: Obstetric Anesthesia: Principles and Practice, 6th edition. Philadelphia, Elsevier Inc, 2020.
2. Hobel, Calvin J. and Mark Zakowki. “Normal Labor, Delivery, and Postpartum Care: Anatomic Considerations, Obstetric Analgesia and Anesthesia, and Resuscitation of the Newborn.” *Hacker & Moore’s Essentials of Obstetrics and Gynecology, 5th edition,* edited by Neville F. Hacker, Joseph C. Gambone, and Calvin J. Hobel, Saunders Elsevier, 2010, 91-118.
3. Lim, Grace, et al. "A review of the impact of obstetric anesthesia on maternal and neonatal outcomes." *Anesthesiology* 129.1 (2018): 192-215.
4. Lin, Wenqian et al. ‘Dural Puncture Epidural with 25-G Spinal Needles Versus Conventional Epidural Technique for Labor Analgesia: A Systematic Review of Randomized Controlled Trials’. 1 Jan. 2023 : 1 – 16.
5. Shi, Haibin, et al. "Dural puncture epidural vs traditional epidural: A meta-analysis with trial sequential analysis of labor analgesia." (2023).
6. Wong, Cynthia A. et al. “Spinal, Epidural, and Caudal Anesthesia: Anatomy, Physiology, and Technique.” (2009).
7. Zuarez-Easton, Sivan, et al. "Pharmacologic and nonpharmacologic options for pain relief during labor: an expert review." *American journal of obstetrics and gynecology* 228.5 (2023): S1246-S1259.

Up Next

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- Please submit your cases/questions, track your attendance for CME/CNE and view course resources at the: DH iECHO site
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WELCOME to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Session 9, Models of Maternity Care:
Best Practices in Induction of Labor

September16, 2025

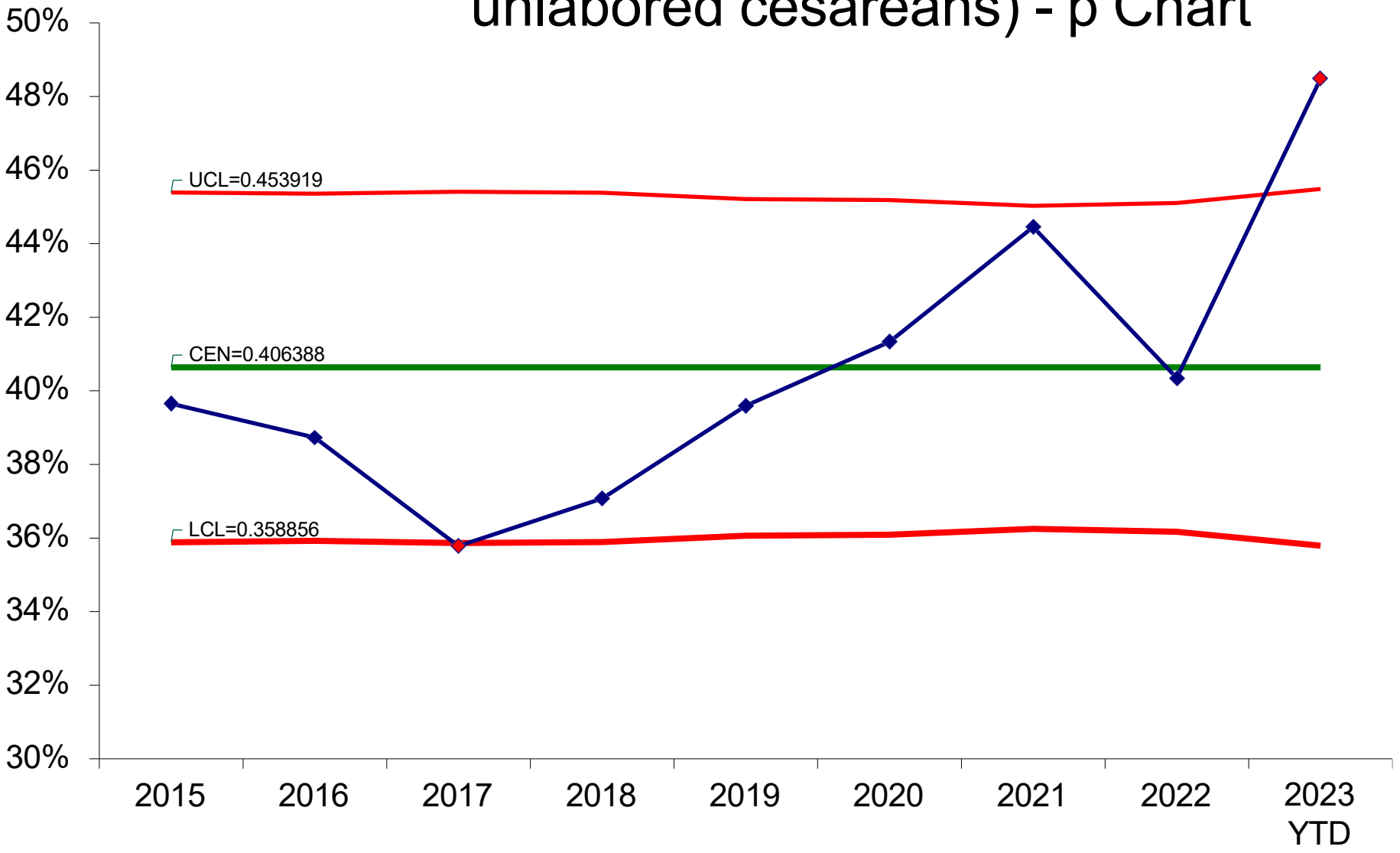
Maternal Care in Rural Areas: Best Practices in Induction of Labor

Emily Donelan, MD

Medical Director, Dartmouth Health

Percentage Induction of Labor (excluding unlabored cesareans) - p Chart

Both medical and elective IOL's are rising



Thanks to Drs Allie Morgan and Ella Damiano

Outline

GOAL of an IOL: Vaginal delivery with good maternal and neonatal outcomes (+ patient satisfaction!)

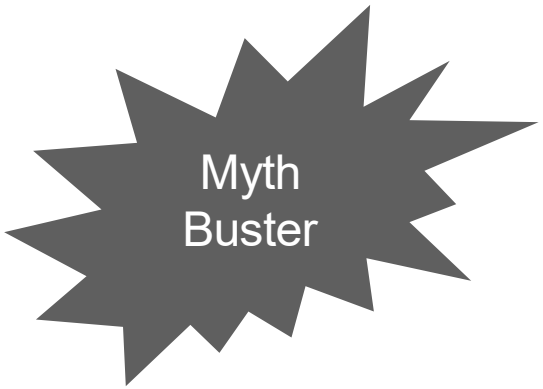
Best Practices to achieve that goal:

1. Dual Cervical ripening: misoprostol + foley/oxytocin
2. Early AROM
3. Strict criteria for failed IOL/arrest disorders
4. Push at complete dilation

Dual Cervical Ripening

- Foley Balloon AND Misoprostol
  - Misoprostol is likely most effective adjunct
  - Preferred if no contraindication

- Foley Balloon AND Oxytocin
  - Oxytocin can be used instead of misoprostol when clinically indicated
    - TOLAC, only borderline unfavorable cervical exam, etc
  - Oxytocin adjunct should follow standard dosing protocol
    - There is NO BENEFIT to low-dose oxytocin with foley ballon in place over foley balloon alone.



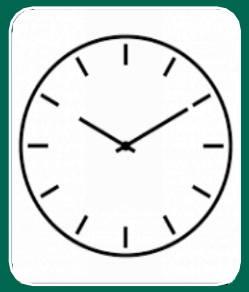
American Journal of Obstetrics and Gynecology
Available online 16 July 2023
In Press, Corrected Proof What's this?

Systematic Review

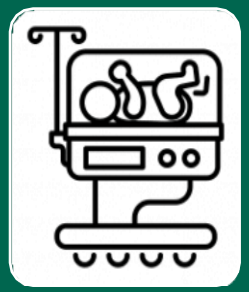
Single-balloon catheter with concomitant vaginal misoprostol is the most effective strategy for labor induction: a meta-review with network meta-analysis

Luis Sanchez-Ramos MD [a], Lifeng Lin PhD [b], Gustavo Vilchez-Lagos MD [c], Jose Duncan MD [d], Niamh Condon DO [a], Jason Wheatley DO [a], Andrew M. Kaunitz MD [a]

Dual Ripening with a foley balloon and vaginal misoprostol **reduced the odds of**:



Prolonged Induction (>24 hr)



NICU Admission

Cesarean Delivery

Sanchez-Ramos, Luis, et al. "Single-balloon catheter with concomitant vaginal misoprostol is the most effective strategy for labor induction: a meta-review with network meta-analysis." American Journal of Obstetrics and Gynecology (2023)

Amniotomy (AROM or artificial rupture of membranes)

A powerful tool for labor or induction management!

De Vivo et al, 2020 Systematic Review & Meta-analysis

Early amniotomy after cervical ripening shortens interval from induction to delivery (by **5 hours**!)

Gomez Slagle et al, 2021 RCT immediate or delayed AROM

Amniotomy within 1 hour of foley expulsion resulted in delivery 2.3 times faster (time savings **8.7 hours**)

Tan et al, 2013 RCT immediate vs delayed oxytocin

Induction started with amniotomy alone works in parous women; no need to delay for 'regular contraction pattern'

ACOG PUBLICATIONS

First and Second Stage Labor Management

ACOG Clinical Practice Guideline No. 8

Author Information

Obstetrics & Gynecology 143(1):p 144-162, January 2024. | *DOI:* 10.1097/AOG.0000000000

Strict Criteria for Failed IOL/Arrest Disorders

Dartmouth Health

ACOG / SMFM Criteria for Cesarean Delivery in Labor

Criteria for Failed Induction/Augmentation in Latent Labor

All three must be met:

- Cervix < 6m dilation (latent labor)
- Membranes ruptured
- Oxytocin administered a minimum of 12-18 hours after membrane rupture without achieving active labor. The decision to continue past 18 hours may be individualized.

Criteria for Arrest of Dilation in Active Labor

All three must be met:

- Cervix ≥ 6cm dilation (active labor)
- Membranes ruptured
- No cervical change after:
  - At least 4 hours of adequate uterine activity defined as MVU ≥ 200 with an IUPC in place
  - At least 6 hours of oxytocin administration with inadequate uterine activity

Criteria for Prolonged Second Stage

- At least 3 hours of pushing in nulliparous patient
- At least 2 hours of pushing in multiparous patient
- Failed trial of operative vaginal delivery

Criteria for Indeterminate Fetal Status

- Category III FHR
- Category II FHR remote from delivery that is not responsive to resuscitation efforts such as: maternal repositioning, fluid administration, maternal blood pressure support if hypotensive, scalp stimulation, correction of uterine tachysystole, amnioinfusion if repetitive variable decelerations
  *provider discretion regarding which category II tracings require delivery vs observation

Second Stage Management

Cochrane Review and Meta-Analyses (Tuuli et al; Di Mascio et al)

Immediate Pushing

- Shorter overall duration of the second stage of labor
  - time savings of **56 minutes!**
- Decreased risk of low umbilical cord blood pH
- Decreased risk of chorioamnionitis

Delayed Pushing

- Shorter duration of active time pushing (by 19 minutes)
- Cochrane ➔ increased spontaneous vaginal delivery (very high OVD rates in both groups!)

"…prolonged duration of the second stage of labor is associated with both adverse maternal and neonatal outcomes…"

Sperling JD, Gossett DR. Immediate vs Delayed Pushing During the Second Stage of Labor. *JAMA*. 2018;320(14):1439–1440.

Cochrane Library

References

- Sanchez-Ramos L, Lin L, Vilchez-Lagos G, Duncan J, Condon N, Wheatley J, Kaunitz AM. Single-balloon catheter with concomitant vaginal misoprostol is the most effective strategy for labor induction: a meta-review with network meta-analysis. Am J Obstet Gynecol. 2024 Mar;230(3S):S696-S715. doi: 10.1016/j.ajog.2022.01.005. Epub 2023 Jul 16. PMID: 38462253.
- First and Second Stage Labor Management: ACOG Clinical Practice Guideline No. 8. Obstet Gynecol. 2024 Jan 1;143(1):144-162. doi: 10.1097/AOG.0000000000005447. PMID: 38096556.
- De Vivo V, Carbone L, Saccone G, et al. Early amniotomy after cervical ripening for induction of labor: a systematic review and meta-analysis of randomized controlled trials. American Journal of Obstetrics and Gynecology, 2020-04-01, Vol 222 (4); 320-329.
- Tan P, Soe M, Sulaiman S, et al. Immediate compared with delayed oxytocin after amniotomy labor induction in parous women: a randomized controlled trial. Obstet Gynecol. 2013 Feb;121(2 Pt 1): 253-259.
- Gomez Slagle H, Fonge Y, Caplan R, et al. Early vs expectant artificial rupture of membranes following Foley catheter ripening: a randomized controlled trial. Am J Obstet Gynecol. 2021 Dec; S0002-9378(21)02628-4.
- Di Mascio D, Saccone G, Bellussi F, et al. Delayed versus immediate pushing in the second stage of labor in women with neuraxial analgesia: a systematic review and meta-analysis of randomized controlled trials. *Am J Obstet Gynecol*. 2020;223(2):189-203.
- Sperling JD, Gossett DR. Immediate vs Delayed Pushing During the Second Stage of Labor. *JAMA.* 2018;320(14):1439–1440.
- Lemos A, Amorim MM, Dornelas de Andrade A, et al. Pushing/bearing down methods for the second stage of labour. *Cochrane Database Syst Rev*. 2017;3(3):CD009124.
- Tuuli MG, Frey HA, Odibo AO, Macones GA, Cahill AG. Immediate compared with delayed pushing in the second stage of labor: a systematic review and meta-analysis. *Obstet Gynecol*. 2012;120(3):660-668.

Up Next

- Next session: VBACs (vaginal birth after cesarian
- Please submit your cases/questions, track your attendance for CME/CNE and view course resources at the: DH iECHO site
- Recordings will be posted on the D-H ECHO website https://www.dartmouth-hitchcock.org/project-echo/enduring-echo-materials

WELCOME to the

Strategies To Optimize Rural Perinatal Healthcare ECHO

Session 10- Maternal Care in Rural Areas: VBACs (vaginal birth after cesarian)

October 21st, 2025

Today's Program

- Brief housekeeping
- Didactic: Maternal Care in Rural Areas: VBACs, Marni Madnick
- Case presentation
- Case discussion
- Summary
- Up Next: Decision Making for Third Trimester Obstetric Emergencies and Transport

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VBAC IN RURAL SETTINGS

Marni Madnick, MD

Mainehealth Memorial Hospital

WHY SHOULD WE FOCUS ON VBAC?

- PATIENT AUTONOMY
- RISKS ASSOCIATED WITH REPEAT CESAREAN DELIVERY
- EQUITY IN ACCESS TO HEALTHCARE

PATIENT AUTONOMY

- The ultimate decision to attempt TOLAC resides with the birthing person.
- When there are no contraindications to TOLAC, every attempt should be made to care for the patient at their preferred birthing hospital.
- Denying a pregnant person the opportunity to TOLAC may have a profound impact in future reproductive risk, as well as risk of future maternal morbidity and even mortality. This is particularly

Neonatal risk favors ERCD

ERCD superior for all neonatal risks, except for **antepartum stillbirth and transient tachypnea**

Not listed here are neonatal consequences down the line of repeat cesarean birth: with increased risk of placental accreta spectrum, **iatrogenic preterm birth** becomes necessary

Table 2.

Neonatal Risks	ERCD (%)	TOLAC (%)
Antepartum stillbirth	0.21	0.10
Intrapartum stillbirth	0–0.004	0.01–0.04
HIE	0–0.32	0–0.89
Perinatal mortality	0.05	0.13
Neonatal mortality	0.06	0.11
NICU admission	1.5–17.6	0.8–26.2
Respiratory morbidity	2.5	5.4
Transient tachypnea	4.2	3.6

Abbreviations: ERCD, elective repeat cesarean delivery; HIE, hypoxic ischemic encephalopathy; NICU, neonatal intensive care unit; TOLAC, trial of labor after cesarean delivery.

Hypoxic Ischemic Encephalopathy: The strength of evidence on the HIE of the infant for ERCD versus TOLAC is low because of the lack of consistency in measurement and few studies. It is not possible to know the true relationship because of the low strength of overall evidence.

Perinatal Mortality: Includes infants less than 28 days of age and fetal deaths of 20 weeks or more of gestation.

Neonatal Mortality: Death in the first 28 days of life.

Neonatal Intensive Care Unit Admission: The overall strength of evidence on the effect of route of delivery on NICU admission is low because of the inconsistent measures and lack of defined criteria for admission.

Respiratory Morbidity: Defined as the rate of bag-and-mask ventilation.

Data from Guise JM, Eden K, Emeis C, Denman MA, Marshall N, Fu R, et al. Vaginal birth after cesarean: new insights. (Archived) Evidence Report/Technology Assessment No.191. AHRQ Publication No. 10–E003. Rockville (MD): Agency for Healthcare Research and Quality; 2010.

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Maternal risk favors TOLAC
- superior for all maternal risks including maternal mortality, except for uterine rupture

This does not take into account risks associated with repeat cesarean delivery and the risk of placental accreta spectrum

Table 1.

Maternal Risks	ERCD (%) [One CD]	TOLAC (%)
Infectious morbidity	3.2	4.6
Surgical injury	0.30–0.60	0.37–1.3
Blood transfusion	0.46	0.66
Hysterectomy	0.16	0.14
Uterine rupture	0.02	0.71
Maternal death	0.0096	0.0019

Abbreviations: CD, cesarean delivery; ERCD, elective repeat cesarean delivery; TOLAC, trial of labor after cesarean delivery.

Surgical Injury: Defined differently and variably reported on in trials. Rate of surgical injury may be increased with TOLAC but definitive studies are lacking.

Infectious Morbidity: Defined as fever, infection, endometritis, and chorioamnionitis

Data from Guise JM, Eden K, Emeis C, Denman MA, Marshall N, Fu R, et al. Vaginal birth after cesarean: new insights. (Archived) Evidence Report/Technology Assessment No.191. AHRQ Publication No. 10-E003. Rockville (MD): Agency for Healthcare Research and Quality; 2010.

OBSTETRICS & GYNECOLOGY

Where You Live Has A Direct Impact On Where You Deliver

-whether or not a person has access to VBAC is dependent on their delivery hospital

-people may chose to travel for VBAC, increasing their risk

-individuals who can’t travel (lack of resources and transportation) are being denied a choice

Can we offer VBAC in a community setting?

- Memorial Hospital- North Conway, NH is a CAH part of a larger organization
- Implemented VBAC 20+ years ago using NNEPQIN guidelines
- ~220 deliveries per year with 7-10 TOLAC
- OR team including anesthesia is in house for active labor, may be engaged in other duties
- New NNEPQIN guidelines have helped expand our TOLAC candidate pool

Implementation

- Buy in- identify who needs to be involved and bring them into the discussion early
- Nursing staff, anesthesia, OR team, pediatrics and administration, other surgical specialties
- Work together to make sure everyone understands their roles and the impact it will have on them and their team

Implementation

- Use NNEPQIN and ACOG as resources
- Understand the risk associated with VBAC - many tend to overestimate the risk relative to other obstetric risks
- Use the SMFM calculator

Implementation

- Not a one size fits all model
- Decide what works for you and your team (do you need to hold an OR, can staff be tied up in other activities, does staff need to be in house, will you induce a VBAC)
- Have a clear understanding of who is a TOLAC candidate at your institution (1 vs 2 prior c/s, other risk factors)
- Ongoing communication and flexibility is key to a successful partnership across the hospital community

Up Next

- Next session: Decision Making for Third Trimester Obstetric Emergencies and Transport
- Please submit your cases/questions, track your attendance for CME/CNE and view course resources at the: DH iECHO site
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Decision Making for Third Trimester Obstetric Emergencies and Transport

Matt Robblee, NRP, CP-C, NH Bureau of EMS

Maria Varanka, MS, NRAEMT, NH EMS for Children Manager

Objectives

1. Understand how the EMS system works and the differences between 911 and interfacility transfer (IFT).
2. Identify what EMS providers can and cannot do during third-trimester and obstetrical emergencies.
3. Recognize how EMS decides where to transport a patient and how clinical staff can best support that process.

Overview of the EMS system

https://www.ems.gov/what-is-ems/

Levels of EMS Provider

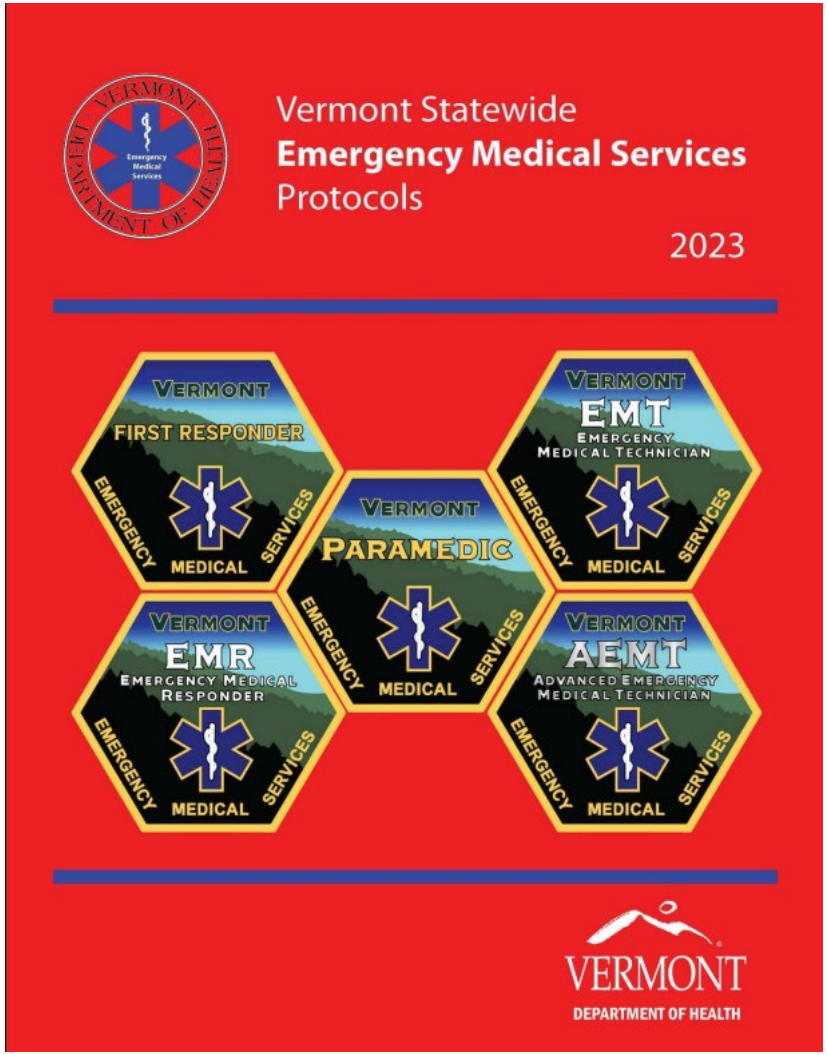
Basic Life Support

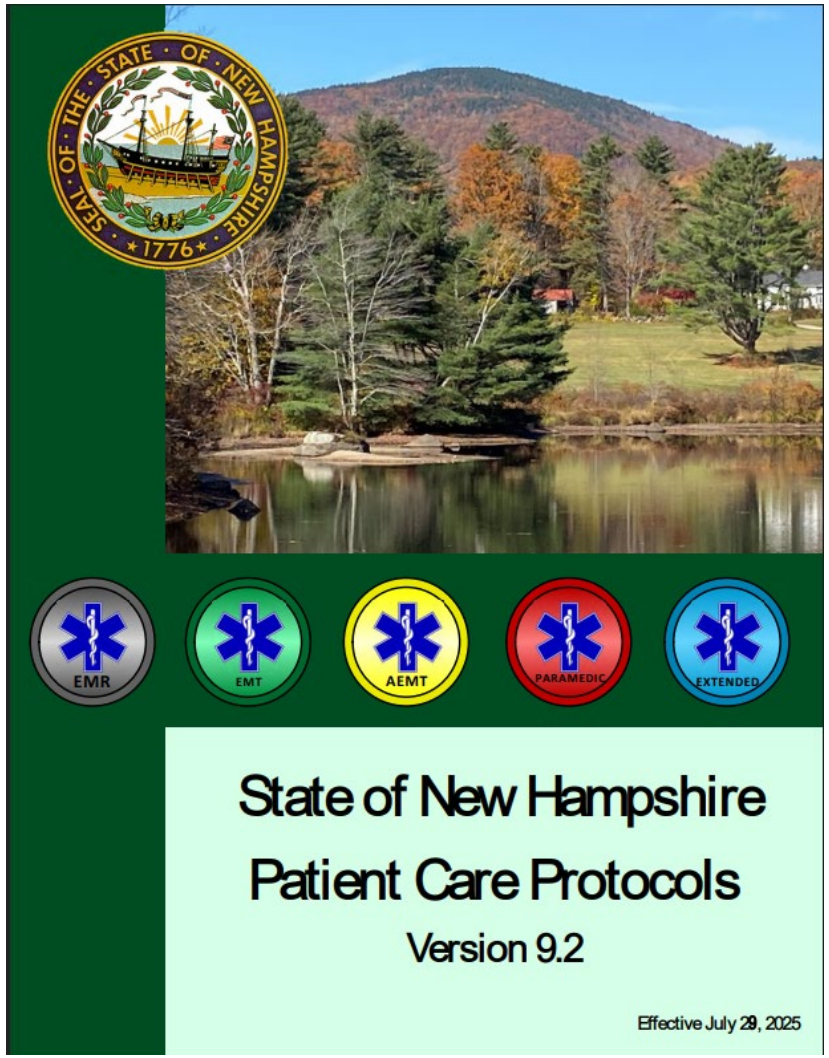
Advanced Life Support

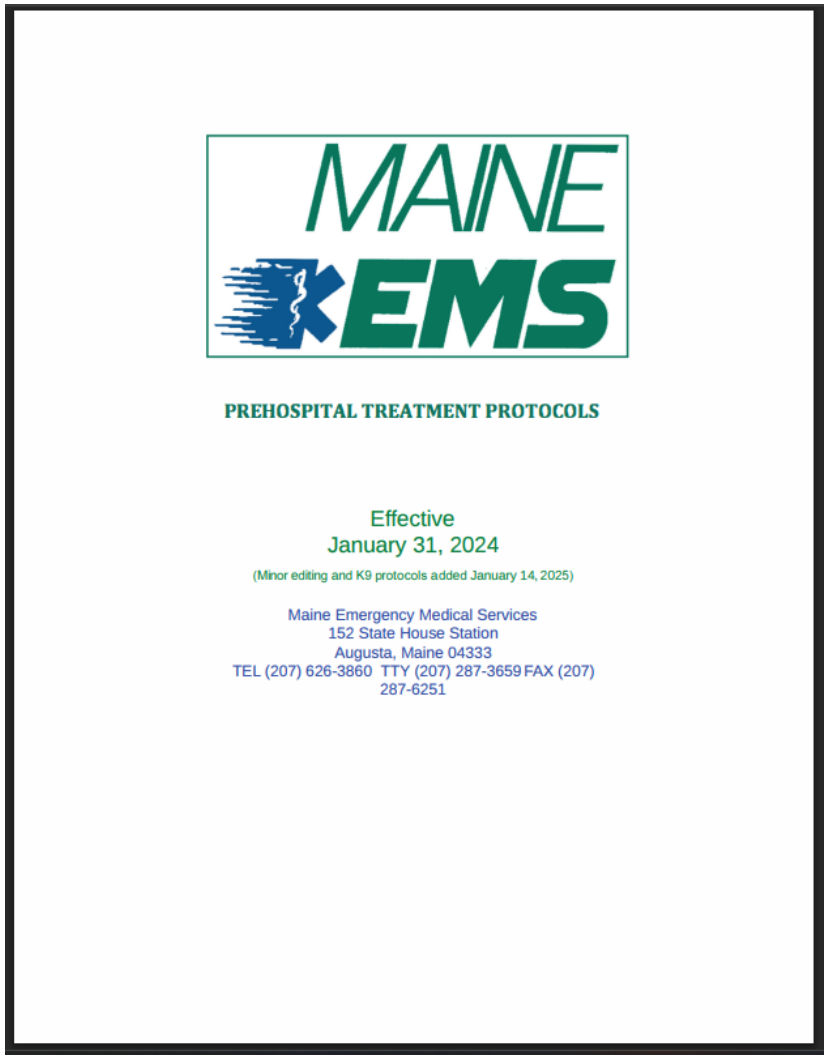
Air Medical

https://www.dartmouth-hitchcock.org/dhart/history

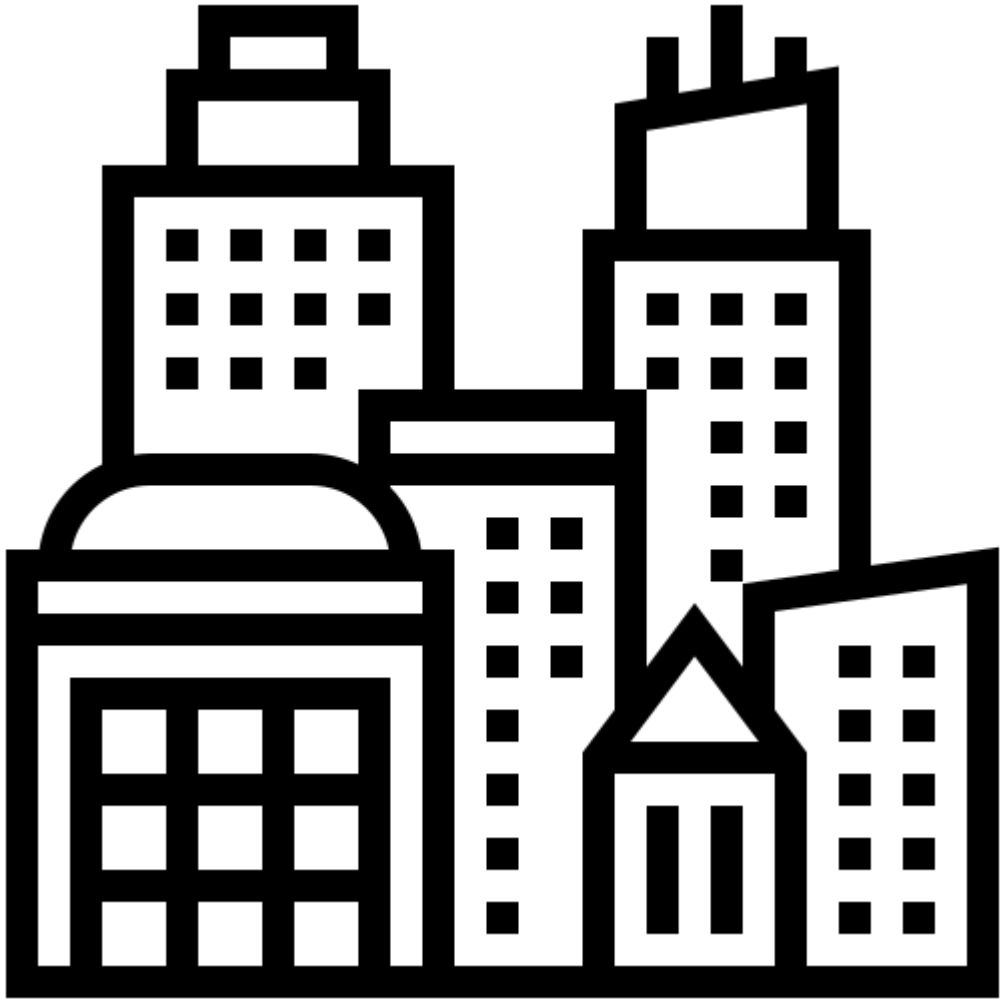
Statewide Protocol







Availability



What is not (widely) available

- ✓ Fetal heart monitoring
- ✓ Dopplering/POCUS
- ✓ Blood
- ✓ Internal exams

911 Transport Decisions

Closures

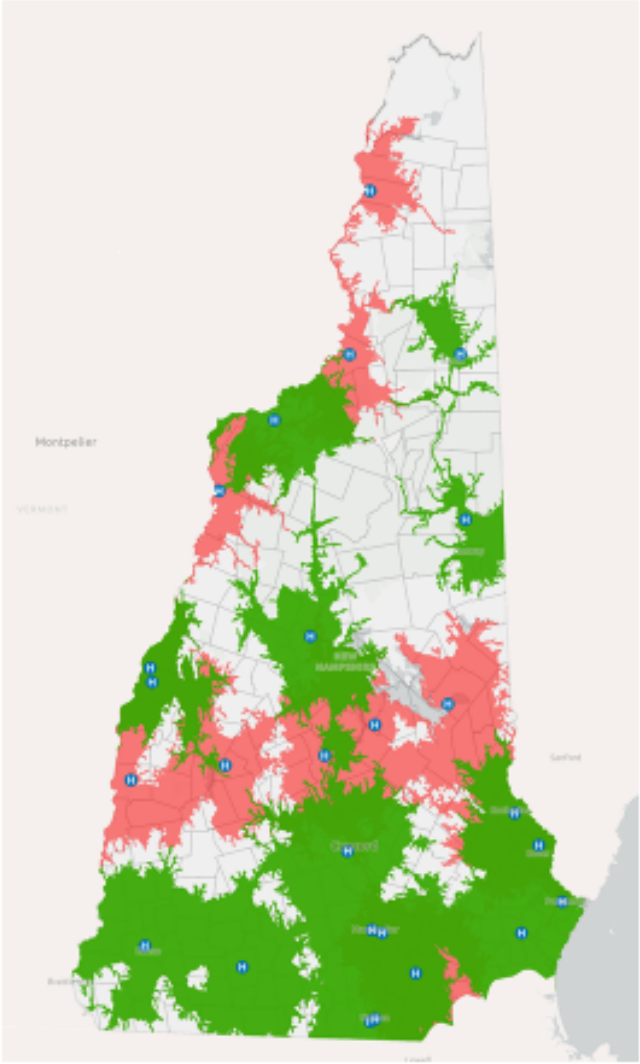
Frisbie Memorial Hospital	November 2022
Parkland Medical Center	November 2020
Alice Peck Day Memorial Hospital	July 2018
Lakes Region General Hospital	May 2018
Cottage Hospital	July 2014
Valley Regional Hospital	January 2012
Huggins Hospital	September 2009
Weeks Medical Center	March 2008
Franklin Regional Hospital	December 2005
Upper Connecticut Valley Hospital	October 2003
New London Hospital	April 2002

Maternal Health/OB Unit
30 Minute Drive Time

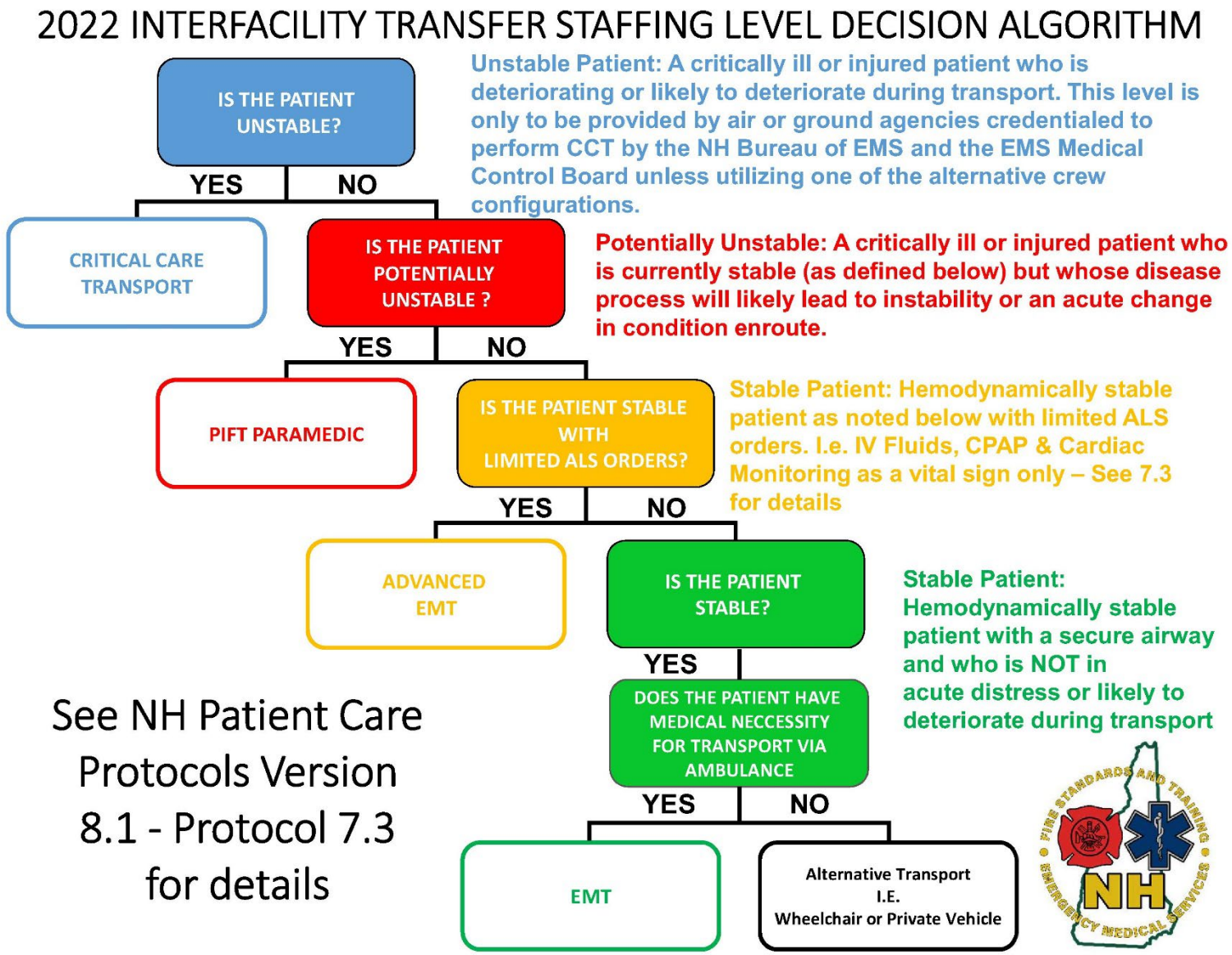
Open Closed

> 30 Minutes

DIVISION OF FIRE STANDARDS AND TRAINING AND EMERGENCY MEDICAL SERVICES



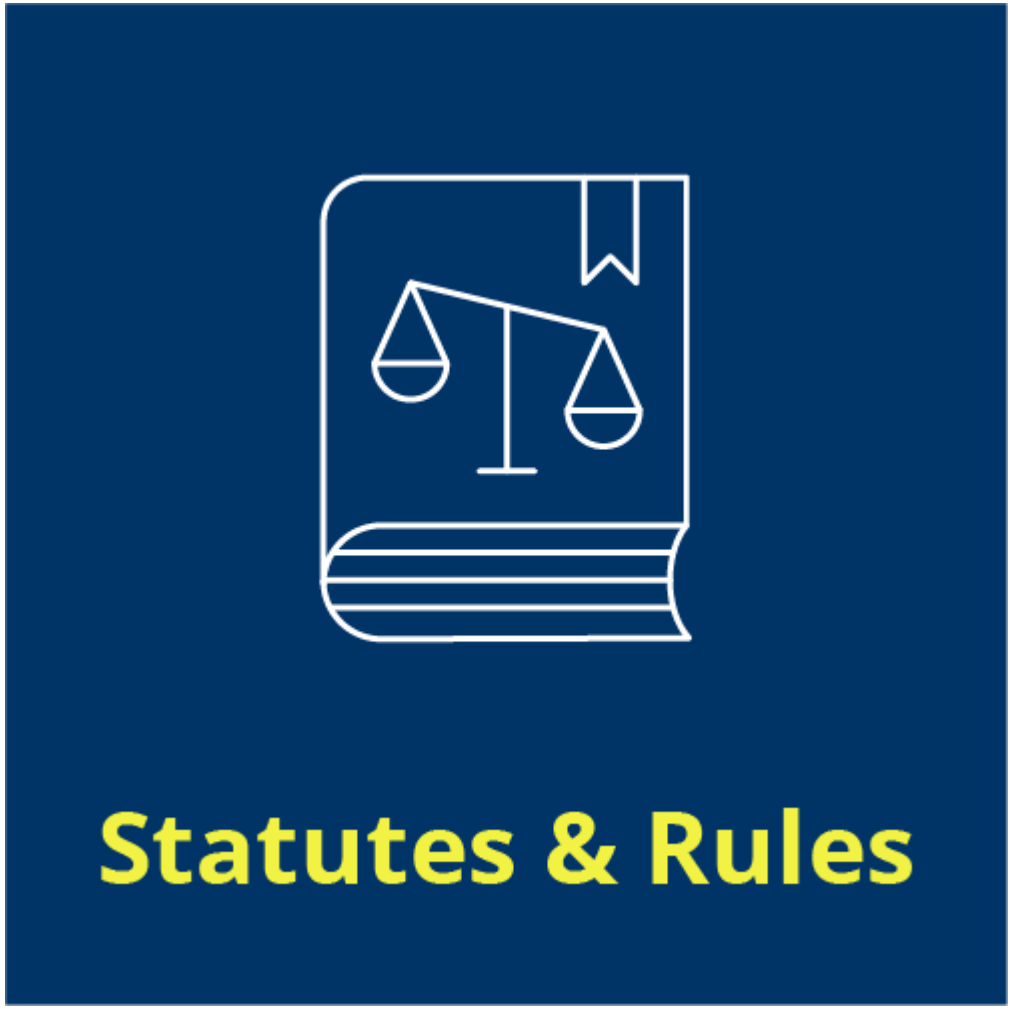
IFT Transport Decisions



Broader Operations Considerations

https://www.masslive.com/news/worcester/2014/01/noreaster_hits_worcester_forec.html

Authority



https://www.healthvermont.gov/emergency/emergency-medical-services/statutes-and-rules

Summary

Transport decision are driven by:

- Patient **status**
- **Protocols**
- **Operational** considerations

Early and often engagement within the local EMS system can pay dividends during an obstetrical emergency.

Contact Information

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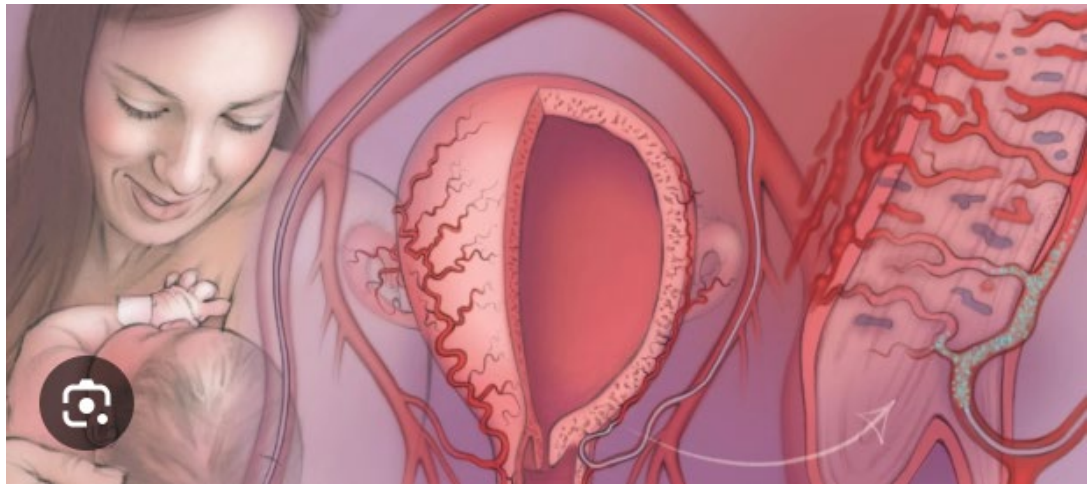
Matthew.J.Robblee@dos.nh.gov

Postpartum Hemorrhage

Tara M. Higgins

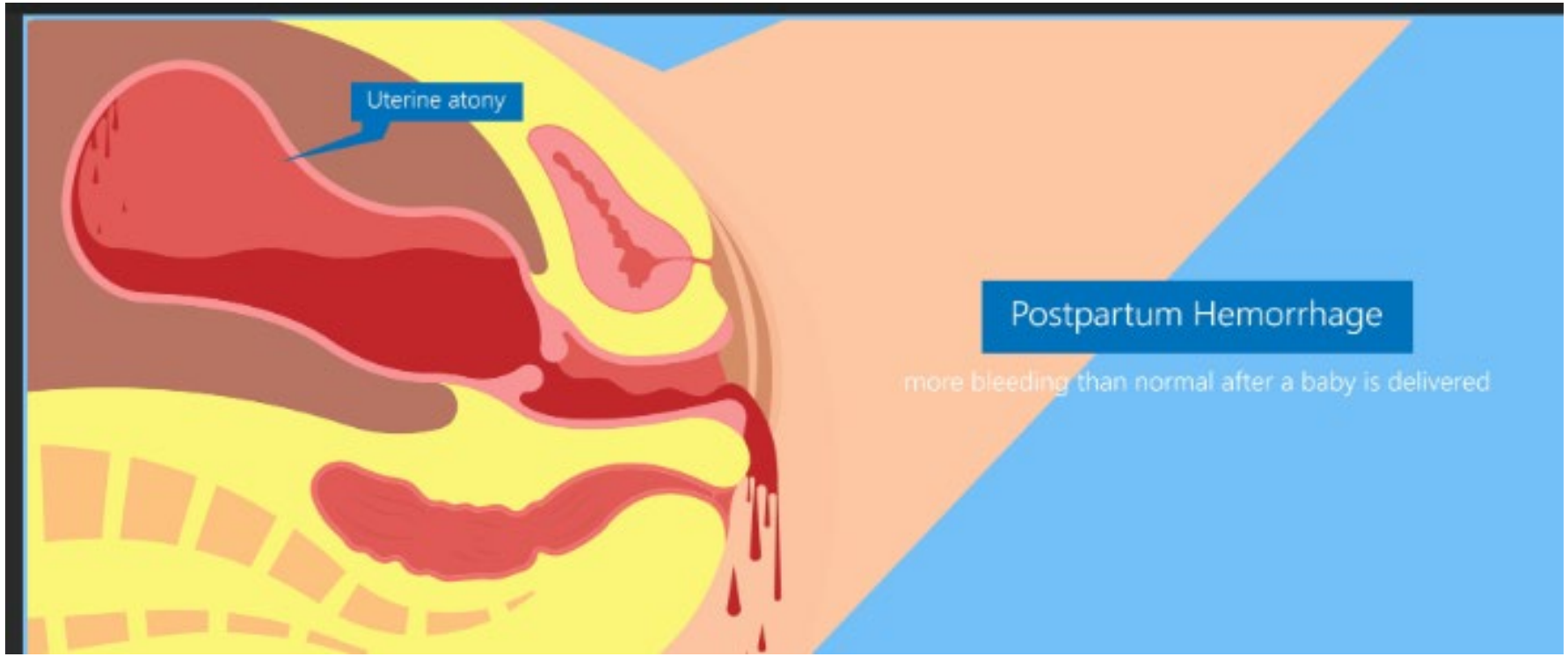
Dartmouth Hitchcock Medical Center

Geisel School of Medicine at Dartmouth



Outline

- Epidemiology
- Physiology
- Risk factors
- Prevention
- Recognition
- Treatment



Epidemiology

- 3-6% of births
- Evidence of increasing frequency
- A leading cause of severe maternal morbidity and mortality nationally and worldwide
  - 1/3 of worldwide maternal deaths
  - 11% of US maternal deaths

Physiology

- Normal postpartum hemostasis relies on:

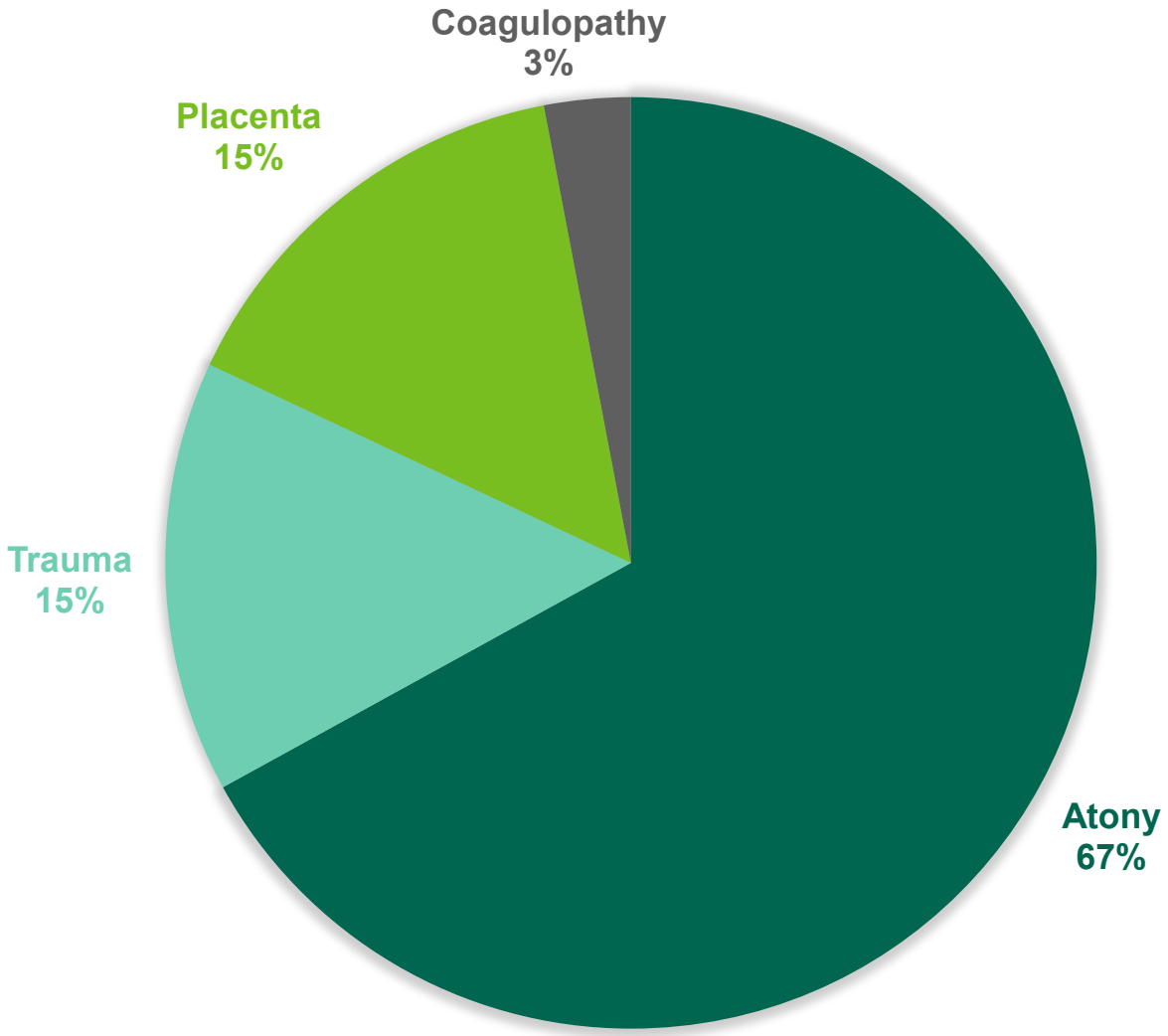
  1. Uterine contraction -> compresses blood vessels feeding placenta site

     +

  2. Local thrombosis -> local factors and systemic factors thrombose vessels at placental site

Uterine artery blood flow in late pregnancy = 500-700 mL/minute

Causes



Risk factors & Associated Conditions

Uterine Atony ★	Prior PPH	Prolonged Labor	Enlarged uterus
Trauma	Labored cesarean	Instrumented vaginal delivery	
Placental abnormality	Prior cesarean Previa PAS	Abruption	Retained Placenta
Coagulopathy	Inherited disorders	Consumptive disorders ★	

PAS = placenta accreta spectrum

Prevention

- **Risk assessment of PPH risk**
  - Timepoints: Prenatally, admission to L&D, start of second stage, transfer to postpartum, change in patient condition
  - Required by Joint Commission
  - Tools:

    California Maternal Quality Care Collaborative PPH toolkit

    AWOHNN toolkit

    ACOG Safe Mothers Initiative

    *** 40% of PPH happens in people without risk factors ***

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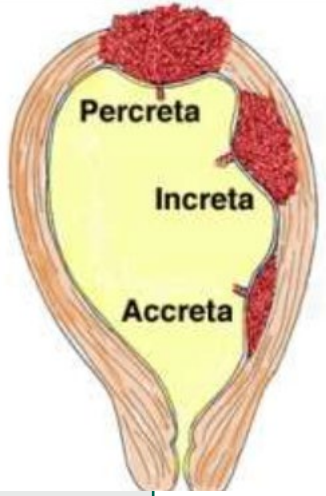
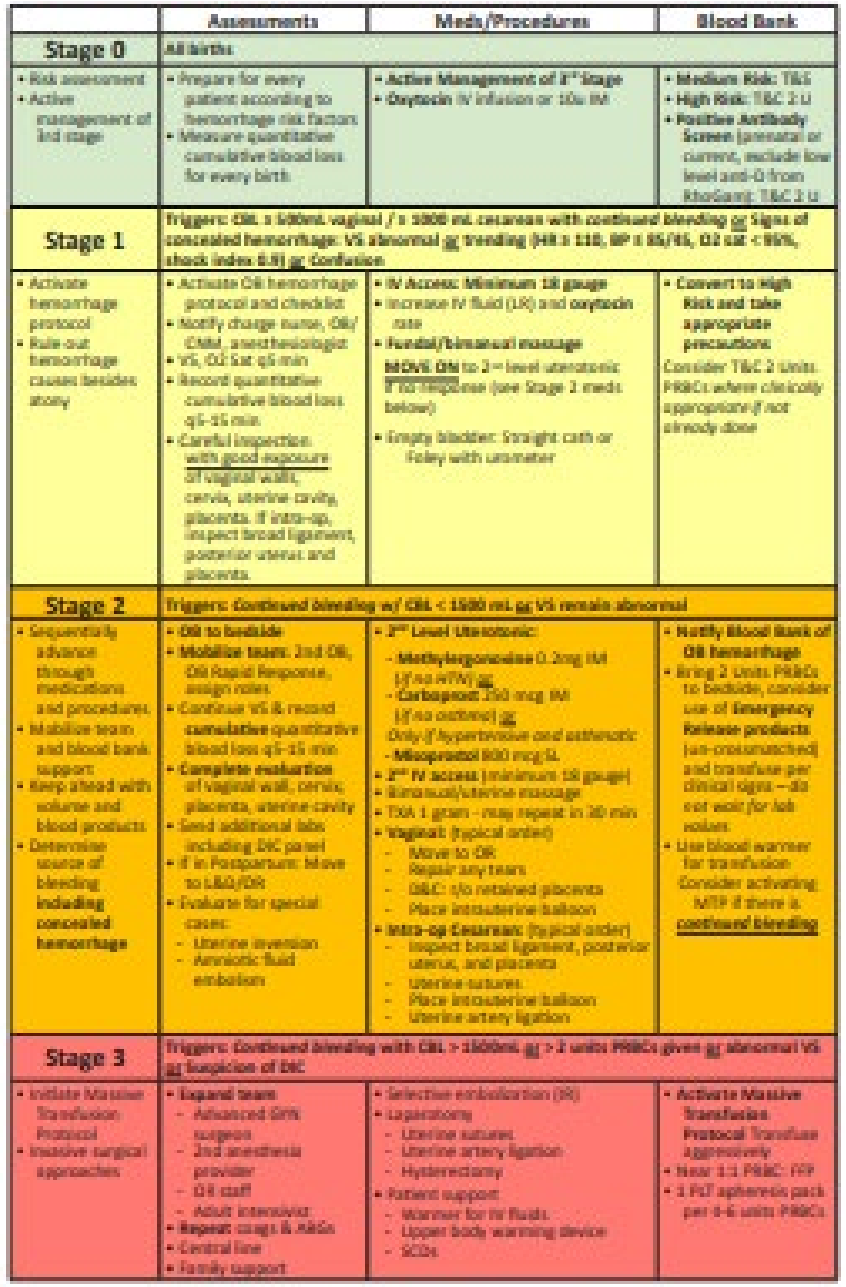


Prevention: specific conditions

Declines blood products	Optimization of H&H Pre-delivery conditional planning
PAS	Delivery at center with multidisciplinary team
Previa	Surgical planning, blood available
Bleeding disorders & thrombocytopenia	Hematology, MFM and anesthesia plans
Anemia	Treat!!

Prevention: Be ready!

- Unit protocols for PPH
- Hemorrhage carts
- Simulation
- Involve all team members
- Multidisciplinary



	Assessments	Meds/Procedures	Blood Bank
Stage 0	**All births**		
• Risk assessment • Active management of 3rd stage	• Prepare for every patient according to hemorrhage risk factors • Measure quantitative cumulative blood loss for every birth	• **Active Management of 3rd Stage** • **Oxytocin** IV infusion or 10u IM	• **Medium Risk:** T&S • **High Risk:** T&C 2 U • **Positive Antibody Screen** (prenatal or current, exclude low level anti-D from RhoGam): T&C 2 U
Stage 1	**Triggers: EBL ≥ 500mL vaginal / ≥ 1000 mL cesarean with continued bleeding or Signs of concealed hemorrhage: VS abnormal or trending (HR ≥ 110, BP ≤ 85/55, O2 sat < 95%, shock index ≥ 1) or confusion**		
• Activate hemorrhage protocol • Rule-out hemorrhage causes besides atony	• Activate OB hemorrhage protocol and checklist • Notify charge nurse, OB/CNM, anesthesiologist • VS, O2 Sat: q5 min • Record quantitative cumulative blood loss q5-15 min • Careful inspection with good exposure of vaginal walls, cervix, uterine cavity, placenta. If intra-op, inspect broad ligament, posterior uterus and placenta.	• **IV Access: Minimum 18 gauge** • Increase IV fluid (LR) and **oxytocin** rate • **Fundal/bimanual massage** **MOVE ON** to 2nd level uterotonic if no response (see Stage 2 meds below) • Empty bladder: straight cath or Foley with urometer	• **Convert to High Risk and take appropriate precautions:** Consider T&C 2 units PRBCs where clinically appropriate if not already done
Stage 2	**Triggers: Continued bleeding w/ EBL < 1500 mL or VS remain abnormal**		
• Sequentially advance through medications and procedures • Mobilize team and blood bank support • Keep ahead with volume and blood products • Determine source of bleeding **including concealed hemorrhage**	• **OR to bedside** • **Mobilize team:** 2nd OB, OB Rapid Response, assign roles • Continue VS & record **cumulative** quantitative blood loss q5-15 min • **Complete evaluation** of vaginal wall, cervix, placenta, uterine cavity • Send additional labs including DIC panel • If in Postpartum: leave to L&D/OR • Evaluate for special cases: - Uterine inversion - Amniotic fluid embolism	• **2nd Level Uterotonic:** - **Methylergonovine** 0.2mg IM (if no HTN) or - **Carboprost** 250 mcg IM (if no asthma) or *Only if hypertensive and asthmatic* - **Misoprostol** 800 mcg SL • **2nd IV access** (minimum 18 gauge) • Bimanual/uterine massage • TXA 1 gram - may repeat in 30 min • **Vaginal:** (typical order) - Move to OR - Repair any tears - D&C: r/o retained placenta - Place intrauterine balloon • **Intra-op Cesarean:** (typical order) - Inspect broad ligament, posterior uterus, and placenta - Uterine sutures - Place intrauterine balloon - Uterine artery ligation	• **Notify Blood Bank of OB hemorrhage** • Bring 2 Units PRBCs to bedside, consider use of **Emergency Release products** (un-crossmatched) and transfuse per clinical signs – do not wait for lab values • Use blood warmer for transfusion Consider activating MTP if there is **continued bleeding**
Stage 3	**Triggers: Continued bleeding with EBL > 1500mL or > 2 units PRBCs given or abnormal VS or Suspicion of DIC**		
• Initiate Massive Transfusion Protocol • Invasive surgical approaches	• **Expand team** - Advanced GYN surgeon - 2nd anesthesia provider - OR staff - Adult intensivist • **Repeat** coags & ABGs • Central line • Family support	• Selective embolization (IR) • Laparotomy - Uterine sutures - Uterine artery ligation - Hysterectomy • Patient support - Warmer for IV fluids - Upper body warming device - SCDs	• **Activate Massive Transfusion Protocol** Transfuse aggressively • Near 1:1 PRBC: FFP • 1 PLT apheresis pack per 4-6 units PRBCs

This table was adapted from the Improving Health Care Response to Obstetric Hemorrhage: A California Quality Improvement Toolkit, funded by the California Department of Public Health, 2013, supported by Title V funds.

Source: California Maternal Quality Care Collaborative

Prevention: Be ready!

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• Initiate Massive Transfusion Protocol • Invasive surgical approaches	• **Expand team** - Advanced GYN surgeon - 2nd anesthesia provider - OR staff - Adult intensivist • **Repeat** coags & ABGs • Central line • Family support	• Selective embolization (IR) • Laparotomy - Uterine sutures - Uterine artery ligation - Hysterectomy • Patient support - Warmer for IV fluids - Upper body warming device - SCDs	• **Activate Massive Transfusion Protocol** Transfuse aggressively • Near 1:1 PRBC: FFP • 1 PLT apheresis pack per 4-6 units PRBCs

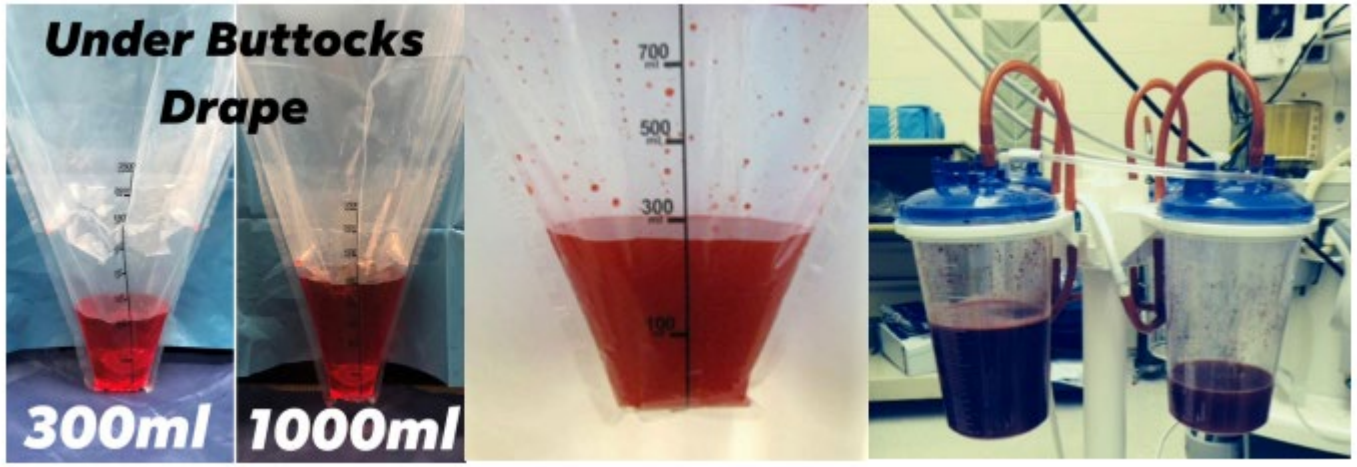
Source: California Maternal Quality Care Collaborative

Response

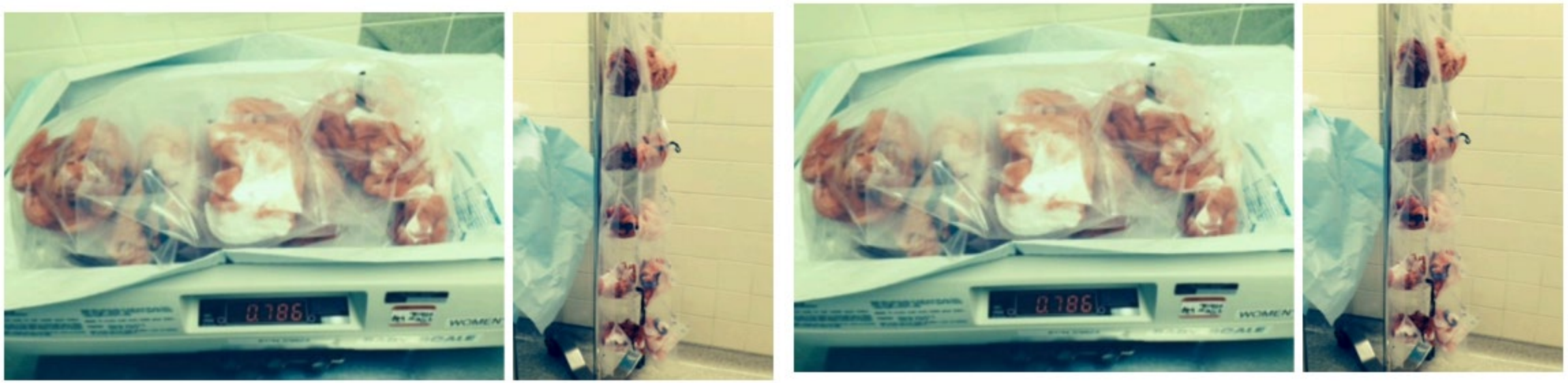
- **Early response is key**

- Key factors:
  - Early recognition of continued bleeding
  - Prompt involvement of experienced clinician
  - Early determination of cause of bleeding
  - Early assessment of severity of blood loss and diagnosis of coagulopathy
  - Timely intervention to control bleeding

Recognition



Consider quantitative blood loss



Source: California Maternal Quality Care Collaborative

Recognition

- 90% of deaths from PPH happen within 4 hours of birth

- **Lethal triad**: Hypothermia, acidosis, coagulopathy

Recognition

Vitals: Look for changes from baseline rather than absolute numbers

Post-delivery hypotension = hemorrhage until proven otherwise

Exam

- Abdominal & vaginal
- US or bimanual to assess for concealed blood accumulated in uterus

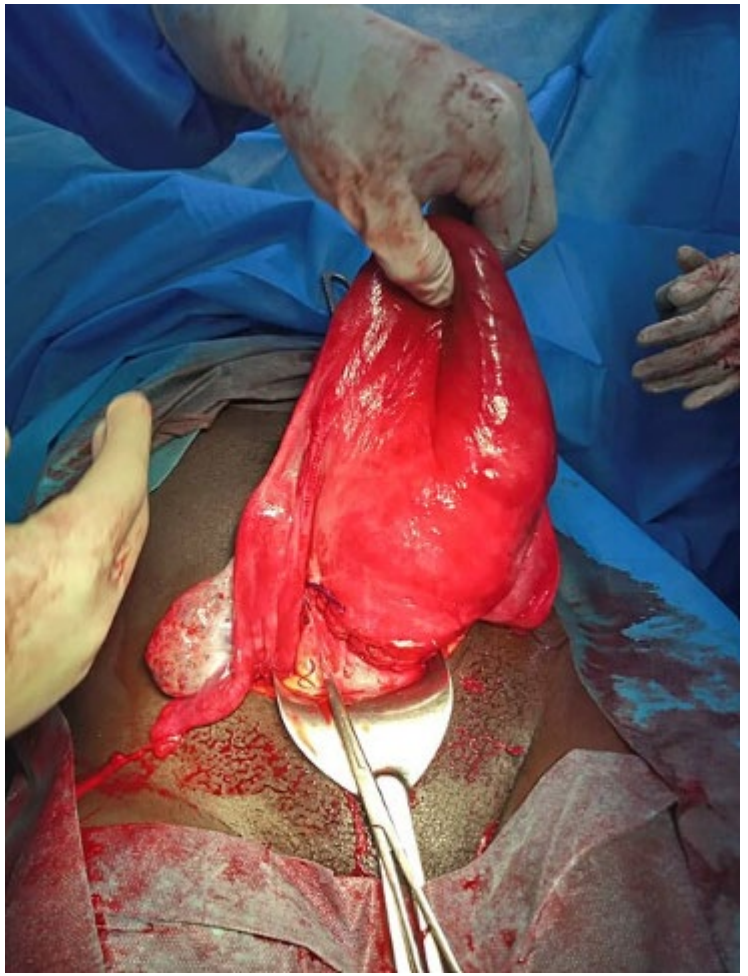
Labs

- CBC, fibrinogen, PT/PTT
- T&S/crossmatch
- Consider: potassium, ionized calcium, lactate, blood gas

THIS IS THE TIME TO GET GOOD IV ACCESS

Treatment: Atony

1. Uterotonics ★
2. Intrauterine methods ★
   1. Tamponade (Bakri, Foley)
   2. Low-grade suction device (Jada)
3. Surgical intervention



Treatment: Uterotonics

If bleeding is heavy despite routine oxytocin, quickly move on to either:

Drug	Dose	Contraindications	
Methylergonovine (Methergine)	0.2 mg IM q2-4 hrs	Hypertensive disease Coronary artery disease	Similar efficacy
Carboprostе (Hemabate)	0.25 mg IM q15-90 mins	Asthma	

Treatment: Uterotonics

What about misoprostol?

- Slower onset, possibly less effective, than injectable (Methergine or Hemabate)
- Sublingual dosing preferential
  - Oral = more side effects, levels fall more rapidly than sublingual
  - Rectal = slower time to onset

Treatment: Tranexamic Acid

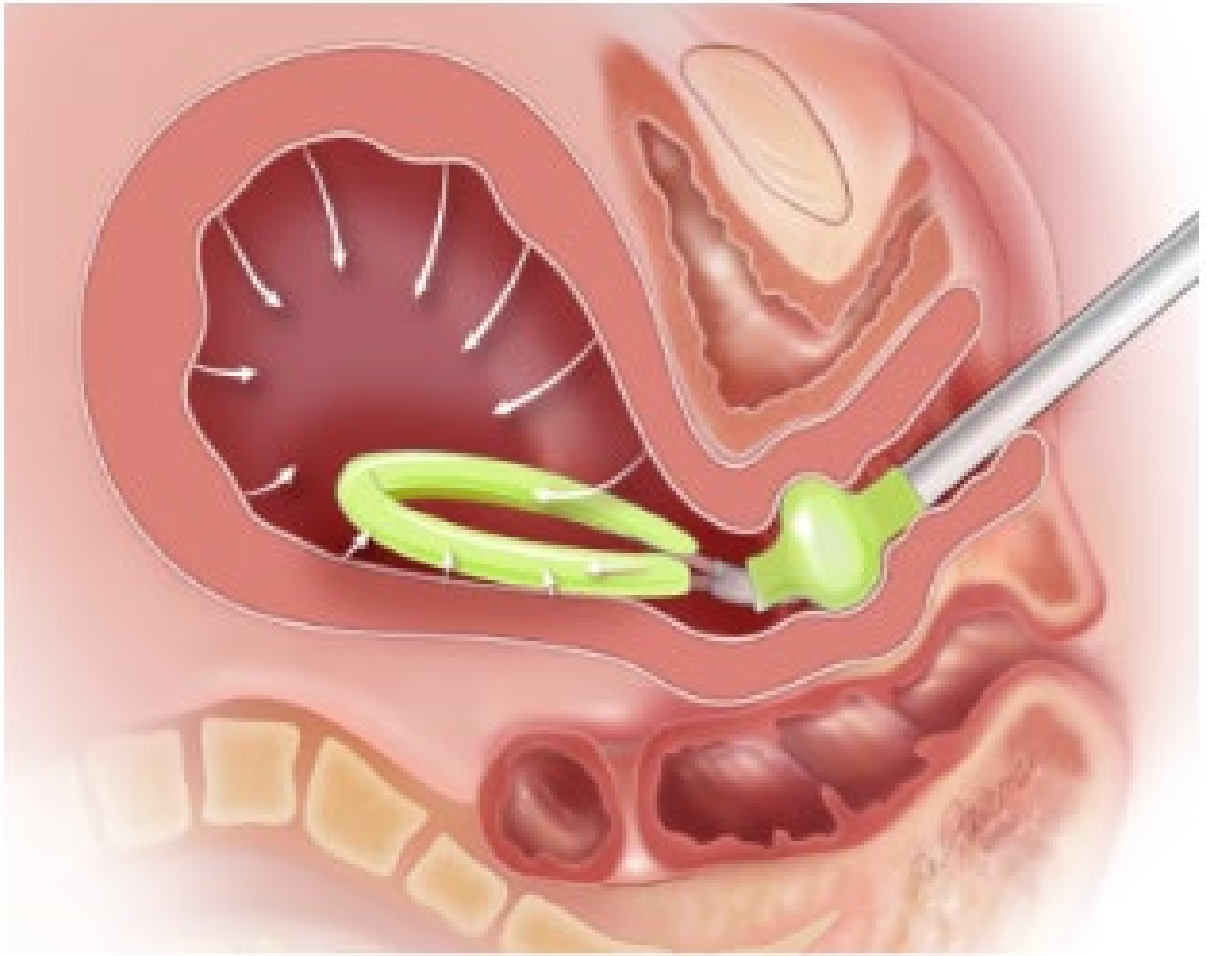
- Reduces mortality when used early in treatment of PPH
- Give as soon as PPH diagnosed
- Give at the same time as uterotonics

- Dose: 1 gram (10 mL in 100 mg/mL solution), given IV over 10 mins
  - Can repeat dose after 30 mins if continued bleeding

- Mixed data regarding prophylactic dosing

Treatment: Intrauterine Balloon (Bakri)

Treatment: JADA low suction intrauterine system



Treatment: JADA vs Bakri

- No randomized controlled trials
- Retrospective comparison data:
  - Equal massive transfusion rates
  - In vaginal deliveries, JADA associated with:
    - Lower blood loss
    - Lower transfusion rate
    - No device expulsions
    - Shorter device indwelling time

    - Similar failure rates and safety profiles

EARLY USE = BETTER OUTCOMES

Source: Chan et al. Comparing Maternal postpartum hemorrhage outcomes with intrauterine balloon tamponade versus vacuum-induced hemorrhage devices: a retrospective cohort study. J Matern Fetal Neonatal Med. 2025 Dec; 38(1):2357225

Treatment: JADA tips

- Deflate cuff (suck air out) prior to insertion
- Cuff stays in the vagina
- Can fill cuff with 60-120 mL of saline according to manufacturer. May need more after SVD/2nd stage c/s

- Have long tubing available

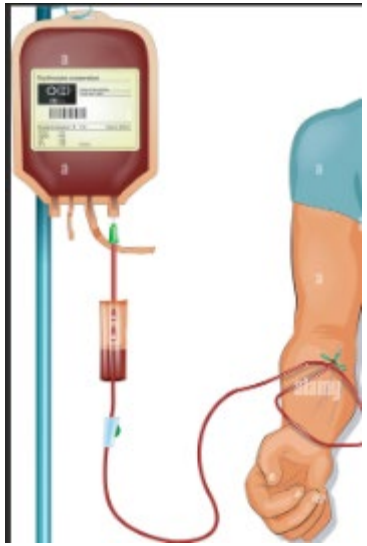
- SHOULD CONTROL BLEEDING WITHIN 3-5 minutes. If heavy bleeding continues, move onto further treatment

Treatment: Transfusion

- Transfuse before hypoperfusion and coagulopathies develop

- What does your blood bank have?
  - How much blood?
  - FFP
  - Cryoprecipitate?
  - Platelets?

  - Call for additional products EARLY



Treatment: Transfusion

- Considerations:
  - EBL/QBL > 1500, start transfusion

  - Massive hemorrhage: need coagulation factors replaced!
    - Consider FFP if > 2 units pRBC
    - ≥4 units of pRBC, give ≥4 units FFP
    - >4 units of pRBCs, give platelets

  - Cryoprecipiate:

Advantage	Less volume
Disadvantage	Needs to thaw

Treatment: Considerations for transport

- Access to more blood products, interventional radiology for uterine artery embolization, ICU, ECMO

- If closing after very high blood loss cesarean, consider leaving in a drain to monitor for continued intra-abdominal bleeding

- Consider Bakri or intrauterine balloon to tamponade and monitor bleeding during transport

References and Resources

- Review articles:
  - Bienstock et al. Postpartum Hemorrhage. N Eng J Med. 2021;384:1635-1645
  - Harvey, SA. Postpartum Hemorrhage. JAMA. 2025;334;(22):2031-2032.
  - Williams CR et al. Transfusion of blood and blood products for the management of postpartum haemorrhage. Cochrane Database Syst Rev. 2025 Feb 6;2(2):CD016168.

References and Resources

ACOG Practice Bulletin #183, PPH

AWOHNN: Free resources, PPH risk assessment and stages algorithm

California Maternal Quality Care Collaborative

- www.cmqcc.org
  - Toolkits
  - Free account