

Cardiovascular Diseases in Pregnancy and Postpartum



ACOG PRACTICE BULLETIN #212

Pregnancy and Heart Disease

Physiologic Changes in Pregnancy That Affect Cardiovascular Stress

Pregnancy is a natural stress test because the cardiovascular system undergoes structural and hemodynamic adaptations to sustain a high-volume load. An understanding of these physiologic changes is essential for health care providers.

What are those Normal Physiological Changes in Pregnancy?



As a Review

Normal Physiological changes in pregnancy

Decreased vascular resistance and peripheral vasodilation

- Decreased systemic blood pressure and mean arterial pressures [MAP]
- Peripheral edema
- Allows for adequate perfusion to end organs- The placenta is an end organ!

Increased blood volume (plasma) and hemodilution

- Dilutional anemia of pregnancy – increase in intravascular volume – Plasma is increased more than red blood cells

Increased cardiac output

- Slight increased in HR

Vascular remodeling occurs

- Spiral arteries of the uterus widen in diameter
- Vessel walls become thinner

Risk Factors for Cardiovascular Disease Across the Maternal Care Continuum:

1. Race and ethnicity – non-Hispanic black women have a 3.4 times increase as compared to other ethnicities
2. Age – over 40 years of age increases maternal death from cardiac disease by 30 times
3. Hypertension in pregnancy
4. Obesity – prepregnancy especially if associated with sleep apnea

Cardiovascular Disease in Relation to Pregnancy

- Cardiovascular pathophysiologic changes of pregnancy persist for weeks postpartum.
- Normally, the heart compensates for the increased workload allowing pregnancy, labor, and the postpartum period to be well tolerated.
- If myocardial disease develops, valvular disease exists, or a congenital heart defect is present, *cardiac decompensation* may occur.

Cardiovascular Disease

- The first presentation of cardiovascular disease may be during pregnancy or in the early postpartum period.
- *The highest risk period for a preexisting cardiac condition to manifest is generally in the late second trimester, i.e., 24-28 weeks, or in the postpartum period.*
- Healthcare providers should maintain a high index of suspicion for underlying cardiovascular disease when a woman presents with symptoms, signs, and risk factors concerning for heart disease for as long five months postpartum.

CVD Signs and Symptoms

- Extreme fatigue
- Extreme swelling
- Weight gain
- Dyspnea
- Mild orthopnea - how many pillows does she prop with at night?
- Tachypnea
- Persistent cough
- Asthma unresponsive to therapy
- Palpitations
- Dizziness
- Syncope
- Tachycardia
- Chest pain

Cardinal Rule.....

When a woman presents to the unit and or emergency department who is pregnant or has been pregnant within the last year with any of the following symptoms:

- Shortness of Breath – Unable to complete a sentence without taking a breath
- Extreme fatigue – Example- activities of daily living which are not influenced by lack of sleep from taking care of a newborn
- Inability to lie flat when resting – Example- using 4 pillows or sleeping in a recliner to be able to breathe adequately
- Chest pain



Should Prompt Concern and Immediate Assessment of the Patient



Concerning Assessments

Vital Sign Changes:

- Resting HR \geq 110 bpm
- Systolic BP \geq 140 mmHg
- Respiratory rate \geq 24
- O₂ sats \leq 95%

Assessment:

- Murmur
- Crackles in lung bases

Diagnosis of Cardiovascular Disease



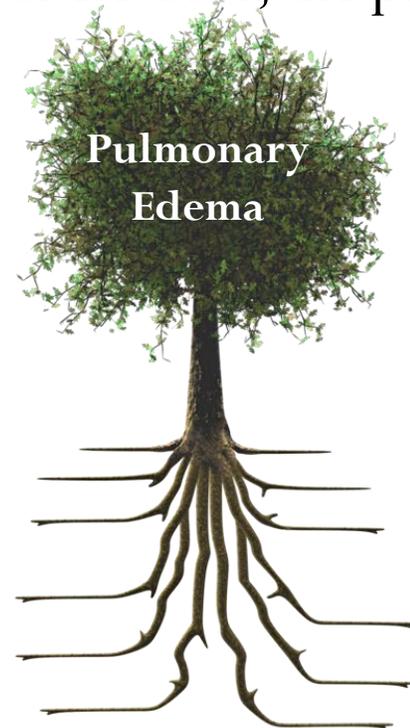
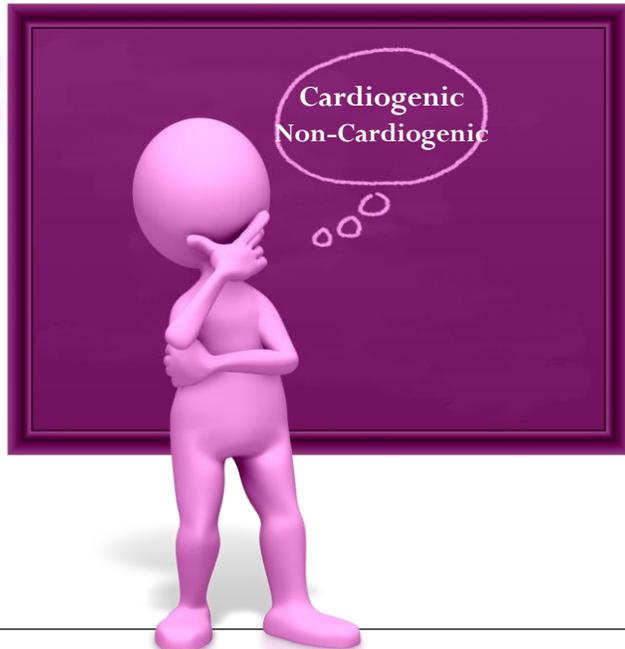
- EKG
- BNP
- Echocardiogram
 - If BNP is elevated
- Chest X-ray
 - Be aware that pulmonary edema or changes on a Chest X-ray may be misinterpreted if the root cause is not investigated and pregnancy conditions are not considered. A new diagnosis of asthma is highly unusual for an adult patient
 - This is when a consult with Maternal Fetal Medicine can be beneficial

What is a BNP

- BNP is a neurohormone secreted predominantly by the cardiac ventricles in response to volume expansion or pressure overload
- Normal levels
 - CMQCC considers anything <100 pg/ml is normal
 - Cardiologists typically use >500 pg/ml as indicative of heart failure
 - BNP levels are higher predictor value of cardiomegaly compared to chest x ray
 - CMQCC (2017) pg. 13

What if the BNP is Normal.....

- If the pregnant or post-partum patient has signs of pulmonary edema and the BNP is normal, suggesting lack of congestive heart failure, or pump failure, look for the **ROOT** cause and in this patient population, consider non-cardiogenic pulmonary edema.
- This condition can be found in women who have hypertensive disorders in pregnancy where the vessels are “leaky” and fluid escapes from within the confines of the vessels and escapes to surrounding tissues. Therefore, even if the BP is elevated, the patient may have decreased intravascular volume.



Is the root cause of pulmonary edema from pump failure of the heart (cardiogenic) or leaky vessels related to hypertensive disorders of pregnancy?????

A Great Podcast

For an in-depth, easy listening explanation of Cardiac Disease in Pregnancy please access the following Podcasts:

<https://www.clinicalconceptsino.com/the-critical-care-obstetrics-podcast/>

CLINICAL CONCEPTS
IN OBSTETRICS
PROACTIVE, NOT REACTIVE

The Critical Care Obstetrics Podcast
Peripartum Cardiomyopathy - The Fundamentals

03:16 | 14:37

SEASON 2, EPISODE 1

This block shows a podcast player interface for the episode 'Peripartum Cardiomyopathy - The Fundamentals'. It includes the logo for Clinical Concepts in Obstetrics, a pause button, the podcast title, a waveform visualization, and the episode duration (03:16) and total season length (14:37). The episode is identified as Season 2, Episode 1.

CLINICAL CONCEPTS
IN OBSTETRICS
PROACTIVE, NOT REACTIVE

The Critical Care Obstetrics Podcast
Cardiac Disease in Pregnancy: Kick Off Episode

00:00 | 18:45

10 1x 30

SEASON 2, EPISODE 2

This block shows a podcast player interface for the episode 'Cardiac Disease in Pregnancy: Kick Off Episode'. It includes the logo for Clinical Concepts in Obstetrics, a play button, the podcast title, a waveform visualization, and the episode duration (00:00) and total season length (18:45). It also features playback controls for 10-second rewind, 1x speed, and 30-second fast forward. The episode is identified as Season 2, Episode 2.

CLINICAL CONCEPTS
IN OBSTETRICS
PROACTIVE, NOT REACTIVE

The Critical Care Obstetrics Podcast
Cardiac Disease in Pregnancy: A Review of the Fundamentals

00:00 | 24:45

10 1x 30

This block shows a podcast player interface for the episode 'Cardiac Disease in Pregnancy: A Review of the Fundamentals'. It includes the logo for Clinical Concepts in Obstetrics, a play button, the podcast title, a waveform visualization, and the episode duration (00:00) and total season length (24:45). It also features playback controls for 10-second rewind, 1x speed, and 30-second fast forward.

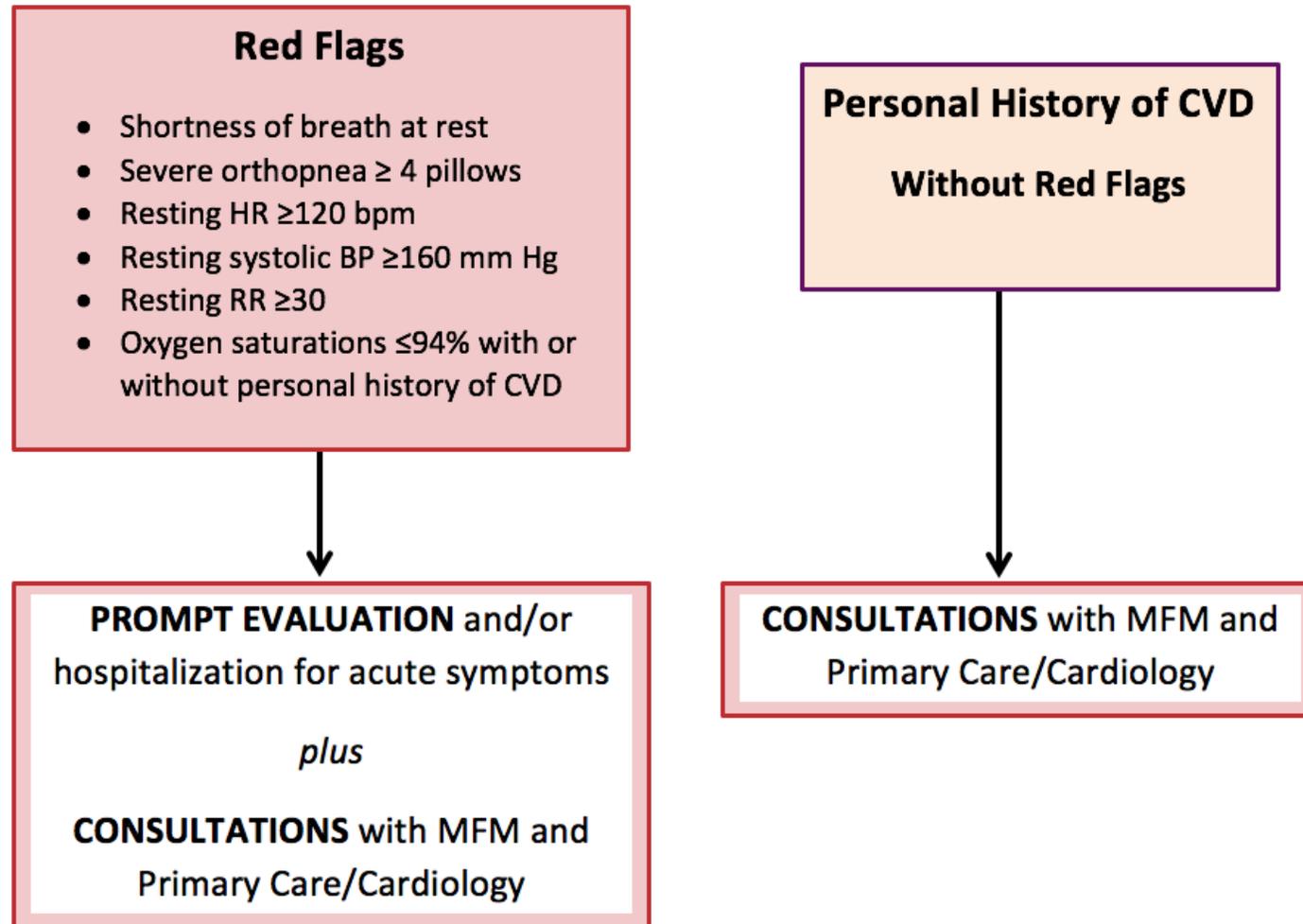
Prompts for further assessment CVD in Pregnancy and Postpartum

- When a pregnant or postpartum woman presents with complaints of shortness of breath, ask if she has experienced:
 - Worsened level of exercise tolerance
 - Difficulty performing activities of daily living; Unexpected fatigue
 - Symptoms that are deteriorating, especially chest pain, palpitations, or dizziness
 - New onset of cough or wheezing
 - Leg edema and if it is improving or deteriorating
 - Inability to lay flat; if this is a change; how many pillows she uses to sleep
 - Failure to lose weight or unusual weight gain, and how much
 - A history of cardiac or pulmonary conditions
 - A history of substance abuse and/or cigarette use
 - Or has been seen by other providers or in other Emergency Departments for these complaints.
 - Especially if she is post partum

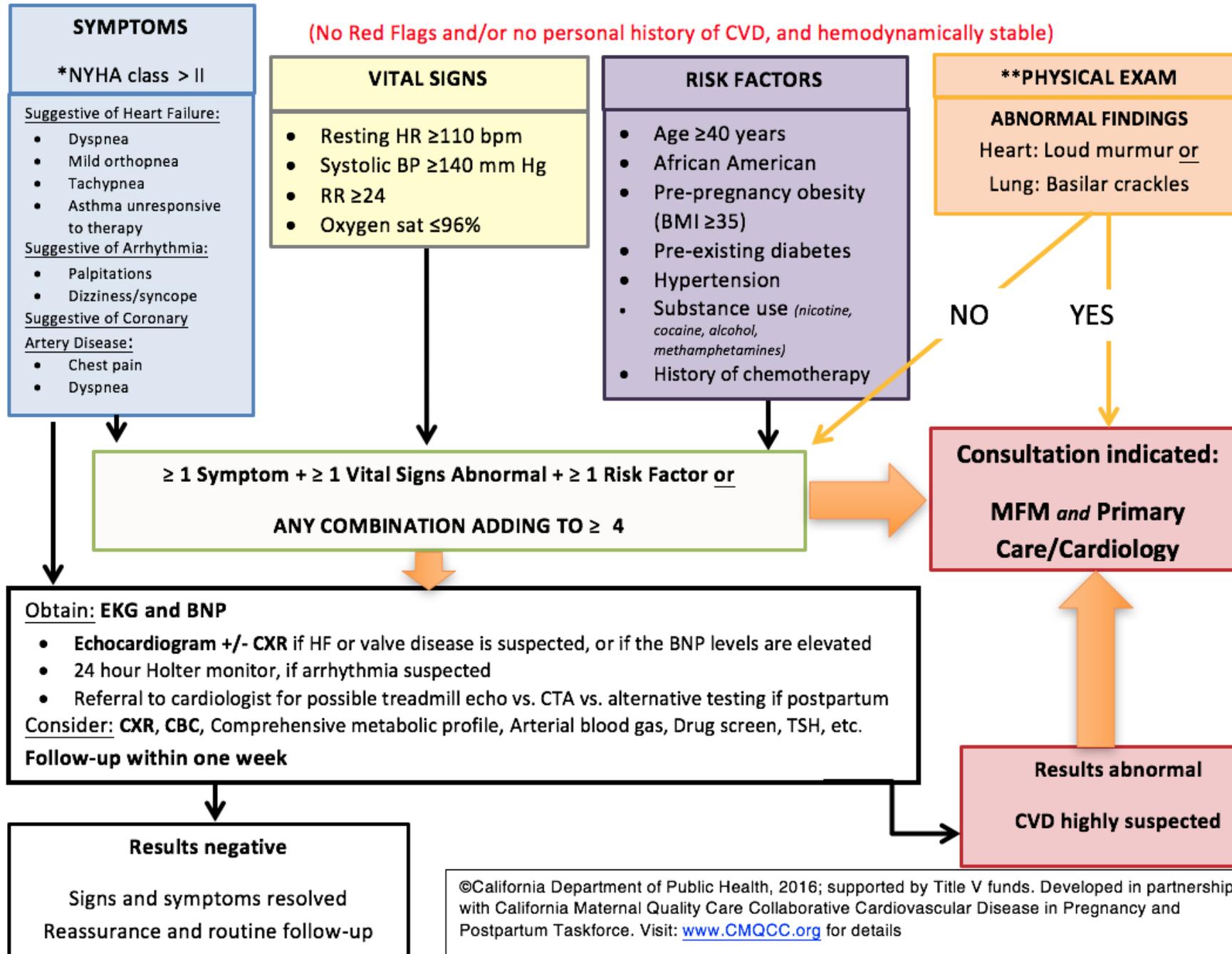
Normal Pregnancy/Postpartum	Cardiac Disease
Chest discomfort	Chest discomfort with myocardial ischemia
Dyspnea	Severe dyspnea limiting activity; paroxysmal nocturnal dyspnea
Orthopnea	Progressive orthopnea
Palpitations	Cardia arrhythmia
Fatigue	Fatigue with chest pain and syncope
Dizzy spells	Dizziness in conjunction with other signs and symptoms
Syncope	Syncope with exertion/activity
Systolic murmurs	Loud, harsh, systolic murmurs, diastolic murmurs, grade III intensity
Dependent edema	Both dependent and nondependent edema
Rales in lower lungs	Rales that don't clear with deep inspiration; hemoptysis
Visible neck veins	Persistent neck vein distention
Cardiomegaly	Cardiomegaly plus hepatomegaly and ascites

(Mattson & Smith, 2016)

CVD Assessment Algorithm For Pregnant and Postpartum Women



CARDIOVASCULAR DISEASE ASSESSMENT IN PREGNANT and POSTPARTUM WOMEN



Key points

Symptoms related to physiologic changes of pregnancy should be improving in the postpartum period.

Any visits to Emergency Department for dyspnea should raise suspicion for cardiovascular disease.

Women of childbearing age should be questioned about recent pregnancies, in addition to their last menstrual period (LMP).

Key points

Postpartum dyspnea or new onset cough is concerning for cardiovascular disease

New onset asthma is rare in adults

Bilateral crackles on lung examination are most likely associated with Congestive Heart Failure (CHF)

Improvement of dyspnea with bronchodilators does not confirm the diagnosis of asthma, as CHF may also improve with bronchodilators. Likewise, a lack of response to bronchodilators should prompt the entertainment of a diagnosis other than asthma.

CVD & Future Risk Discharge Education

Signs & Symptoms of Heart Disease

During Pregnancy and Postpartum

Heart disease is the leading cause of death among women in the U.S. who are pregnant or gave birth in the last 5 months (postpartum).

Symptoms to watch for in late pregnancy and up to five months postpartum:



NOTE: While some of these symptoms are common in late pregnancy, they may be a sign of heart disease especially if they are severe and do not go away after treatment.



If you have any of these symptoms and they don't go away:

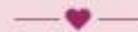
- ♥ Contact your OB, midwife, family medicine doctor, or your primary care provider
- ♥ Describe your symptoms clearly and explain how sick you feel
- ♥ If your symptoms arise postpartum, be sure to tell the provider that you recently had a baby
- ♥ If your provider says your symptoms are normal, ask what symptoms should cause you to call or come back



Go to the Emergency Department

If you have persistent chest pain or severe shortness of breath, or otherwise feel extremely sick. If possible, take someone with you.

Any woman can develop heart disease in pregnancy or postpartum, but you are at **higher risk** if you:



Have prior heart disease



Are over 40 years old



Have preeclampsia or high blood pressure (hypertension)



Are African-American (4X greater risk and 8-10X more likely to die of heart disease)



Are obese



Bottom line

LONG TERM CONSEQUENCES OF PREECLAMPSIA

If you had complications in pregnancy, you can lower your risk:

New Mothers



See your health care provider 3-6 months after birth to check your overall physical health. Discuss your pregnancy and any complications you experienced.



Get a copy of your pregnancy and post-delivery medical records to share with your providers for the rest of your life. Don't wait – records may be destroyed.



Breastfeed as long as possible. Women whose total lifetime breastfeeding is 6-12 months were 10% less likely to develop heart disease (and it's good for baby too).

If you had one of these complications, speak with your provider when planning your next pregnancy to optimize your health.



REMEMBER!

It's a **MYTH** that **ALL** pregnancy related high blood pressure and gestational diabetes complications go away after the baby is born!

Get more information and stay heart healthy.
www.cmqcc.org

Mothers With Kids Over One Year



Get annual checkups and be screened for heart disease. At this visit, your provider should check your overall physical condition.



Ask your provider what your test results mean and how you can lower your heart disease risk.

These screening numbers show desirable results.

Blood Pressure	< 120/80 mm hg	Fasting Blood Glucose	< 100 mg/dl
Total Cholesterol	< 200 mg/dl	Body Mass Index	< 25 kg/m ²



Try a mobile app to automatically retrieve and store your medical records, so you always have them handy.



Eat healthy! A diet low in salt, fat, cholesterol and sugar can help you lower your risk for obesity, diabetes and heart disease.



Maintain a healthy weight. Body Mass Index (BMI) is an estimate of body fat based on height and weight. Less than 25 is healthy.



Get active for 30 minutes a day, or as recommended by your provider.



If you smoke, make a plan to quit. Your provider may have resources to support you.



Take medications as directed. Sometimes a healthy diet and exercise is not enough to lower your risk for heart disease, so your provider may prescribe medications to help.



SISTER TO SISTER
The Women's Heart Health Foundation



(CMQCC, 2017)

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PREECLAMPSIA foundation

HEALTH INFORMATION GET SUPPORT RESEARCH NEWS & VIEWS GET INVOLVED CARE PROVIDERS ADVOCACY

Signs and Symptoms

- ▶ HEADACHE
- ▶ HIGH BLOOD PRESSURE
- ▶ CHANGES IN VISION
- ▶ SWELLING

GET INVOLVED

JOIN OUR MAILING LIST

JOIN THE REGISTRY

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SHARE YOUR STORY

BECOME A GEM

Be a G.E.M.
Give Every Month TO SAVE LIVES OF MOTHERS & BABIES
Become a GEM Today

JOIN A PROMISE WALK FOR PREECLAMPSIA NEAR YOU!

Did you know that preeclampsia can impact your long-term health? Help us raise awareness! Register today!
www.promisewalk.org

Resources

CMQCC
California Maternal
Quality Care Collaborative

FOR FAMILIES CMQCC Accounts Login Contact Us

ABOUT CMQCC MATERNAL DATA CENTER QI INITIATIVES RESEARCH RESOURCES & TOOLKITS

TOOLKITS	Toolkits
Cardiovascular Disease Toolkit	<p>CMQCC Maternal Quality Improvement Toolkits aim to improve the health care response to leading causes of preventable death among pregnant and postpartum women as well as to reduce harm to infants and women from overuse of obstetric procedures. All Toolkits include a compendium of best practice tools and articles, care guidelines in multiple formats, hospital-level implementation guide, and professional education slide set. The Toolkits are developed in partnership with key experts from across California, representing the diverse professionals and institutions that care for pregnant and postpartum women. CMQCC is grateful to the volunteers who make this work possible.</p> <p>Maternal Quality Improvement Toolkits:</p> <ul style="list-style-type: none"> Improving Health Care Response to Maternal Venous Thromboembolism, 2018 Improving Health Care Response to Cardiovascular Disease in Pregnancy and Postpartum, 2017 Toolkit to Support Vaginal Birth and Reduce Primary Cesareans and Implementation Guide, 2016 Improving Health Care Response to Obstetric Hemorrhage, V2.0, 2015 (V1.0 released in 2010) Improving Health Care Response to Preeclampsia, 2014 Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age, 2010 (Licensed to March of Dimes)
Early Elective Deliveries Toolkit	
OB Hemorrhage Toolkit, V2.0	
Preeclampsia Toolkit	
Supporting Vaginal Birth and Reducing Primary Cesareans Toolkit	
Venous Thromboembolism Toolkit	
WEBINARS	
RESOURCE LIBRARY	

Contact Us

If you are having problems downloading our toolkit, please try using another internet browser. Our website functions best in Chrome, Firefox or Safari.

If you are still unable to download the toolkit or have further questions, please contact CMQCC Admin.

Quality Improvement Quick Links

Check out our resource guides for the following quality improvement initiatives:

- Obstetric hemorrhage
- Preeclampsia
- Supporting Vaginal Birth



Dissolved in 2021 and has been replaced by **AIM ALLIANCE FOR INNOVATION ON MATERNAL HEALTH**



Patient's Story



[Peripartum cardiomyopathy survivor, Zuleyma Santos, shares her story of survival and recovery \(youtube.com\)](#)



Through Education, Recognition and Listening to
Our Patients!

MHS CUSTOM PATIENT EDUCATION

Methodist Health System

Preeclampsia

Preeclampsia is a serious condition related to high blood pressure. It can develop during pregnancy and/or postpartum (post-delivery). Regardless of preexisting health conditions, pregnant women or those who have recently had a baby can develop this condition. Preeclampsia can be mild or severe, resulting in health risks for you and your baby if you are pregnant.

What are the risks?

If preeclampsia is untreated, you are at an increased risk of a seizure, stroke, organ damage or death. During pregnancy, you are at risk of premature delivery.

After Delivery

Even if you were not diagnosed with preeclampsia during pregnancy, you are still at risk of developing this condition for up to 6 weeks postpartum.

Signs and symptoms of preeclampsia

- High blood pressure (greater than 140/90)
- Headaches (unrelieved by over the counter medication)
- Stomach pain - especially on your right side
- Vision problems (blurry, seeing spots/sparkles)
- Nausea and vomiting
- Increased swelling in hands and face
- Rapid weight gain (more than 3 pounds in 3 days).

Treatment for Preeclampsia

During pregnancy and postpartum, preeclampsia may be treated with bed rest and/or medications. Magnesium sulfate may be given through an IV in the hospital to prevent seizures before or after delivery.

What to expect after discharge?

- Follow up with your provider 3-7 days postpartum.
- You may need to see your provider more often over the next several weeks.
- It is important to keep all follow-up appointments.
- If you are prescribed medication, take it exactly as directed. Your provider will tell you when you can stop taking the medication.
- Weigh yourself at the same time each day. If you have gained more than 3 pounds in 3 days, contact your provider. Take the record of your daily weights with you to your appointments.
- You may be asked to monitor your blood pressure at home. Call your provider if your top blood pressure number (systolic) is equal to or greater than 140 or your bottom blood pressure number (diastolic) is equal to or greater than 90.

When to Call your Doctor

- If you have any signs or symptoms of preeclampsia, contact your OB provider immediately.

Recognizing these warning signs could save your life.

Go to the Emergency Department

- If you cannot reach your OB provider and you are experiencing signs or symptoms of preeclampsia.
- If your top blood pressure number (systolic) is equal to or greater than 160 or your bottom blood pressure number (diastolic) is equal to or greater than 110.
- You are experiencing shortness of breath.
- You have had a seizure.

Tips for talking with your provider:

- Clearly describe your symptoms and explain how sick you feel.
- Report how long you have had the symptoms.
- Tell them what makes the symptoms better or worse.
- Let them know if you have been seen for this issue in the past.
- If your symptoms occur postpartum, make sure you tell the provider you have recently had a baby.
- If the provider feels your symptoms do not require treatment at this time; ask when you should call again or return to the clinic/hospital for evaluation.

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Methodist Health System

Pregnancy and Heart Disease

Women who develop complications during pregnancy have a higher risk of developing heart disease later in life. All pregnancy related complications may not go away after the baby is born.

Pregnancy Complications that Increase the Risk of Heart Disease

- **High blood pressure during pregnancy (such as gestational hypertension, preeclampsia, eclampsia, and HELLP syndrome)** increases the future risk of heart disease, chronic hypertension, heart failure, stroke, and kidney disease.
- **Gestational diabetes during pregnancy** increases the risk of developing Type II diabetes. Gestational diabetes is also linked to increased cardiovascular risk later in life.
- **Preterm birth at less than 37 weeks and preeclampsia** significantly increases the risk of heart disease.

How to Protect Your Heart Post-Baby

- Discuss your pregnancy history
- Schedule an appointment with your primary health care provider 3 months after birth to check your overall health. This is in addition to your routine OB postpartum visit.
- Get a copy of your medical records.
- Talk to your health care provider about any pregnancy complications you had and how they may affect your heart.
- Talk to your provider about ways to prevent complications in future pregnancies.

Be proactive with screenings

- Schedule a yearly physical with your primary care provider.
- Get screened for heart disease at each yearly physical.
- Common heart disease screening includes blood pressure reading, fasting blood sugar, total cholesterol, and body mass index (BMI).
- Ask your health care provider to explain your test results and ask how you can lower your risk of heart disease.

Live a healthy lifestyle

- **Eat healthy.** A diet low in salt, fat, cholesterol, and sugar will help lower your future health risks.
- **Exercise.** Be active for 30 minutes each day. A walk a day goes a long way.
- **Maintain a healthy body weight.** A body mass index (BMI) of less than 25 will decrease your health risks.
- **Don't smoke.** If you smoke ask your health care provider about resources to help you quit.
- **Take prescribed medications as instructed.** Sometimes medications are needed to lower your risk of heart disease, in combination with a healthy diet and exercise.

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ACOG COMMITTEE OPINION #736 “OPTIMIZING POST-PARTUM CARE”

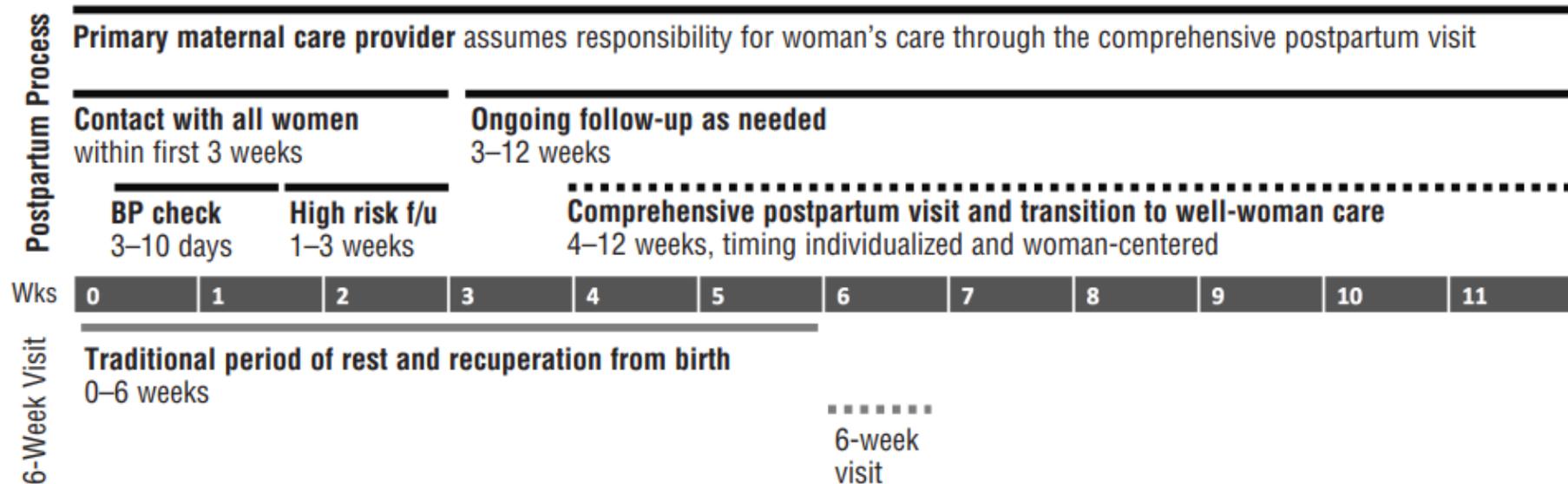


Figure 1. Proposed paradigm shift for postpartum visits. The American College of Obstetricians and Gynecologists’ Presidential Task Force on Redefining the Postpartum Visit and the Committee on Obstetric Practice propose shifting the paradigm for postpartum care from a single 6-week visit (bottom) to a postpartum process (top). Abbreviations: BP, blood pressure; f/u, follow-up. ↩

RESOURCES



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Learn the urgent maternal warning signs. You could help save her life.



- ### What's New
- [Allyson Felix PSA: Not Alone](#)— Watch this new video.
 - [Urgent Maternal Warning Signs Poster](#)—Available in 17 Languages.
 - [Allyson Felix](#)—Joins CDC's Hear Her campaign to share her story and help educate women and all who support them about the urgent warning signs of pregnancy-related complications.

SUGGESTED PATIENT EDUCATION TO BE POSTED IN THE EMERGENCY ROOM



Tell us if you
ARE PREGNANT *or*
HAVE BEEN PREGNANT
within the past 6 weeks



Come to the front of the line if you have:

- ▶ Persistent headache
- ▶ Visual change (floaters, spots)
- ▶ History of preeclampsia
- ▶ Shortness of breath
- ▶ History of high blood pressure
- ▶ Chest pain
- ▶ Heavy bleeding
- ▶ Weakness
- ▶ Severe abdominal pain
- ▶ Confusion
- ▶ Seizures
- ▶ Fevers or chills
- ▶ Swelling in hands or face

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