



Cardiac Lecture #3: Cardiomyopathy

December 6, 2022

Updates



- Next Maternal Webinar January 3rd

Topic: *Acute MI/Arrhythmias* | Speaker: Stacey Westerman, MD

- Data Submission via Survey 123: Severe Hypertension & Cardiac Conditions

- Celebrating facility wins – Severe HTN initiative and Health Equity

- GaPQC website



Lecture Recordings

Lectures 2022



- March 1, 2022 - GaPQC Kick-Off Cardiac Education Webinar
- September 6, 2022 - Intro Lecture: Building a Cardio Ob Team
- October 4, 2022 - Lecture 1: Cardiac Physiology
- November 1, 2022 - Lecture 2: Cardiac Warning Signs
- December 6, 2022 - Lecture 3: Cardiomyopathy

[Open GaPQC Maternal Youtube Playlist](#)

Lectures 2023



- January 3, 2023 – Lecture 4: Acute MI/Arrhythmias
- February 7, 2023 – Lecture 5: Congenital Cardiac Lesions
- March 7, 2023 – Lecture 6: Valvular Heart Disease
- May 2, 2023 – Lecture 7: Pulmonary Hypertension
- June 6, 2023 – Lecture 8: Ob Anesthesia and L&D Considerations

[Open GaPQC Maternal Youtube Playlist](#)

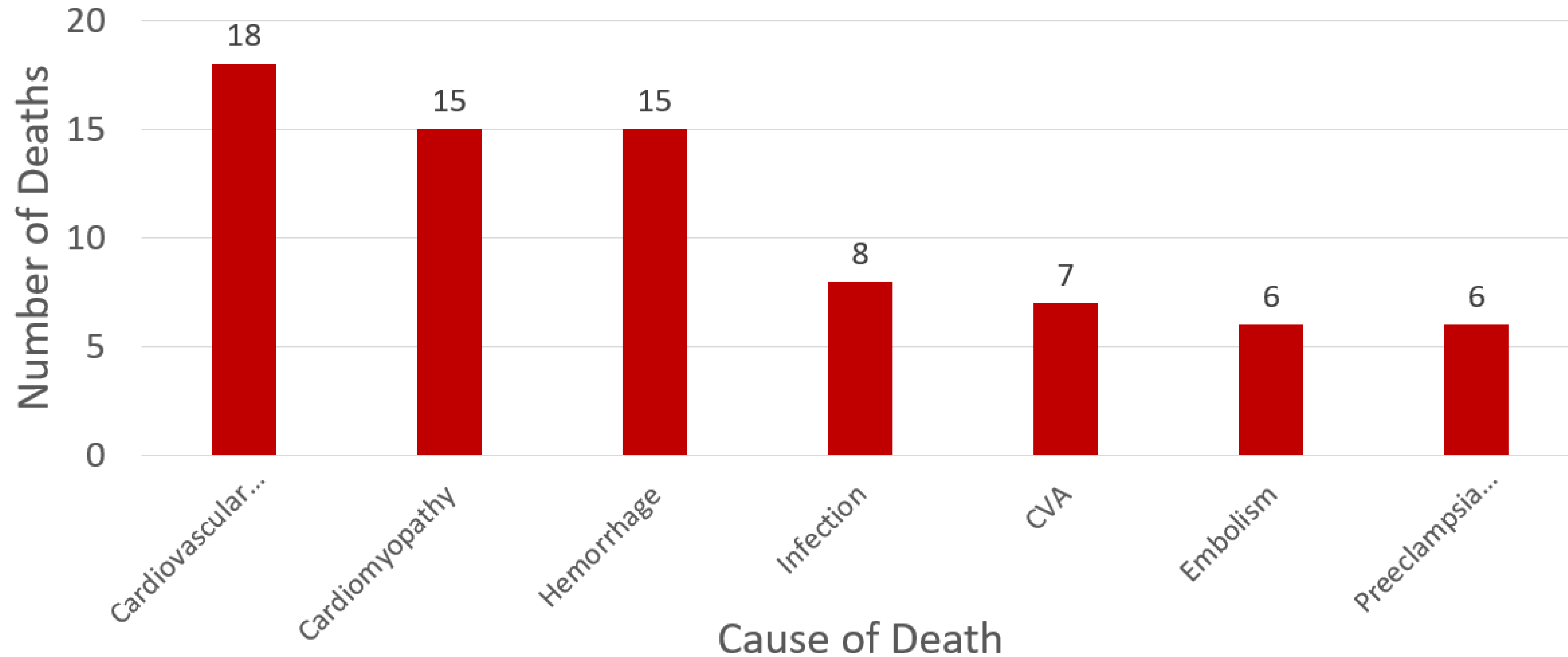
Lecture Presentations

March 1, 2022 - GaPQC Kick-Off Cardiac Education Webinar (pdf)	<u>Download</u>
September 6, 2022 - Intro Lecture: Building a Cardio-Ob Team (pdf)	<u>Download</u>
October 4, 2022 - Lecture 1: Cardiac Physiology (pdf)	<u>Download</u>
November 1, 2022 - Lecture 2: Cardiac Warning Signs (pdf)	<u>Download</u>

Leading Causes of Pregnancy-Related Deaths



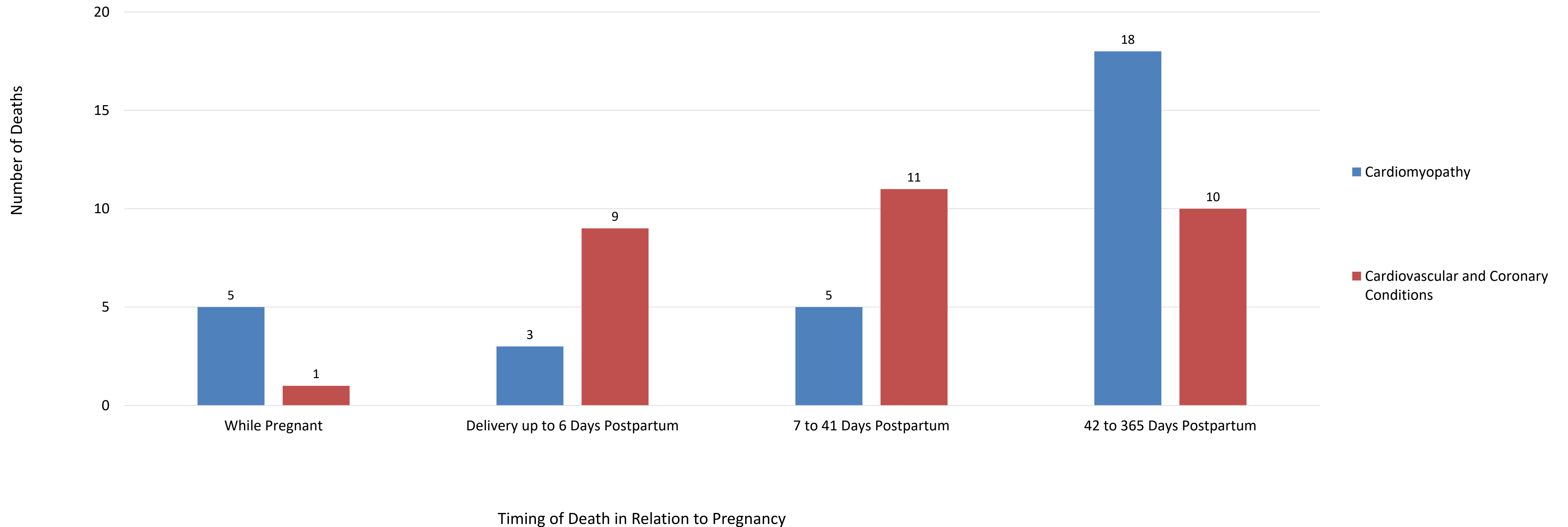
Georgia, 2015-2017





Timing of Pregnancy-Related Maternal Deaths Caused by a Cardiac Condition

Georgia, 2012-2017
(N=62)



Key Driver Diagram: Maternal Cardiac Conditions

GOAL:

To reduce severe morbidity & mortality related to maternal cardiac conditions in Georgia.

SMART AIM:

By 02/6/2026, **National Wear Red Day**, to reduce harm related to existing and pregnancy related cardiac conditions through the 4th trimester by **20%**.

Key Drivers

Readiness: EVERY UNIT - Implementation of standard processes for optimal care of cardiac conditions in pregnancy and post-partum.

Recognition & Prevention: EVERY PATIENT - Screening and early diagnosis of cardiac conditions in pregnancy and post-partum.

Response: EVERY UNIT - Care management for every pregnant or postpartum woman with cardiac conditions in pregnancy and post-partum.

Reporting/System Learning: EVERY UNIT - Foster a culture of safety and improvement for care of women with cardiac conditions in pregnancy and post-partum.

Respectful, Equitable, and Supportive Care — EVERY UNIT/PROVIDER/TEAM MEMBER - Inclusion of the patient as part of the multidisciplinary care team.

INTERVENTIONS

- Train all obstetric care providers to perform a basic Cardiac Conditions Screen.
- Establish a protocol for rapid identification of potential pregnancy-related cardiac conditions in all practice settings to which pregnant and postpartum people may present.
- Develop a patient education plan based on the pregnant and postpartum person's risk of cardiac conditions.
- Establish a multidisciplinary "Pregnancy Heart Team" or consultants appropriate to their facility's designated Maternal Level of Care to design coordinated clinical pathways for people experiencing cardiac conditions in pregnancy and the postpartum period. S1**
- Establish coordination of appropriate consultation, co-management and/or transfer to appropriate level of maternal or newborn care.
- Develop trauma-informed protocols and training to address health care team member biases to enhance quality of care
- Develop and maintain a set of referral resources and communication pathways between obstetric providers, community-based organizations, and state and public health agencies to enhance quality of care. *

- Obtain a focused pregnancy and cardiac history in all care settings, including emergency department, urgent care, and primary care.
- In all care environments assess and document if a patient presenting is pregnant or has been pregnant within the past year. S2**
- Assess if escalating warning signs for an imminent cardiac event are present.
- Utilize standardized cardiac risk assessment tools to identify and stratify risk.
- Conduct a risk-appropriate work-up for cardiac conditions to establish diagnosis and implement the initial management plan.

- Facility-wide standard protocols with checklists and escalation policies for management of **cardiac symptoms**.
- Facility-wide standard protocols with checklists and escalation policies for management of people **with known or suspected cardiac conditions**.
- Coordinate transitions of care including the discharge from the birthing facility to home and transition from postpartum care to ongoing primary and specialty care.
- Offer reproductive life planning discussions and resources, including access to a full range of contraceptive options in accordance with safe therapeutic regimens. *
- Provide patient education focused on general life-threatening postpartum complications and early warning signs, including instructions of who to notify if they have concerns, and time and date of a scheduled postpartum visit.**

- For pregnant and postpartum people at high risk for a cardiac event, establish a culture of multidisciplinary planning, admission huddles and post-event debriefs.
- Perform multidisciplinary reviews of serious complications (e.g. ICU admissions for other than observation) to identify systems issues. S4**
- Monitor outcomes and process data related to cardiac conditions, with disaggregation by race and ethnicity due to known disparities in rates of cardiac conditions experienced by Black and Indigenous pregnant and postpartum people. **Process Measures – 1-5**

- Screen for structural and social drivers of health that might impact clinical recommendations or treatment plans and provide linkage to resources that align with the pregnant or postpartum person's health literacy, cultural needs, and language proficiency.
- Engage in open, transparent, and empathetic communication with pregnant and postpartum people and their identified support network to understand diagnoses, options, and treatment plans.
- Include each pregnant or postpartum person and their identified support network as respected members of and contributors to the multidisciplinary care team. *S5**



Charisma Manley, MD
Assistant Professor
Department of Gynecology and Obstetrics
Emory University School of Medicine



CARDIOMYOPATHY

Charisma Manley, MD
Maternal Fetal Medicine
GaPQC LECTURE
December 6, 2022

I HAVE NO FINANCIAL
DISCLOSURES



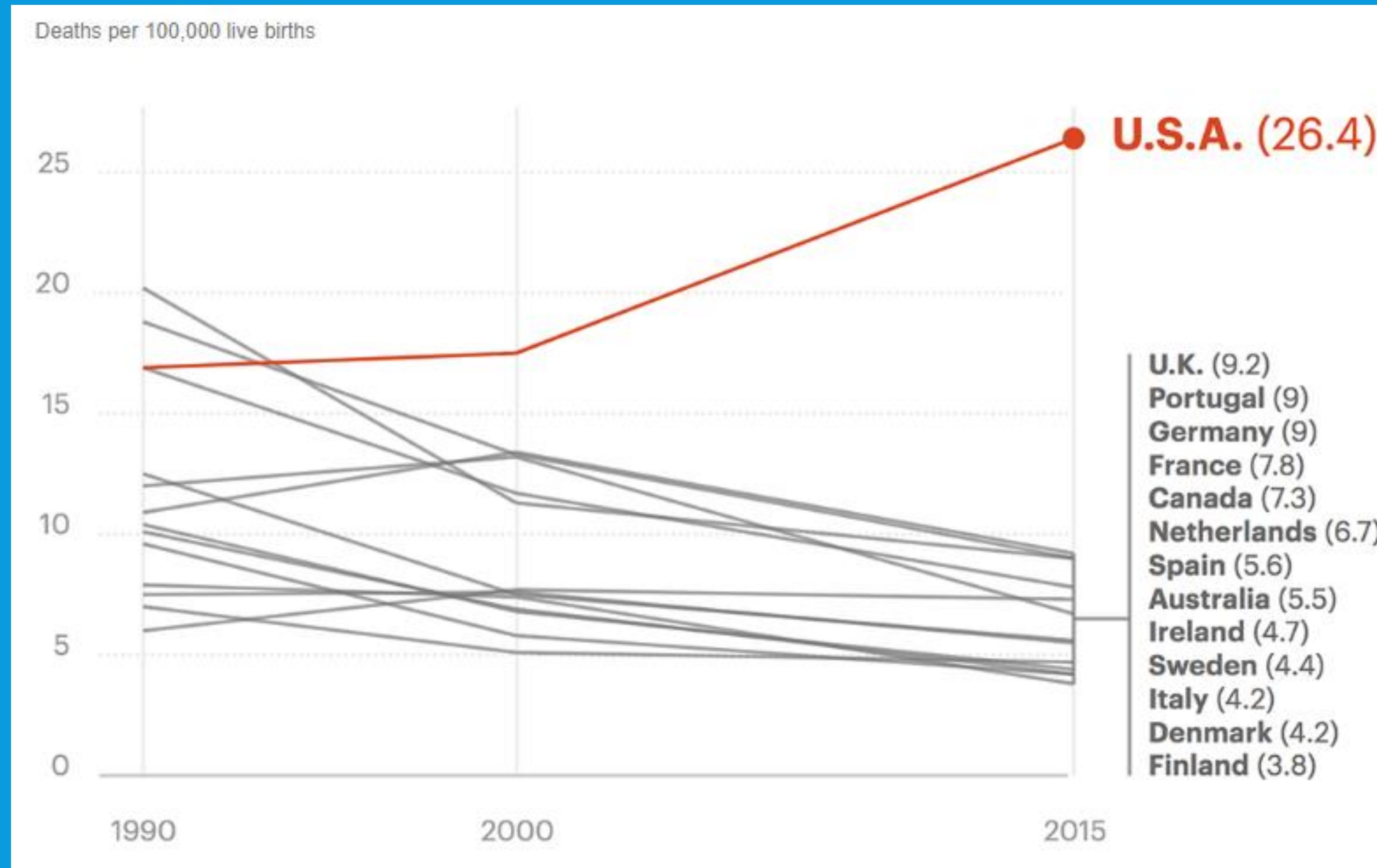
OVERVIEW

- Relevance
- Introduction
- Pregnancy & Heart Changes
- Peripartum Cardiomyopathy
 - Etiology
 - Risk Factors
 - Clinical Manifestations
 - Prevention
 - Treatment
 - Outcomes
 - Future Pregnancies



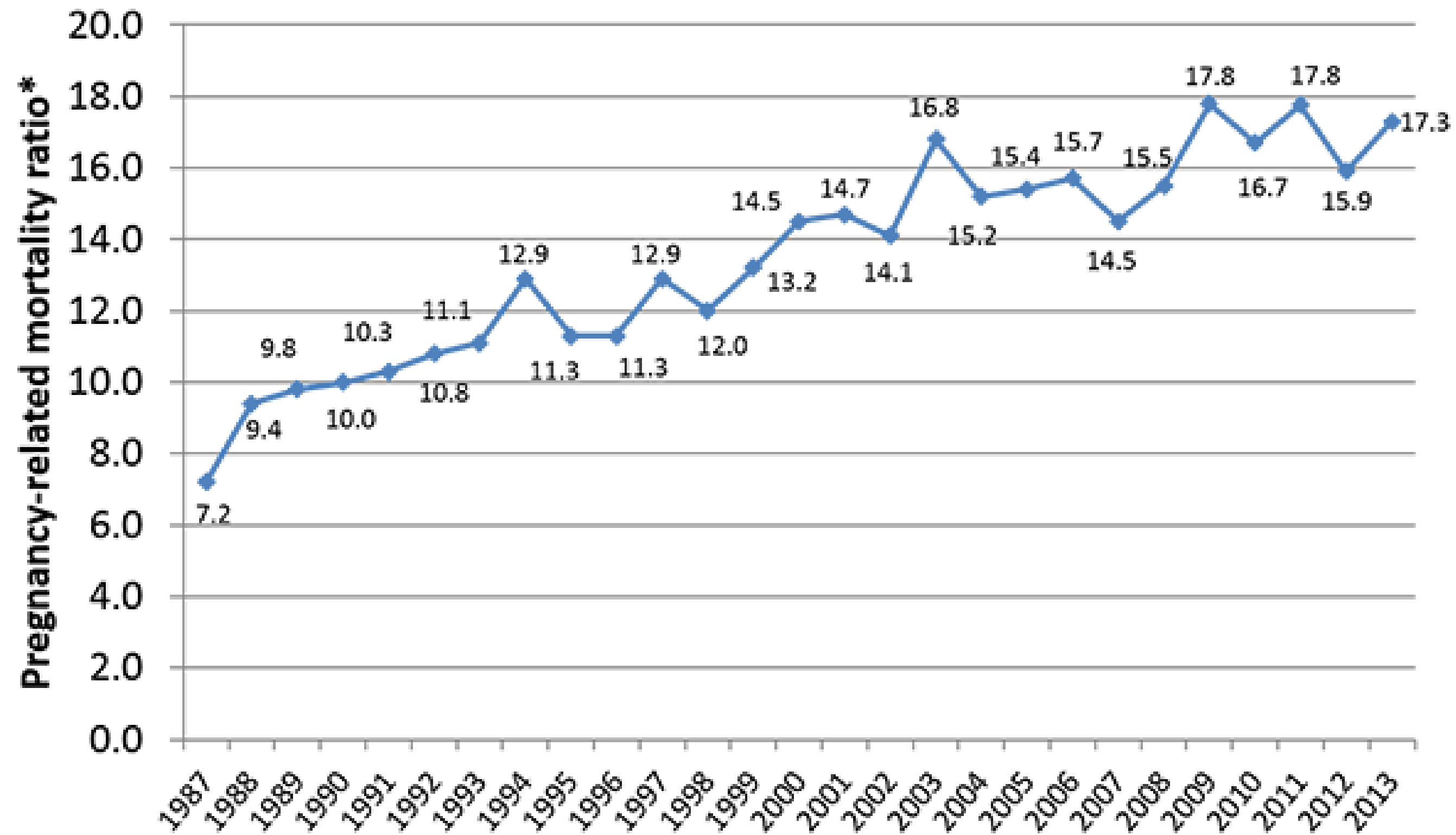
WHY DOES IT MATTER?

GLOBAL MATERNAL MORTALITY



"Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015," *The Lancet*.

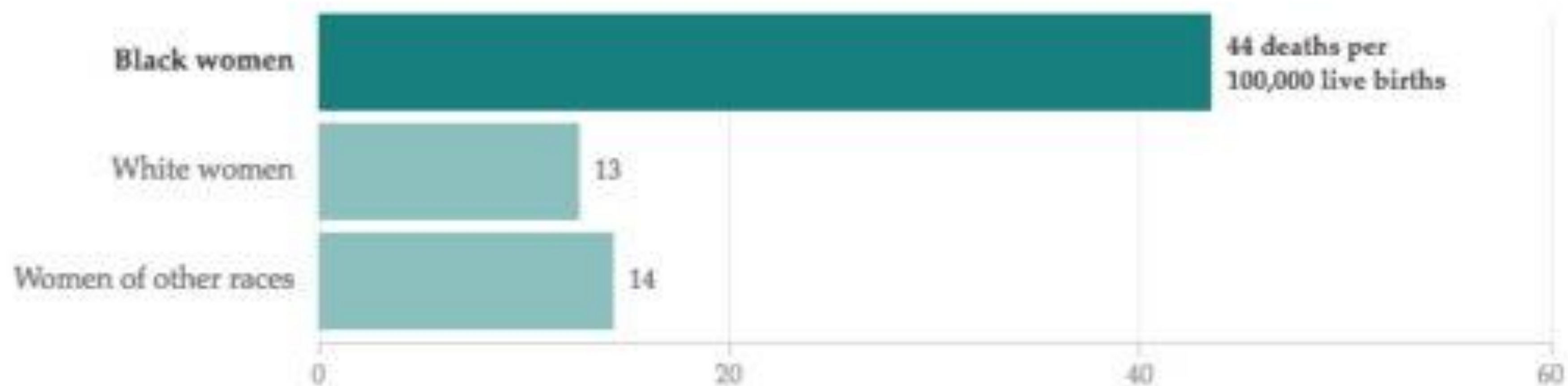
Trends in pregnancy-related mortality in the United States: 1987–2013



*Note: Number of pregnancy-related deaths per 100,000 live births per year.

Black women face significantly higher maternal mortality risk

Maternal deaths per 100,000 live births (2011-2013)



Source: Centers for Disease Control and Prevention

Credit: Alyson Hurt/NPR

GEORGIA: MATERNAL MORTALITY

WHAT YOU SHOULD KNOW:

The Maternal Mortality Review Committee (MMRC) reviews deaths that occur during pregnancy or within a year of the end of pregnancy to determine cause, contributing factors, and to recommend interventions to prevent pregnancy-associated deaths in Georgia.

THE NUMBERS

(2015-2017)

68.9

PREGNANCY-ASSOCIATED DEATHS

PER 100,000 LIVE BIRTHS

25.1

PREGNANCY-RELATED DEATHS

PER 100,000 LIVE BIRTHS

87%

WERE PREVENTABLE PREGNANCY-RELATED

2.3x

BLACK WOMEN
NON-HISPANIC
MORE LIKELY TO DIE FROM PREGNANCY-RELATED CAUSES THAN WHITE WOMEN
NON-HISPANIC

PREGNANCY-ASSOCIATED, BUT NOT RELATED:

A death during pregnancy or within one year of the end of pregnancy due to a cause that is not related to pregnancy.

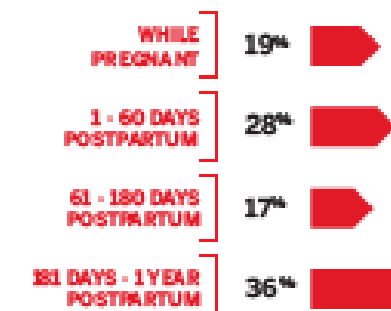
PREGNANCY-RELATED:

A death during pregnancy or within one year of the end of pregnancy from pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

THE LEADING CAUSE OF DEATHS (PREGNANCY-RELATED)

- Cardiovascular / Coronary • Cardiomyopathy • Hemorrhage • Infection
- Cerebrovascular Accidents

PREGNANCY ASSOCIATED DEATHS BY TIMING OF DEATH IN RELATION TO END OF PREGNANCY IN GEORGIA



THE LEADING CAUSES OF DEATH (PREGNANCY-ASSOCIATED, BUT NOT RELATED)



MATERNAL MORTALITY REVIEW COMMITTEE RECOMMENDATIONS

- Georgia should **mandate an autopsy** be performed on all pregnancy-associated deaths.
- Providers, insurance providers, and birthing hospitals **should ensure case management is provided** for women during pregnancy and postpartum.
- Georgia should **extend Medicaid coverage up to one year postpartum**.
- Obstetric providers should **use a validated instrument** for screening perinatal mood and anxiety disorders at the first prenatal visit, in each subsequent trimester, and at the postpartum visit.
- Providers should **initiate pre-pregnancy counseling on all women of reproductive age**, in accordance with the American College of Obstetricians and Gynecologists recommendations to optimize health, address modifiable risk factors, provide education about healthy pregnancy, and family planning counseling.

For more information: www.dph.ga.gov/maternal-mortality



Figure 5. Leading Underlying Causes of Pregnancy-Related Deaths, by Race-Ethnicity

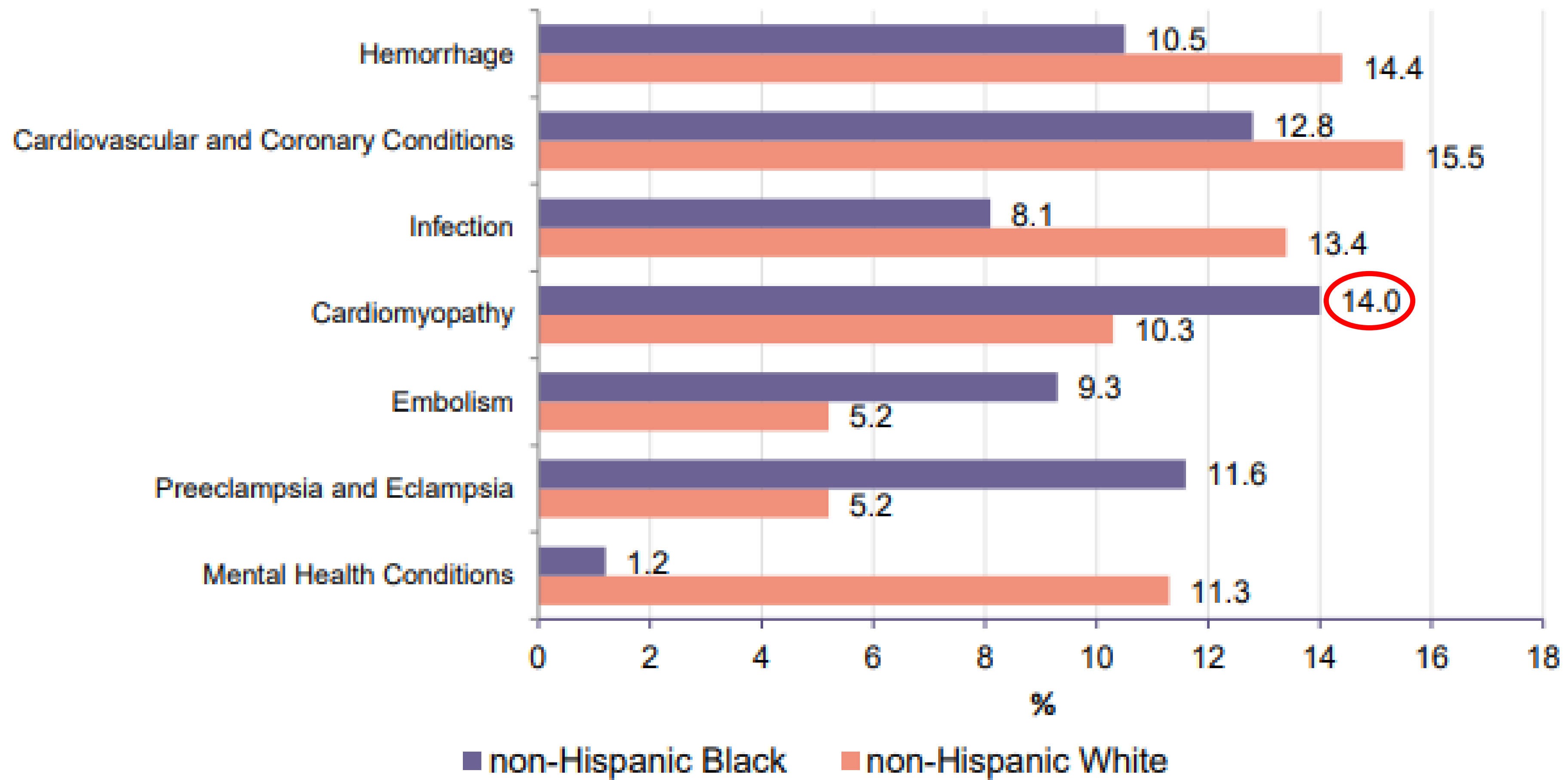


Figure 6. Leading Underlying Causes of Pregnancy-Related Deaths, by Age at Death (in Years)

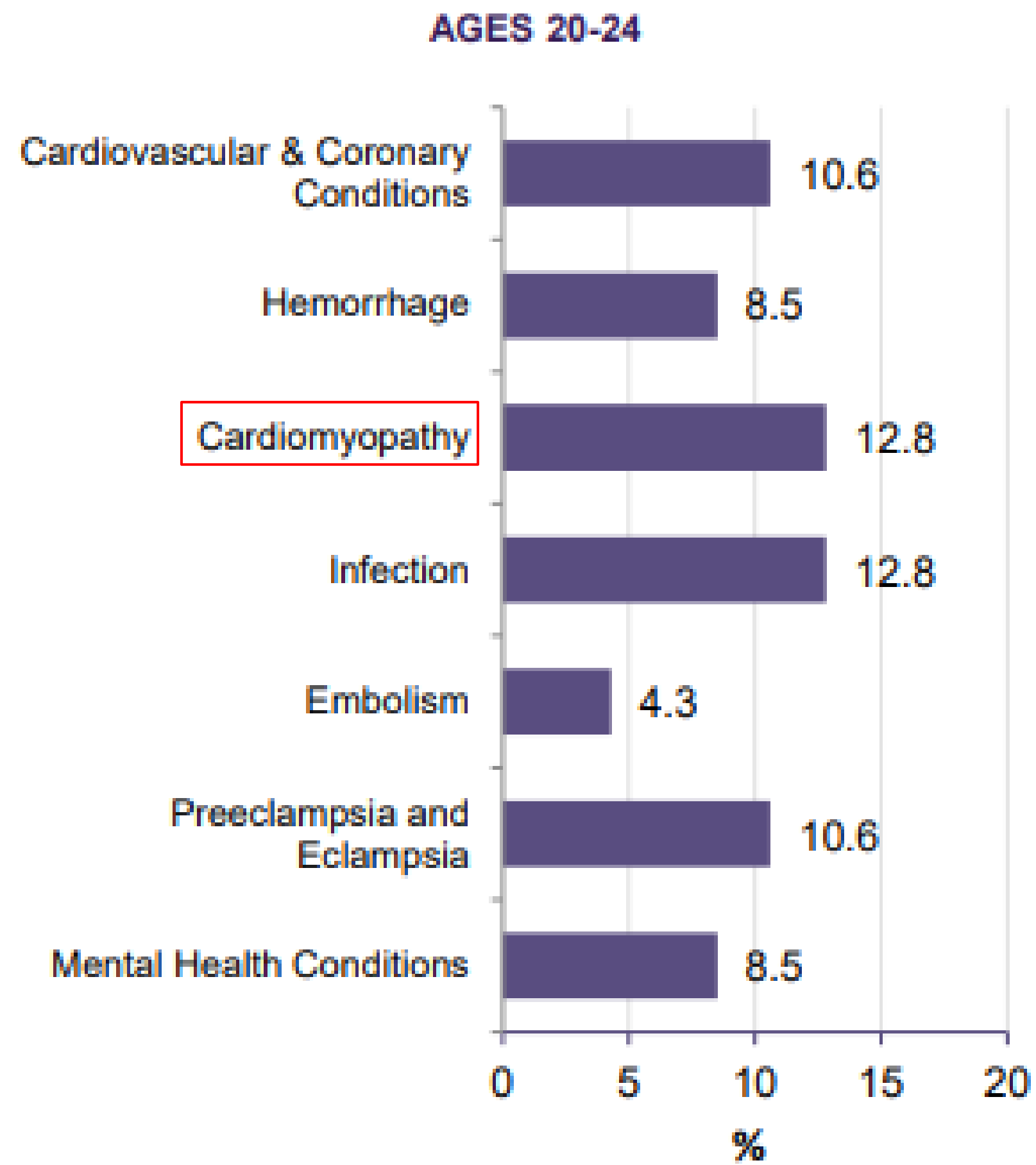
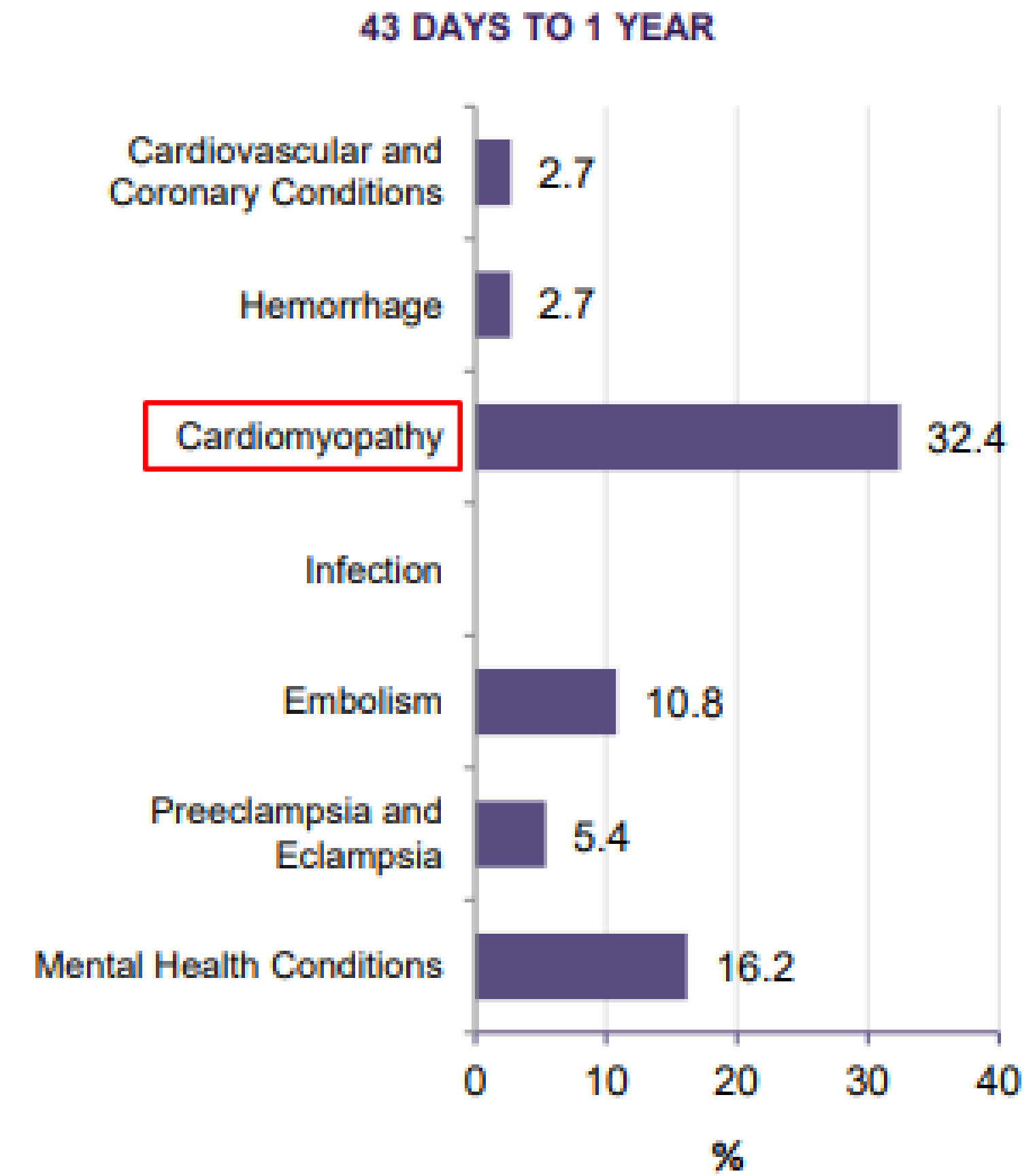


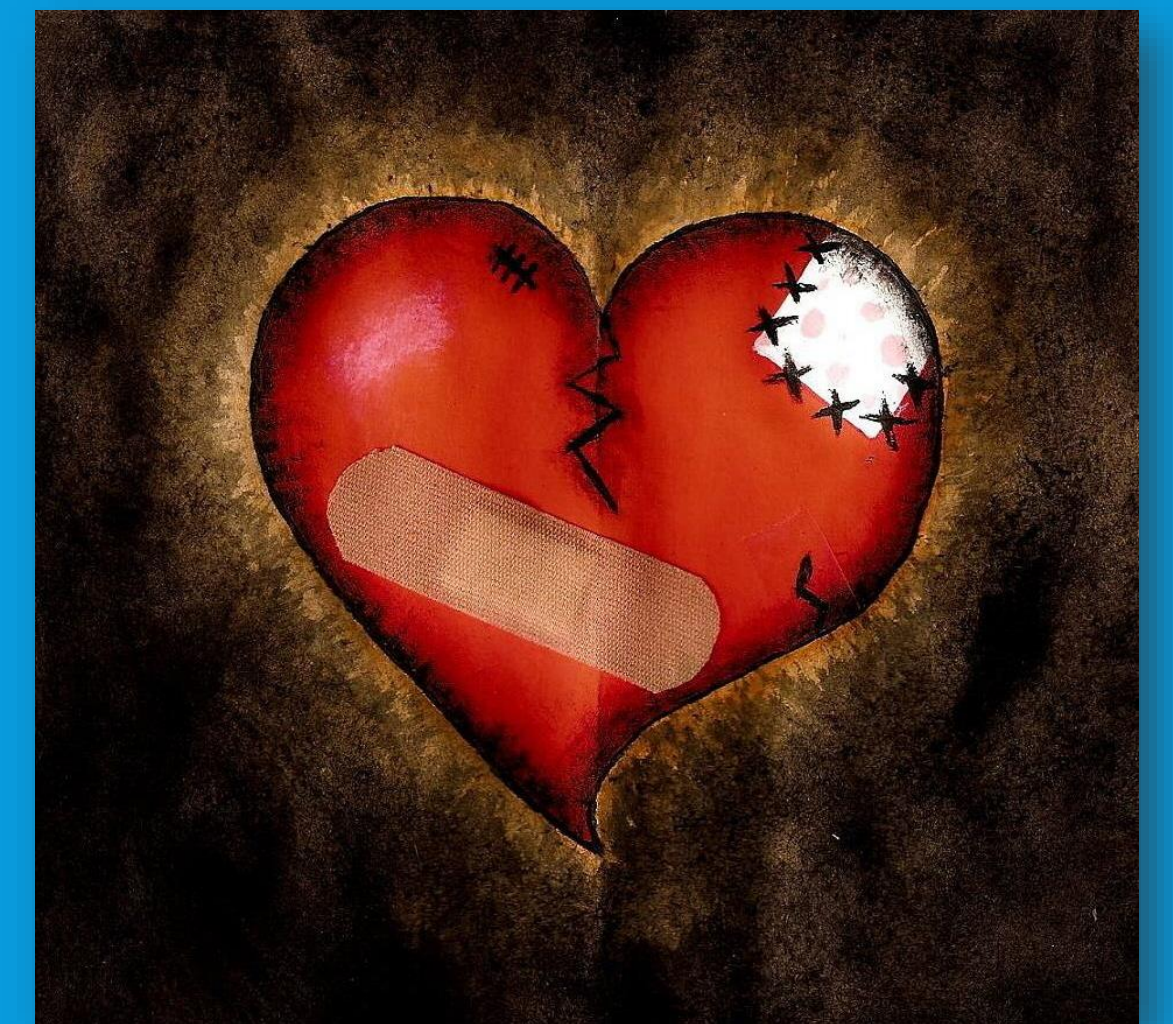
Figure 7. Leading Underlying Causes of Pregnancy-Related Deaths, by Timing of Death in Relation to Pregnancy



INTRODUCTION

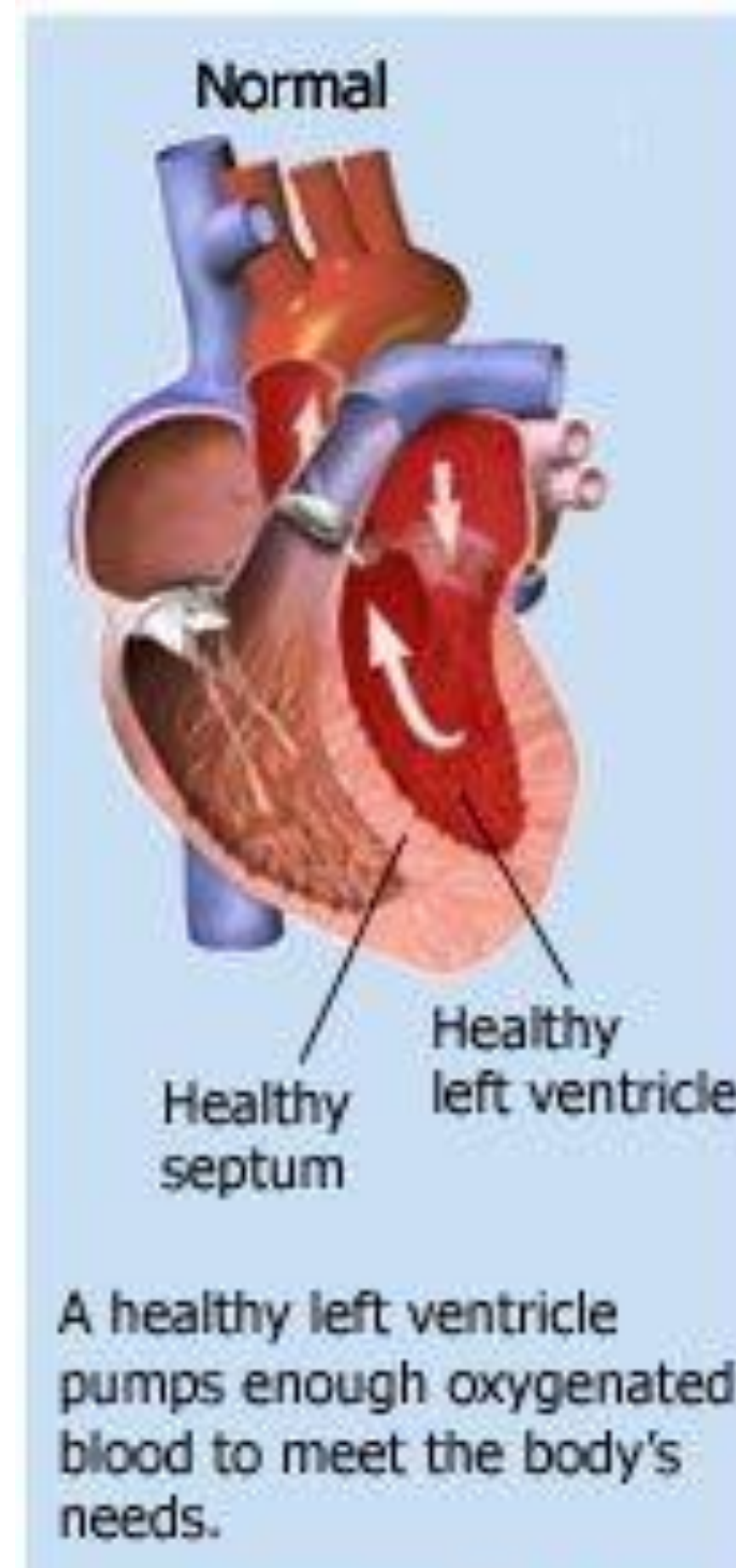
CARDIOMYOPATHY

- What is cardiomyopathy?
- 2008 ESC - A myocardial disorder in which the heart muscle is structurally and functionally abnormal in the absence of coronary artery disease, hypertension, valvular disease and congenital heart disease sufficient to explain the observed myocardial abnormality
- 1980 WHO – Heart Muscle Diseases of unknown cause
- Acquired or Inherited



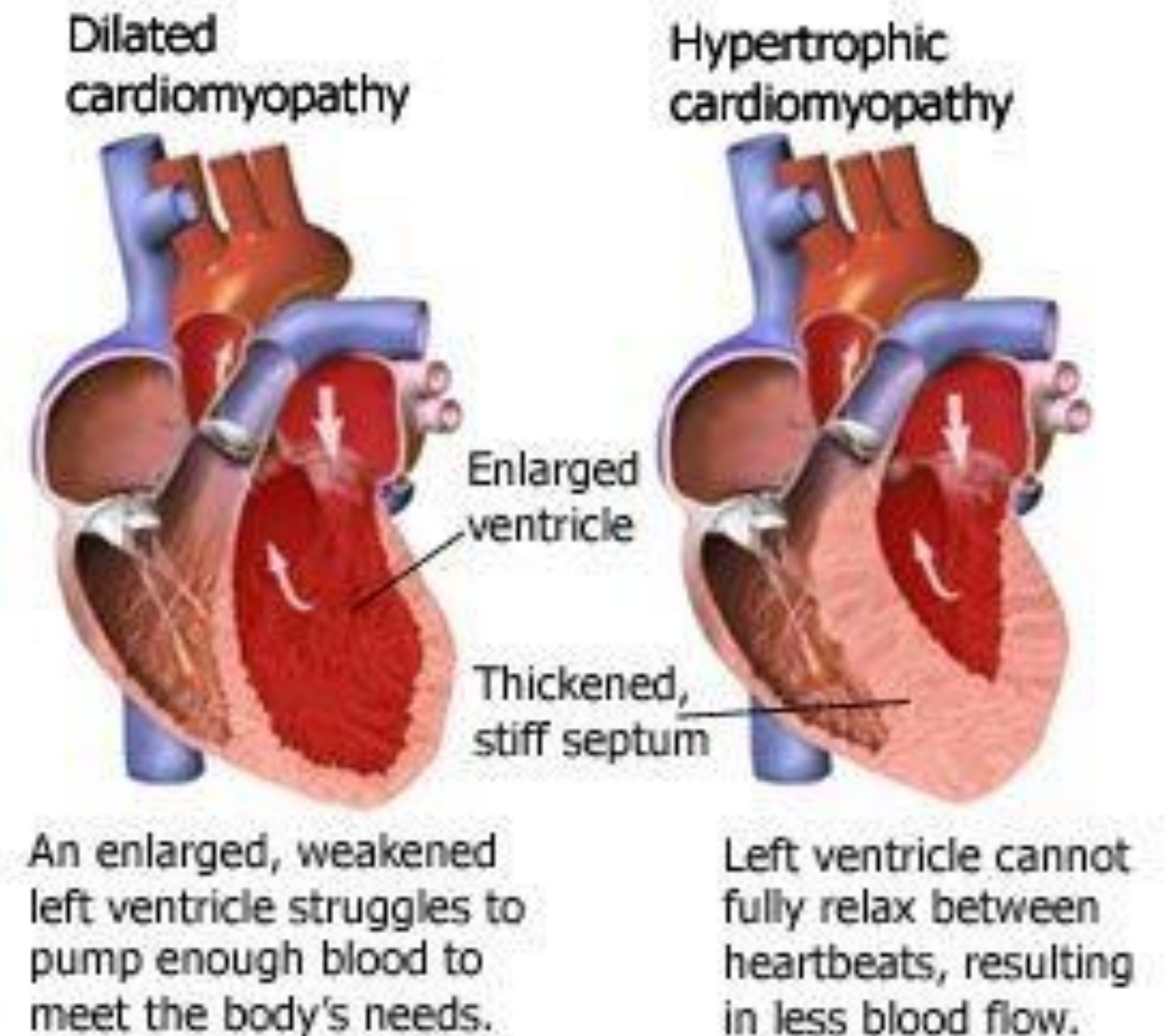
TYPES

- Dilated Cardiomyopathy
 - *Peripartum Cardiomyopathy*
- Hypertrophic Cardiomyopathy
- Restricted Cardiomyopathy
- Arrhythmogenic Right Ventricular Cardiomyopathy
- Unclassified Cardiomyopathy



Cardiomyopathy

A condition in which a ventricle has become enlarged, thickened and/or stiffened. As a result, the heart's ability to pump is reduced. Two types of cardiomyopathy include:



Normal Heart



**Normal
contraction**

**Hypertrophic Cardiomyopathy
(HCM)**



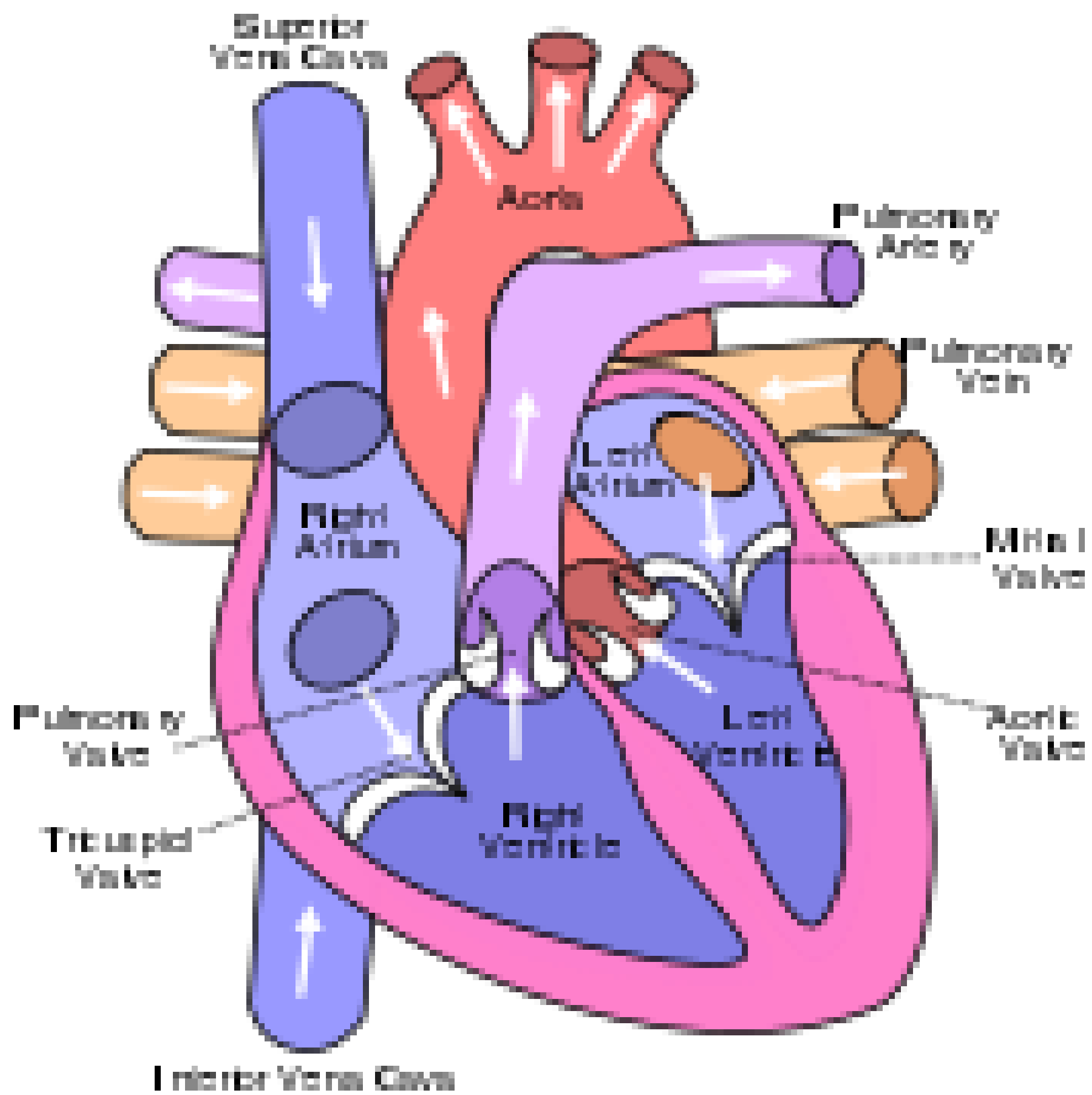
**Excessive
contraction**

**Dilated Cardiomyopathy
(DCM)**

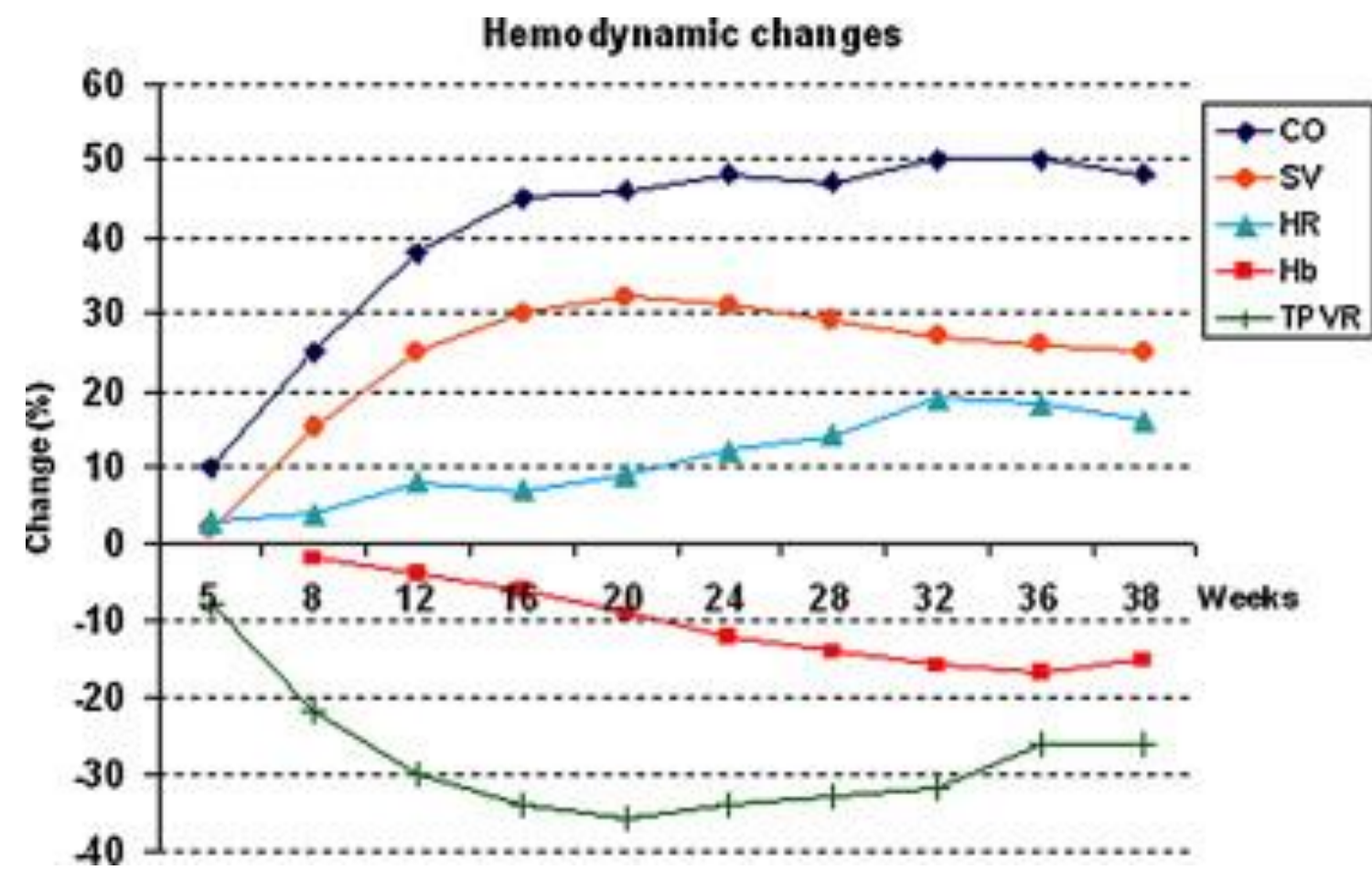


**Impaired
relaxation**

**Inadequate
contraction**



PREGNANCY



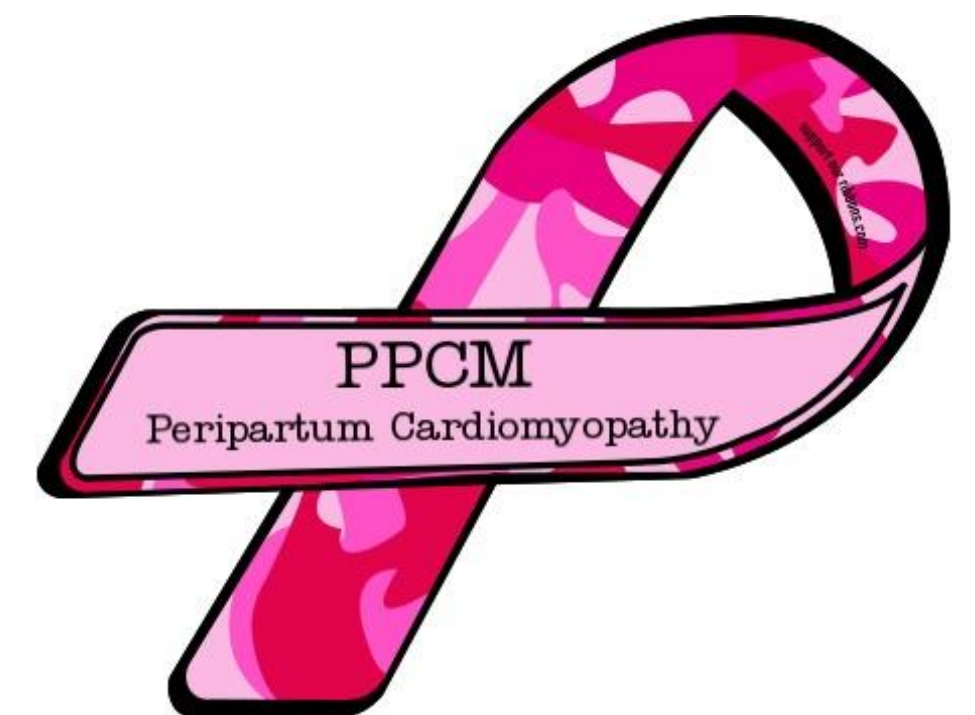
Hemodynamic Parameter	Change During Normal Pregnancy	Change during labor and delivery	Change during postpartum
Blood volume	↑ 40-50%	↑	↓ (autodiuresis)
Heart rate	↑ 10-15 beats/min	↑	↓
Cardiac output	↑ 30-50%	↑ additional 50%	↓
Blood pressure	↓ 10 mm Hg	↑	↓
Stroke volume	↑ 1st and 2nd trimester; ↓ 3rd trimester	↑ (300-500 mL per contraction)	↓
Systemic vascular resistance	↓	↑	↓

HEMODYNAMIC CHANGES

HYPERTROPHIC CARDIOMYOPATHY

- Pregnancy may be generally tolerated well in patients
- Most pregnant women with HCM increase cardiac output adequately in response to the enhanced physiologic demands of pregnancy.
- A series of 100 women with HCM who had a total of 199 births, the following findings were noted:
 - Among 40 patients evaluated in pregnancy, only one of 28 previously asymptomatic patients progressed to symptoms during pregnancy.
 - Two deaths occurred, both sudden and both in patients at particularly high risk. One patient had massive LV hypertrophy. The other patient had a family history of eight deaths in young patients, five of which were sudden.
- In a cohort of 60 pregnant women with HCM (mean age 30.4 years, 42 percent with LVOT obstruction) from the prospective worldwide Registry of Pregnancy and Cardiac disease, there were **no maternal deaths**, but 14 patients (23 %) experienced HF and/or arrhythmic complications

PERIPARTUM CARDIOMYOPATHY



Development of heart failure (HF) toward the end of pregnancy or within five months following delivery.

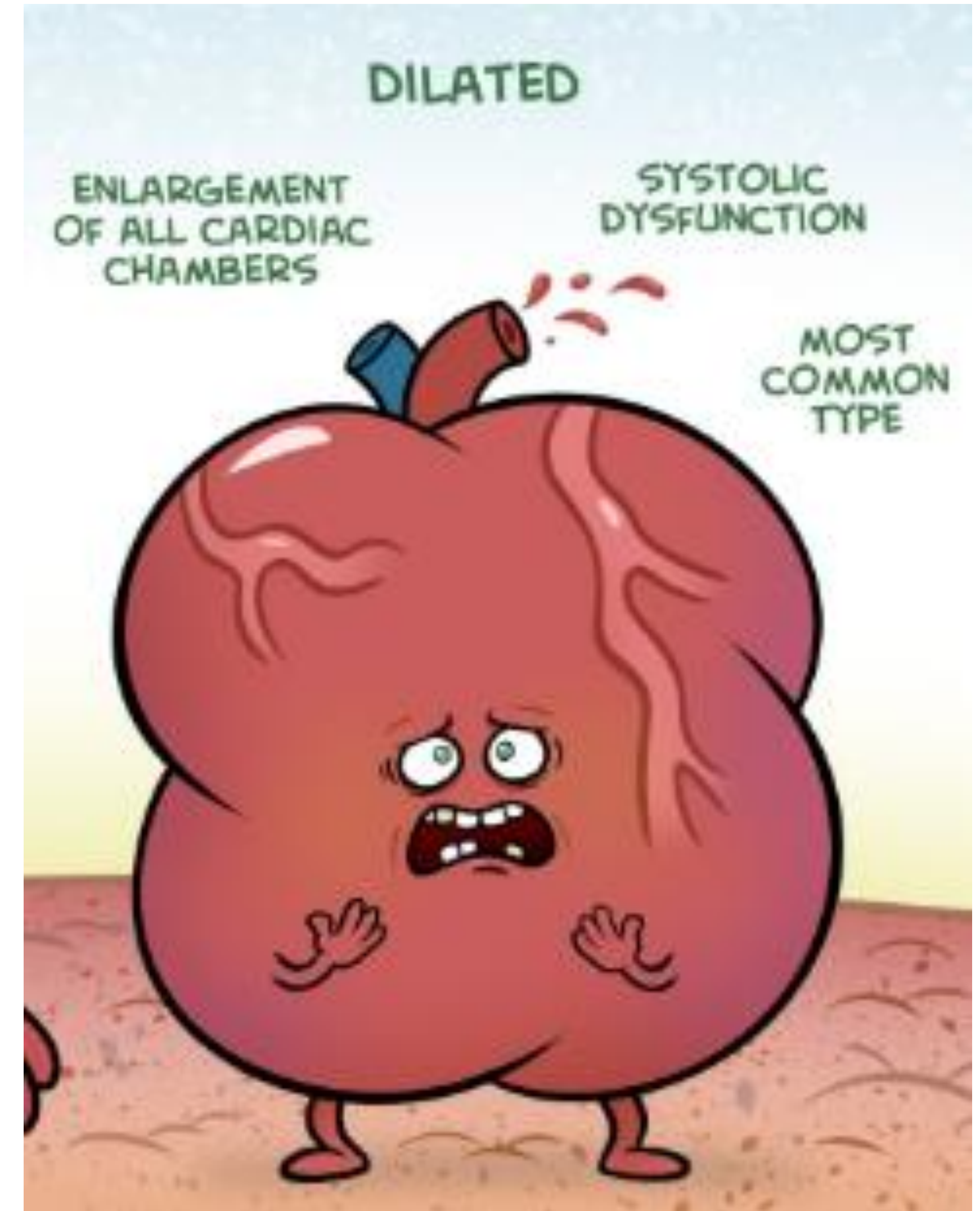
Absence of another identifiable cause for the HF

Left ventricular (LV) systolic dysfunction with an LV ejection fraction (LVEF) of less than 45 percent. *The LV may or may not be dilated*

2010
EUROPEAN SOCIETY OF CARDIOLOGY
WORKING GROUP
ON PERIPARTUM CARDIOLOGY

BACKGROUND

- A *rare*, idiopathic dilated cardiomyopathy
- Incidence varies by region
- Affects less than 0.1% of pregnancies globally
- Morbidity and mortality rates as high as 5% to 32%
- 60% present within the first two months postpartum
- 7% present in the 3rd trimester

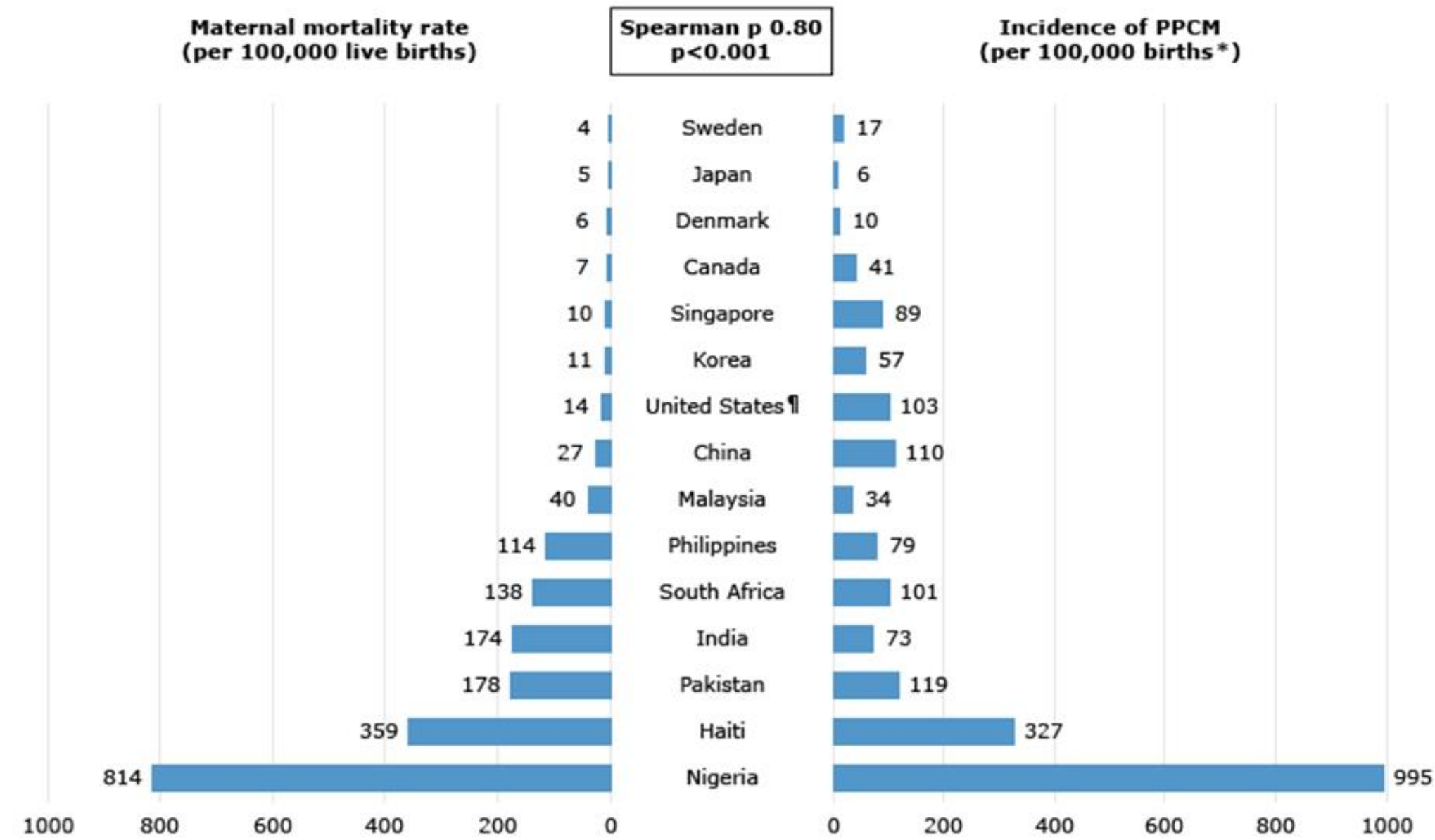




INCIDENCE

- 1:20,000 live births in Japan
- 1:10,149 in Denmark
- 1: 5719 in Sweden
- **1:968 to 1:4000 in the United States**
- 1:2400 in Canada
- 1:1000 in South Africa
- 1:300 in Haiti
- 1:100 in Zaria, Nigeria

Incidence of peripartum cardiomyopathy



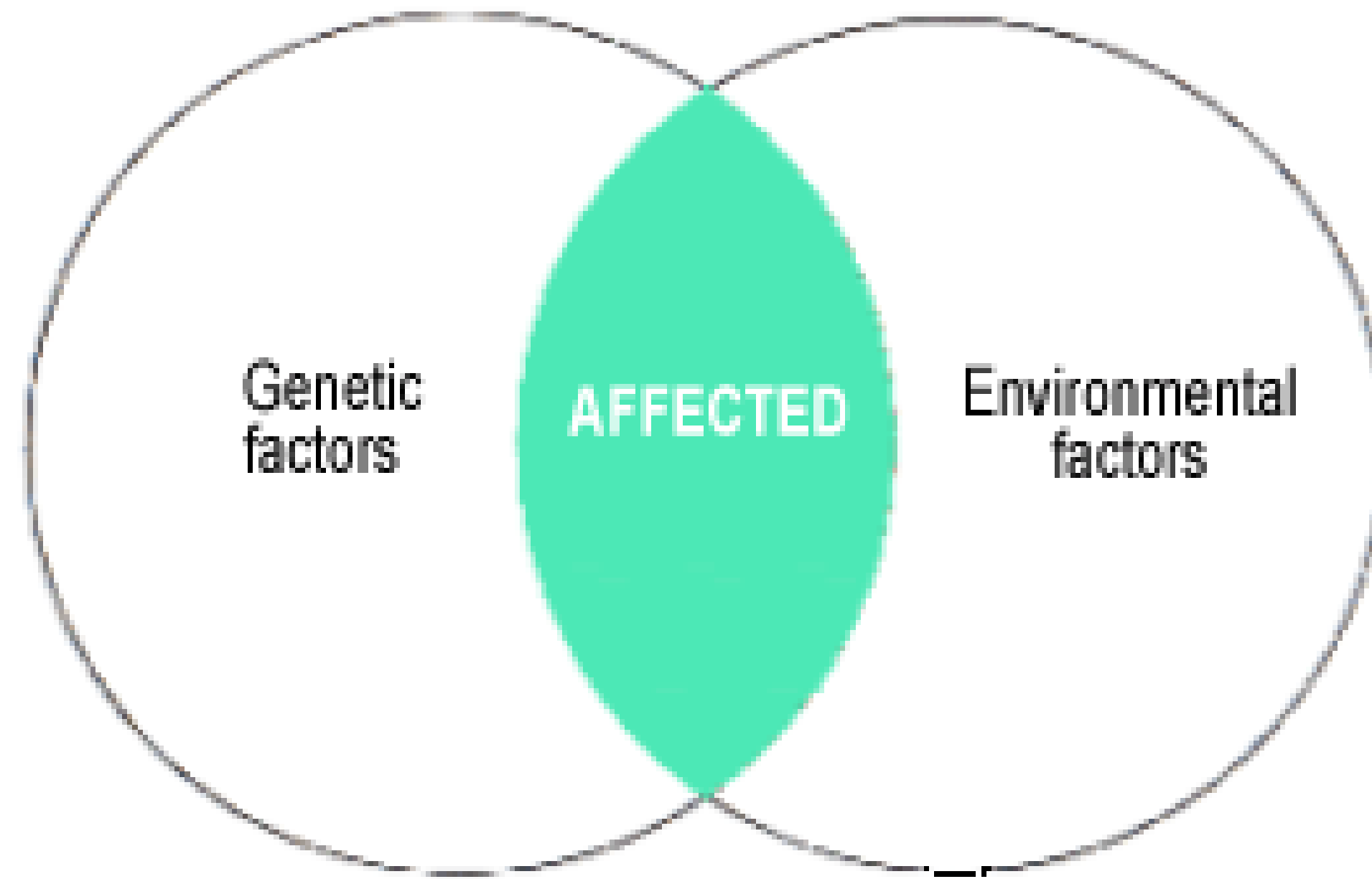
Maternal mortality rate and incidence of PPCM in various countries.

PPCM: peripartum cardiomyopathy.

* The unit of population differs among studies, depending on the population representing all births, live births (excluding stillbirth), deliveries, hospitalizations, and women.

¶ Although there are several reports from the United States, the report by Kolte et al. (Kolte D, Khera S, Aronow WS, et al. Temporal trends in incidence and outcomes of peripartum cardiomyopathy in the United States: a nationwide population-based study. *J Am Heart Assoc* 2014; 3:e001056) was selected because it includes more recent data.

Reproduced with permission from: Isogai T, Kamiya CA. Worldwide incidence of peripartum cardiomyopathy and overall maternal mortality. *Int Heart J* 2019; 60:503. Copyright © 2019 International Heart Journal Association.

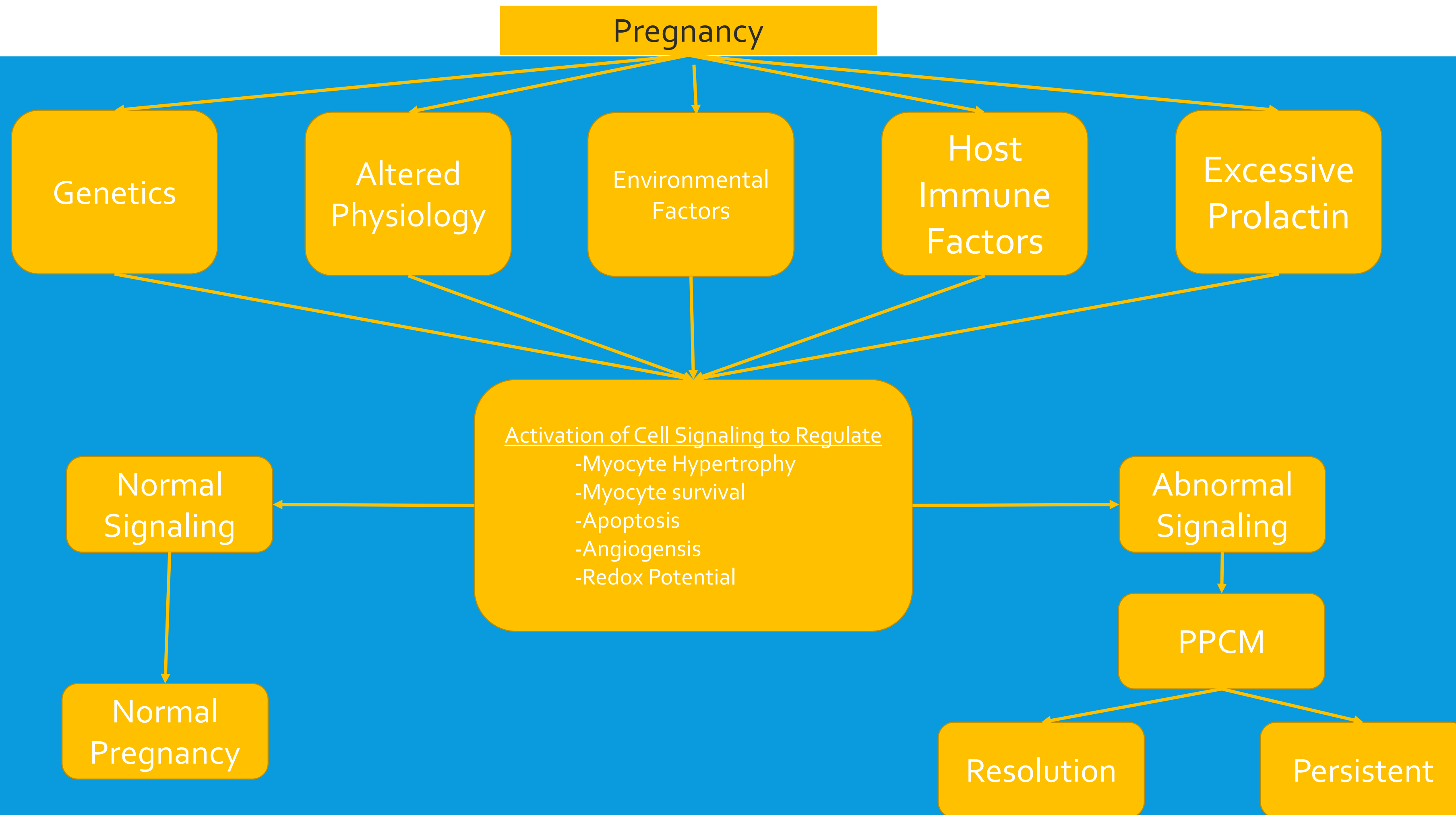


MULTIFACTORIAL?

PATHWAYS

- Prolactin
- Inflammation
- Myocarditis
- Abnormal Immune Response
- Genetic Predisposition
- Hemodynamic Response
- *Unbalanced oxidative stress and decreased angiogenesis*

PROPOSED PATHOGENIC MECHANISMS FOR PPCM

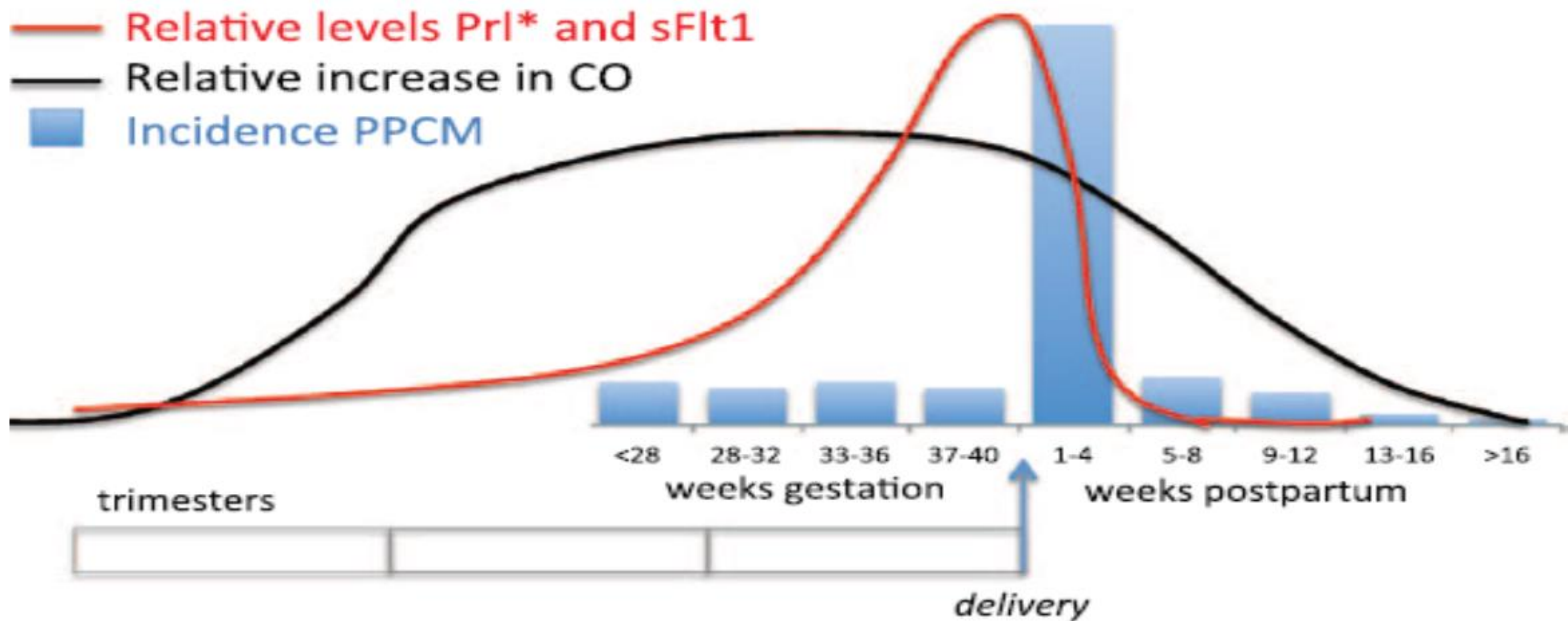


RISK FACTORS



- Maternal Age > 30
- African descent
- Multiple gestation
- HIV+
- Cocaine Abuse
- Long term tocolytic therapy > 4 weeks
- *Multiparity*
- *Diabetes*
- Hypertensive Disorders
 - Gestational HTN
 - Chronic HTN
 - Preeclampsia

- Relative levels Prl^* and $sFlt1$
- Relative increase in CO
- Incidence PPCM



CLINICAL MANIFESTATIONS

Symptoms

- Dyspnea
- Lower Extremity Edema
- Palpitations
- Chest Pain
- Dizziness
- Cough
- Orthopnea

Signs

- Elevated jugular venous pressure
- Displaced apical impulse
- Tachycardia
- S₃ - third heart sound
- Systolic Murmur
 - mitral regurgitation



Welcome to the Third Trimester

Getting ready to meet your baby!

The last few weeks of pregnancy can be challenging. Not only are you anxious to meet your new addition, but you also may feel increasingly uncomfortable and tired. Getting answers to your questions and planning for the first few weeks at home with your new baby can help alleviate some of the anxiety you may experience as your due date approaches. Prenatal care is just as important during these last few weeks of pregnancy and you'll likely visit your health care provider even more often than before.



Physical Changes During the Third Trimester



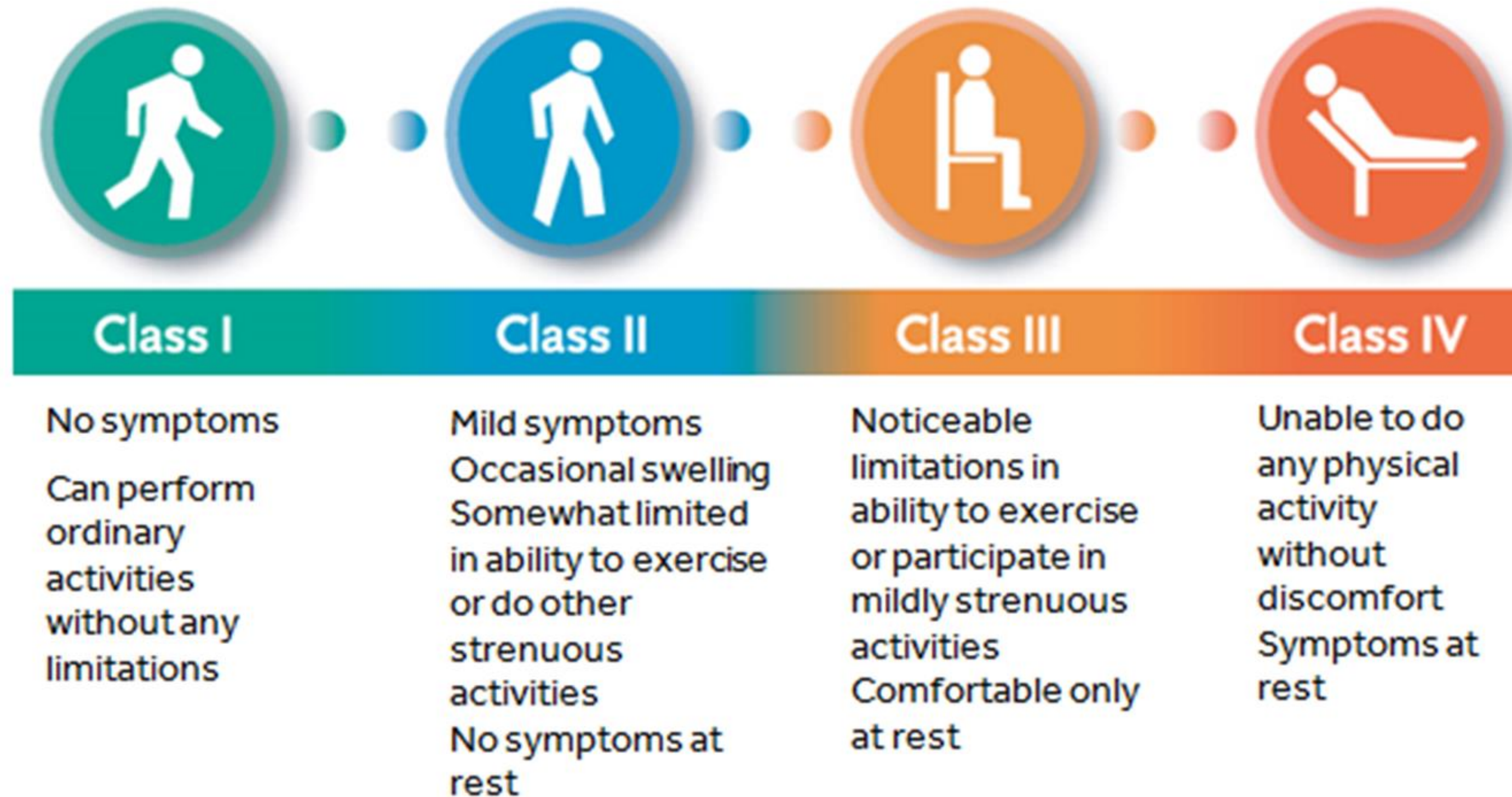
These can be different for each woman and for each pregnancy. You may experience many of these changes or just a few.

- Larger breasts
- Growing belly and weight gain
- Braxton Hicks contractions
- Skin changes and/or stretch marks
- Congestion and/or nose bleeds
- Swollen or sensitive gums
- Heartburn, gas and indigestion
- Hemorrhoids
- Backaches
- Leg cramps
- Swollen ankles or feet
- Varicose veins
- Vaginal discharge
- Frequent urination
- Bladder and kidney infections
- Dizziness
- Shortness of breath
- Difficulty sleeping



COMPLICATIONS

NYHA Class = New York Heart Association Classification



1. The Criteria Committee of the NYHA. *Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels*. 9th ed. Boston, Mass: Little, Brown & Co; 1994:253-256

- Arrhythmia
- Thrombus
- Congestive Heart Failure
- Mortality

DIAGNOSIS

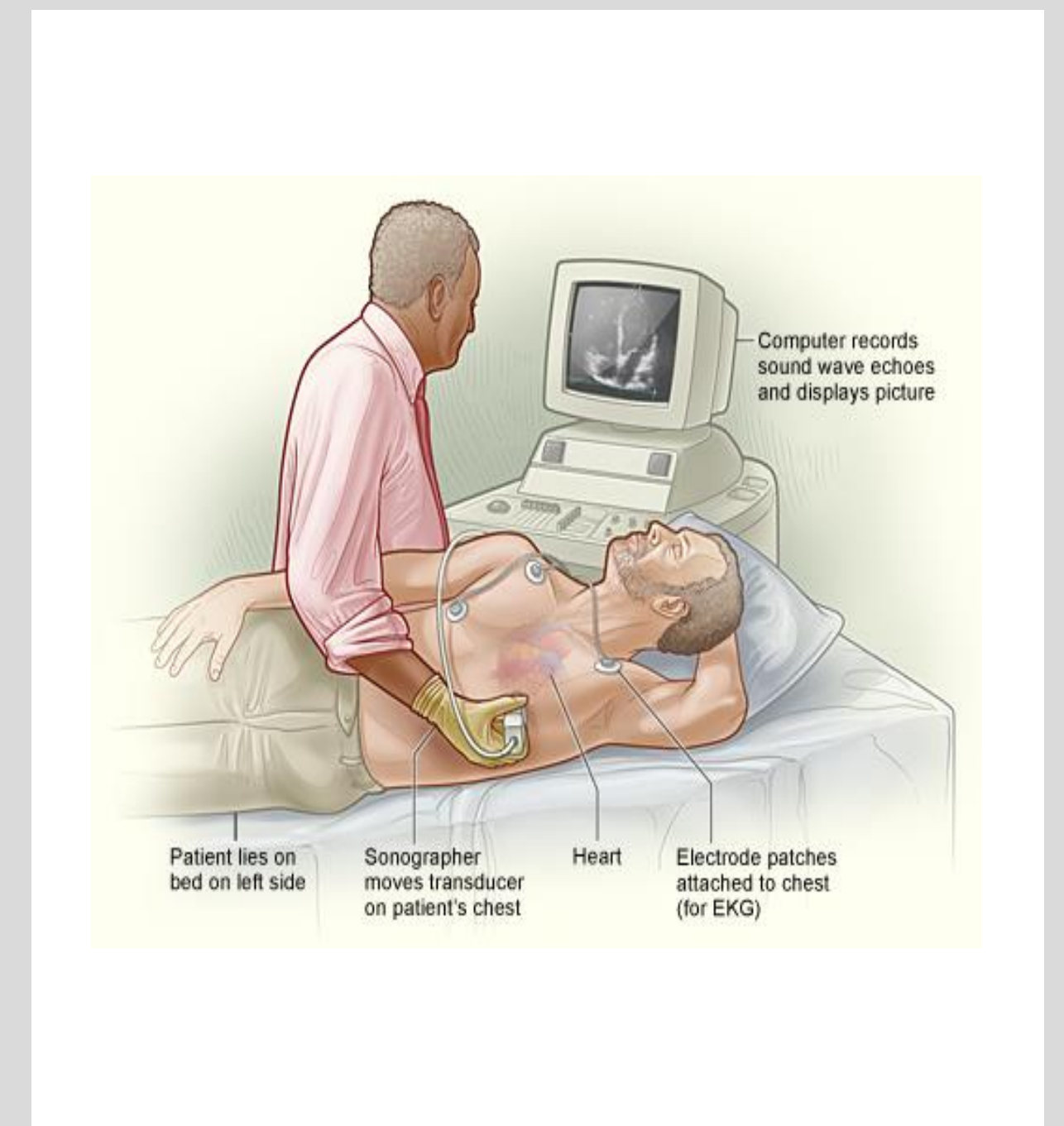
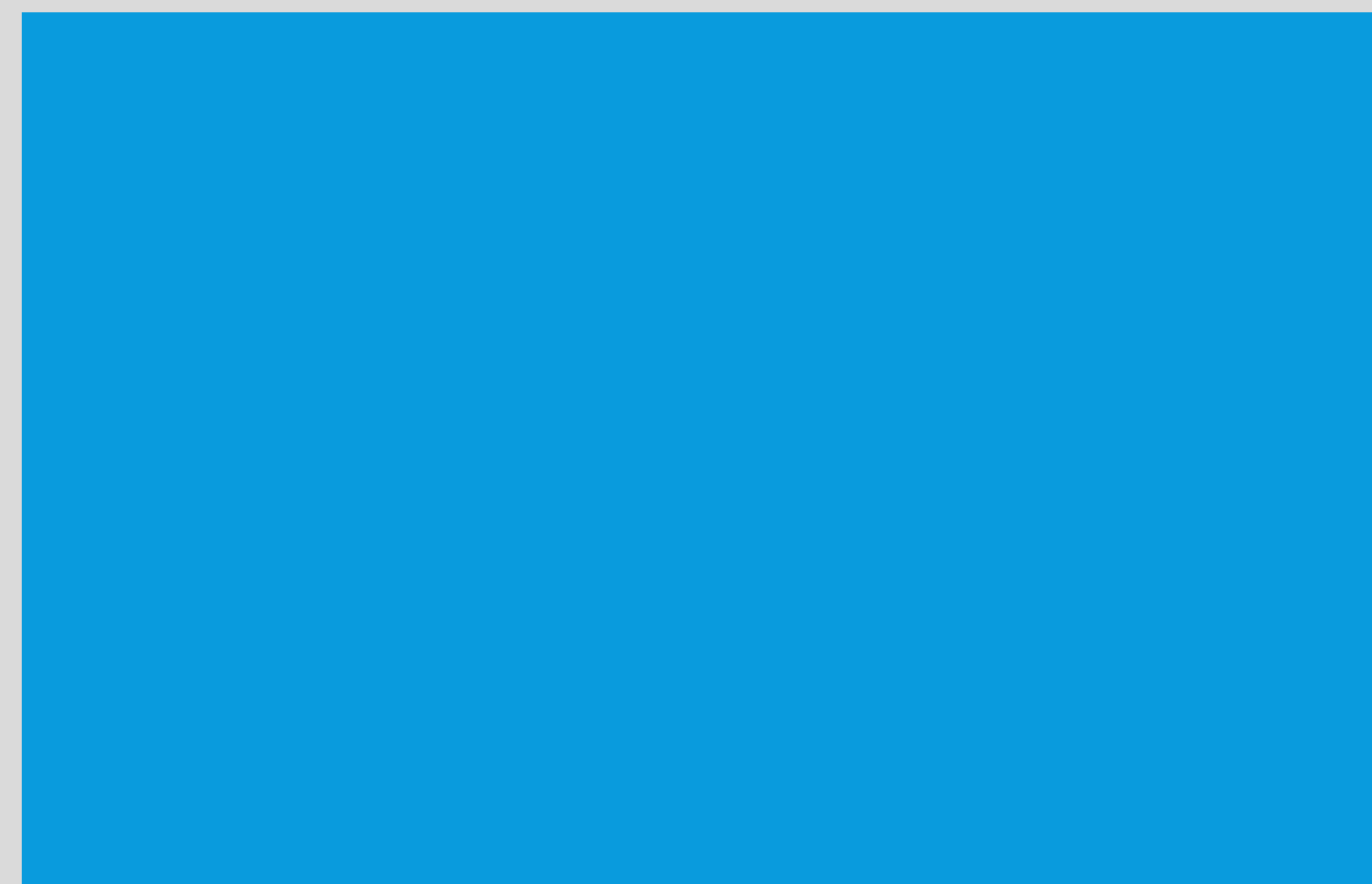
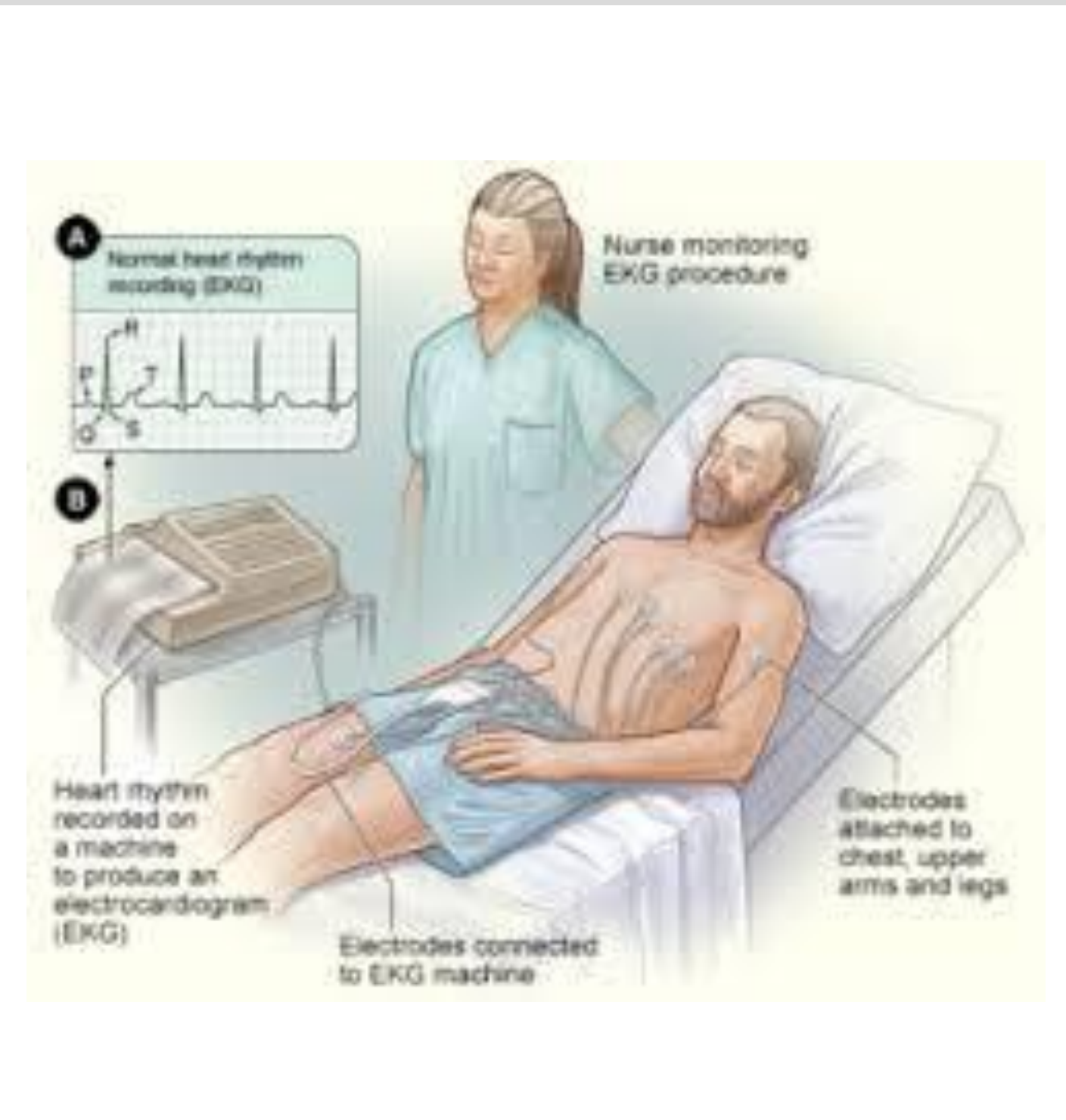
Heart failure develops in the last month of pregnancy or within 5 months of delivery.

Heart pumping function is reduced, with an ejection fraction (EF) less than 45% (typically measured by an echocardiogram). EF is how much blood the left ventricle pumps out with each contraction. A normal EF can be between 55 and 70.

No other cause for heart failure with reduced EF can be found.

DIAGNOSTIC TOOLS

- Electrocardiogram (ECG)
- Echocardiogram
- BNP
- Troponin
- Other studies
 - Chest x-ray
 - Cardiac MRI
 - Cardiac catheterization
 - Endomyocardial biopsy



PPCM

is a diagnosis of
exclusion!

TREATMENT

MULTIDISCIPLINARY TEAM

- Nurse
- Obstetrician
- Maternal Fetal Medicine
- Neonatologist
- Cardiologist
- Cardiac Surgeon
- Anesthesiologist



Heart Failure Treatment

Arrhythmia Management

Device Therapy – needed in 3%

Antithrombotic Therapy*

Mechanical Circulatory Support

Cardiac Transplant

Investigational Therapy

TREATMENT



TREATMENT

- The objective of peripartum cardiomyopathy treatment is to keep extra fluid from accumulating in the lungs and to help the heart recover as fully as possible.
- There are several medications which include:
 - ACE (angiotensin converting enzyme) inhibitors – Help the heart use the strength that it has to work more efficiently
 - Beta blockers – Cause the heart to beat more slowly so that it has a greater chance to recover
 - Diuretics – Help reduce fluid retention

DURING PREGNANCY

AVOID

- ACE-I, ARB
- Aldosterone Antagonist

UTILIZE

- Loop diuretics
- Nitrates/hydralazine
- Use caution re: hypovolemia and uterine perfusion
- Beta Blocker – β_1 -selective blocker (preferred)
- Digoxin

DELIVERY

- In women with advanced heart failure, **consider** delivery for maternal cardiovascular indications.
- Urgent delivery may be required in women with advanced HF with hemodynamic instability
- Planned cesarean delivery is preferred for women with advanced HF requiring inotropic therapy or mechanical circulatory support
- The 2010 European Society of Cardiology working group statement advised that early delivery is not required if the maternal and fetal conditions are stable

POSTPARTUM

Drug	Risk Category	Information in Humans	Potential Complications	Safety for Breast Feeding
Furosemide	C	Limited	Hypotension and decreased uterine perfusion	Compatible
Intravenous nitroglycerin	B	Modest	Hypotension and decreased uterine perfusion	Unknown
Intravenous nitroprusside	C	Limited	Thiocyanate toxicity	Unknown
Nesiritide	N/A	None	Hypotension and decreased uterine perfusion; effect on the fetus unknown	Unknown
Dopamine	C	Limited	Unknown	Unknown
Dobutamine	B	Limited	Unknown	Unknown
Milrinone	C	Limited	Unknown	Unknown
ACE inhibitors/ ARBs	C	Limited	Renal insufficiency, oligohydramnios, IUGR, prematurity, bony malformation, limb contractures, PDA, pulmonary hypoplasia, RDS, hypotension, anemia, and neonatal death	Compatible
Carvedilol	C	Not available	Unknown, beta 2 receptor blocking may cause premature uterine contractions	Unknown
Bisoprolol	C	Not available	Unknown	Unknown
Metoprolol succinate	C	Not available	Unknown	Unknown
Metoprolol tartrate	C	Modest	Relatively safe	Compatible, monitoring of infants for signs of beta blockade recommended
Digoxin	C	Modest used for both maternal and fetal indications	None reported	Compatible
Spirolactone	C	Limited	Possible antiandrogenic effect and feminization	Compatible
Warfarin	D	Modest	Teratogenic effect in first trimester (warfarin embryopathy), increased maternal and fetal bleeding	Compatible
Heparins	C	Extensive	Do not cross the placenta	Compatible

BROMOCRIPTINE

- Dopamine D₂-agonist
- Multiple small trials in South Africa and Germany
 - Unblinded
 - Show increased recovery in treatment arm
 - Lack of placebo control 2' deemed unethical
 - 'control' group with > 50% recovery
- Concern with bromocriptine use
 - Adverse maternal vascular events
 - Infants in developing countries rely on breastmilk early in life for nutrition
 - Inability to breastfeed

BREASTFEEDING

Studies show no significant difference or improved outcomes among breastfeeding women when compared to those who did not breastfeed



ADVANCED SUPPORT

- As needed
 - Inotropes
 - Mechanical support
 - IABP
 - Bi-VADs
 - ECMO
 - LVADs
 - Better outcomes than non-PPCM women
 - Minimal explanted 2' recovery
- Heart Transplant
 - Decreased graft survival

PROGNOSIS

OUTCOMES

- Recent studies show PPCM mortality rates have decreased to as low as approximately 3% *within 6 months postpartum*.
- Recovery of left ventricular function is markedly higher in PPCM than in other dilated cardiomyopathies.
- Approximately 50% of patients will recover to normal ejection fraction within 6 months to 5 years
- Transplant may be needed in up to 4% of PPCM patients

FETAL OUTCOMES

- Data limited
- In a report of 123 patients, cesarean delivery was performed in 40% of patients, largely for obstetric indications
 - Preterm birth (<37 weeks) occurred in 25%
 - mean birthweight was 3.1 kg (range 1.4 to 5.0 kg)
 - 5.9% of infants were small for date
 - two stillbirths
 - one neonatal death
 - four newborns had congenital anomalies.

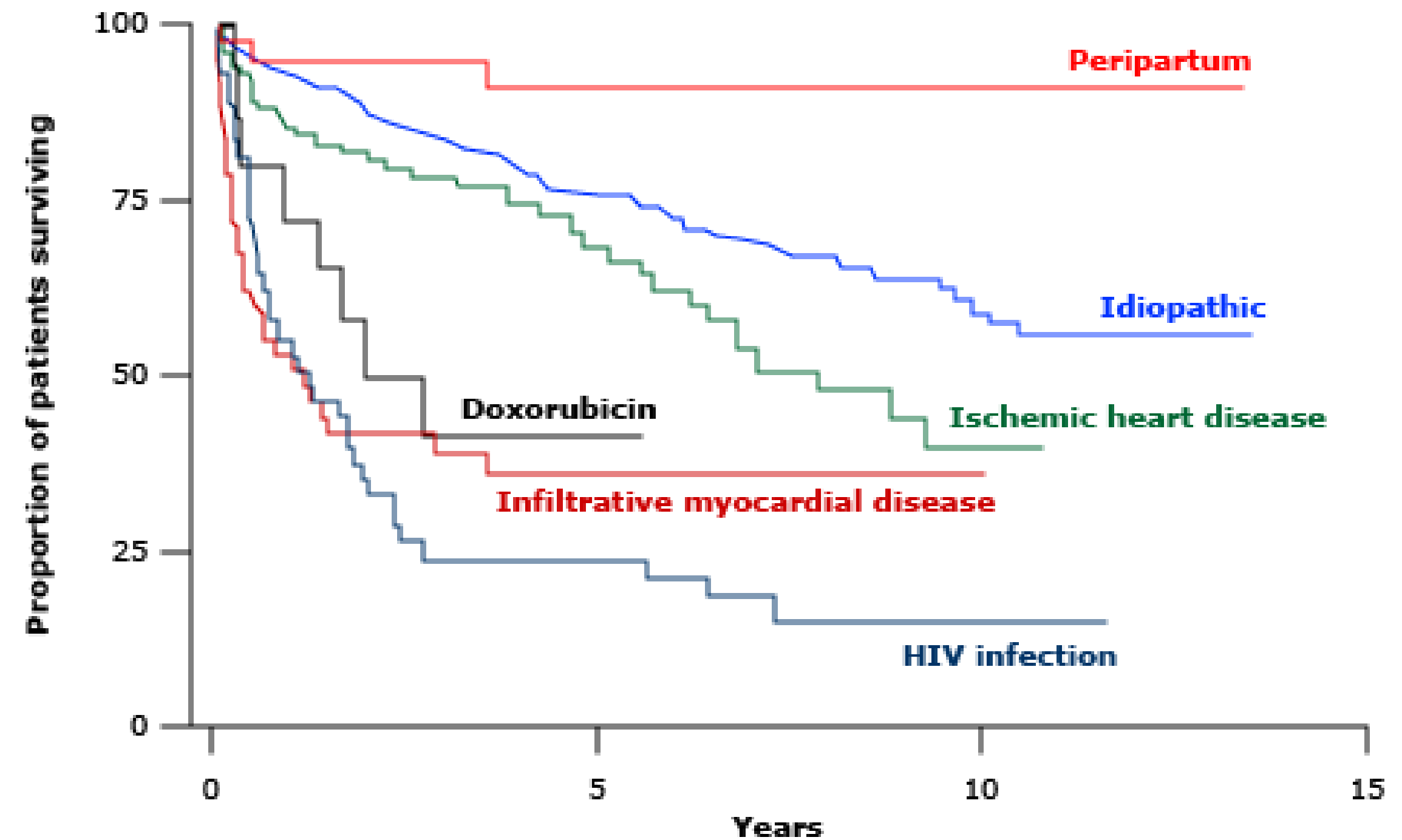
AFRICAN AMERICAN WOMEN

Characteristic or Outcome	Overall (N = 220)	African American Women (n = 121)	Non-African American Women (n = 99)	P Value
Presenting LVEF, mean (SD), %	29 (13)	27 (13)	31 (12)	.06
Presenting LVEF <30% (n = 161; 85 African American and 76 non-African American women)	78 (35.5)	48 (56.5)	30 (39.5)	.03
Follow-up LVEF, mean (SD), % (n = 123; 60 non-African American and 63 African American women)	39 (14)	36 (15)	42 (14)	.02
Worst documented LVEF, mean (SD), %	27 (13)	24 (13)	29 (12)	.02
Worsen after diagnosis (n = 161; 85 African American and 76 non-African American women)	44 (27.3)	30 (35.3)	14 (18.4)	.02
Documentation EF >50% (n = 161; 85 African American and 76 non-African American women)	144 (89.4)	69 (57.0)	75 (75.8)	.004
Time to LVEF >50%, median (interquartile range), d (n = 80; 50 non-African American and 30 African American women)	167 (67-352)	265 (89-552)	125.5 (52-286)	.02

RECOVERY

- Some patients recover only part of their heart function over a period of six months or longer
- Some have the heart return to full strength in as little as two weeks.
- Among all types of cardiomyopathy, peripartum cardiomyopathy has a relatively high recovery rate compared to other causes.

Outcome with a cardiomyopathy is related to the etiology



RECOVERY

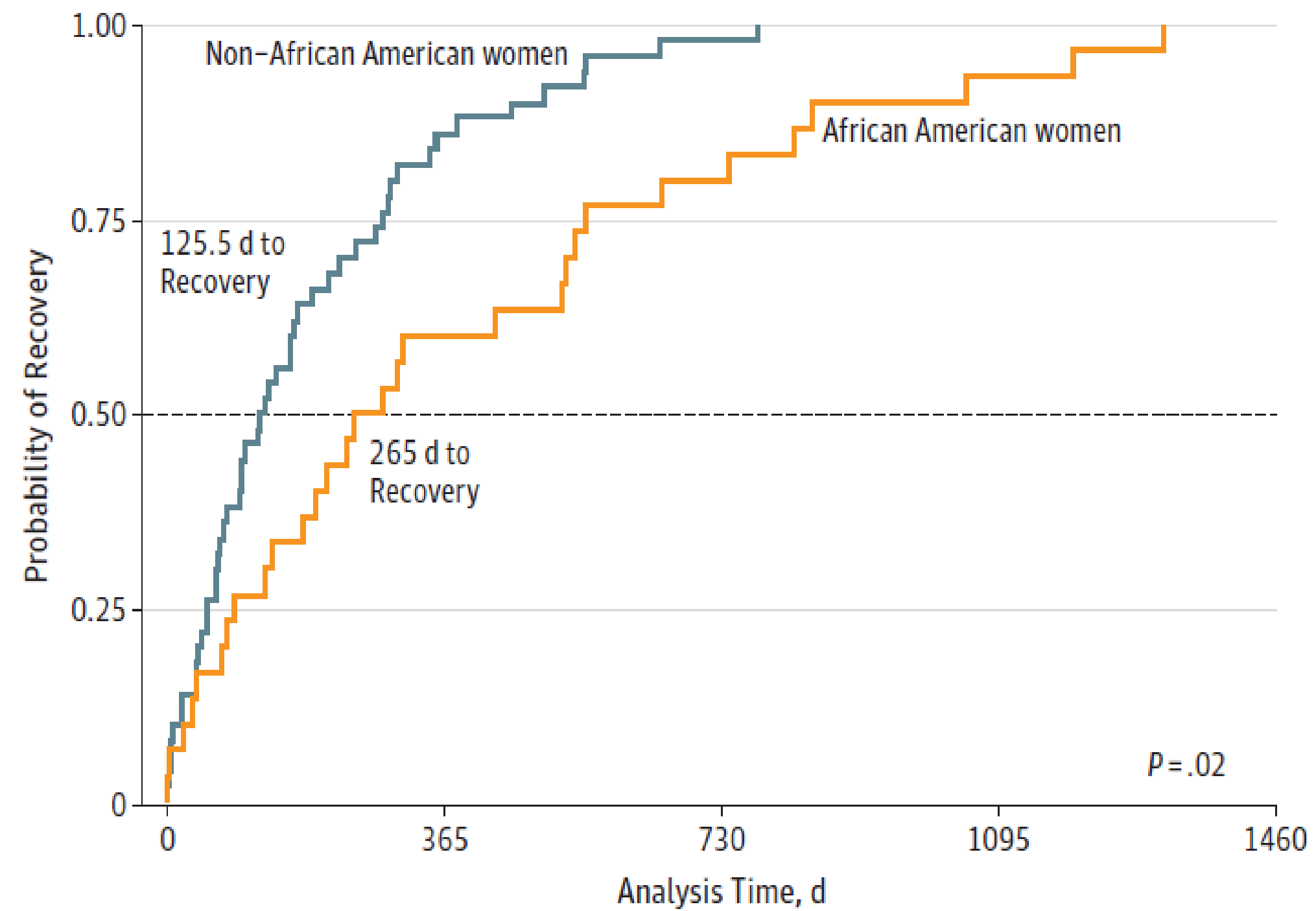
Recovery of LV EF to $\geq 50\%$ at 6 months to 1 year occurs in $>65\%$ of patients

Predictors of Recovery

- EF $> 30\%$
- LVEDD < 6 cm
- Lower BNP
- Lower troponin

RECOVERY

Figure 2. Time to Recovery Stratified by Race



No. at risk		0	365	730	1095	1460
Non-African American women		50	50	50	50	50
African American women		30	30	30	30	30

MORTALITY RATE

- Death due to PPCM is usually caused by progressive pump failure, sudden death, or thromboembolic events.
- 10 percent in two years.
- **As high as 28 percent in a report of 29 black patients!**

ADVERSE FACTORS

- Worse New York Heart Association functional class
- Left ventricular ejection fraction (LVEF) ≤ 25 percent
- African descent
- Multiparity
- Age greater than 30 to 35 years

EXTRACARDIAC MORBIDITY

- In a study of 182 women with PPCM, 46 had major adverse events (MAE)
- In 50% of the patients with an MAE, the MAE preceded diagnosis of PPCM
- One-third of patients who had an MAE *other than death or cardiac transplantation* had residual **brain damage** as a result of cerebrovascular accident or cardiopulmonary arrest

The degree of severity does not seem to affect the degree or rate of recovery. For example, patients with a very low ejection fraction can eventually completely recover from peripartum cardiomyopathy.

PREVENTION

Currently, no risk calculator exists to help determine the probability a woman will develop PPCM. In an effort to prevent the development of PPCM, women should follow a heart healthy lifestyle. Regular exercise, refraining from alcohol consumption and smoking, as well as a balanced diet all help the heart.

Bromocriptine may be beneficial in reducing mortality and preventing further reduction in ejection fraction in women with a history of PPCM when presenting for a subsequent pregnancy

Can the disease be prevented...unlikely

Can the adverse event be prevented by prompt recognition and treatment...likely.

MORTALITY PREVENTION

FUTURE PREGNANCIES



**KEEP
CALM
WE'RE
EXPECTING...
AGAIN!**

- Preconception Counseling is key!
- Limited data show:
 - Risk of complications is high
 - Termination of pregnancy may not prevent relapse
 - Patients with persistent LV dysfunction (LVEF <50 percent) or LVEF \leq 25 percent at diagnosis should be advised to avoid a subsequent pregnancy due to the risk of HF progression and death

ELKAYAM, ET AL.

Persistent Dysfunction

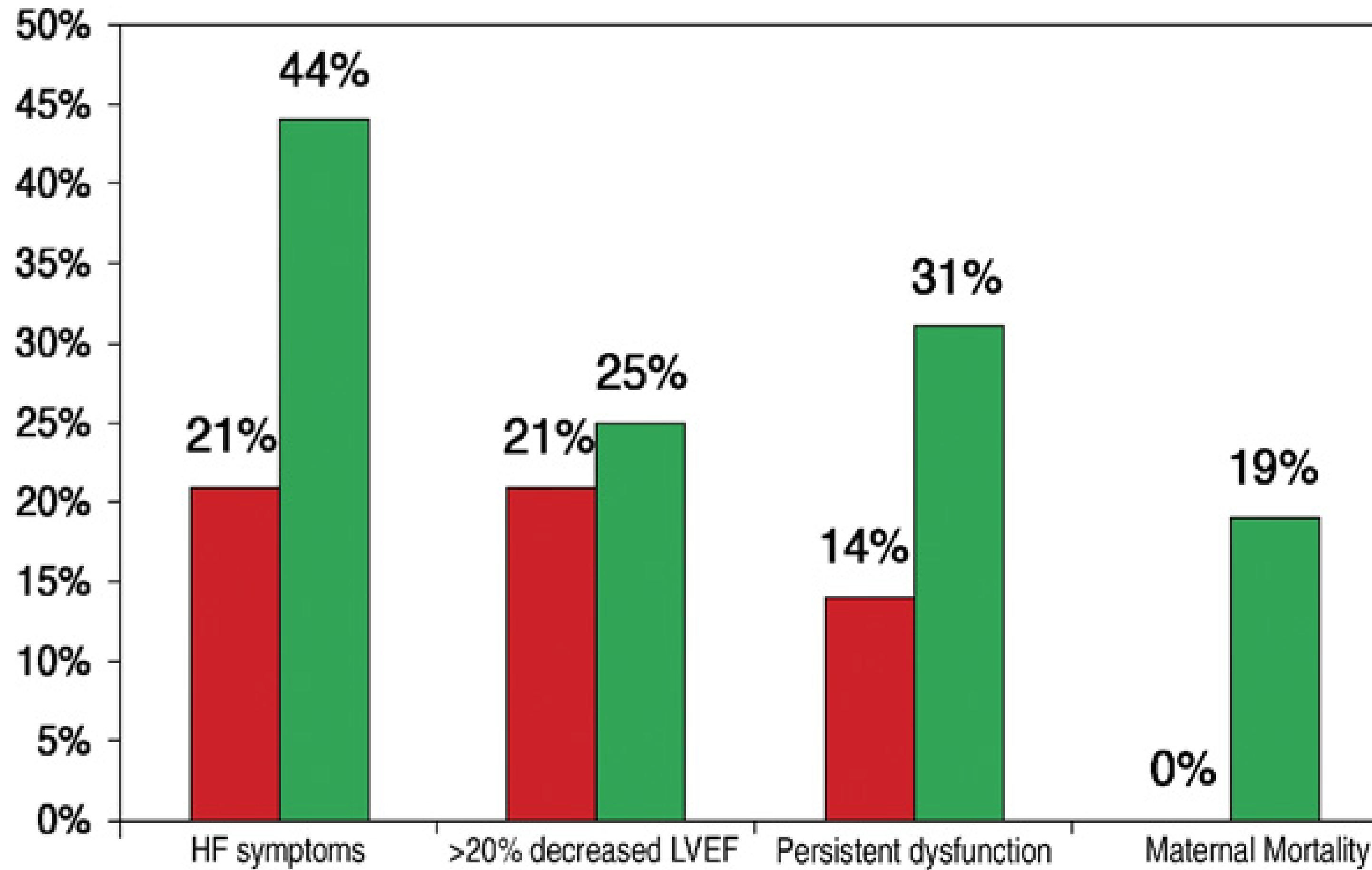
- **19% mortality**
- 44% adverse events
- Persistent low contractile reserve

Recovered Function (EF > 45-50%)

- Lower risk
- Reduction in Ejection Fraction
- 21% became symptomatic
- **0 cases of death**

*If the heart has completely recovered from the previous pregnancy:
An additional pregnancy can be attempted if the heart is periodically monitored with echocardiograms and stress tests. Echocardiograms check how the heart functions at rest and stress tests measure how the heart works under strain.*

SUBSEQUENT PREGNANCY?



- **Red** - Had improved LV function before getting pregnant again
- **Green** - Persistent LV dysfunction

SUMMARY

- PPCM as the development of systolic heart failure towards the end of pregnancy or in the months following pregnancy with LVEF generally less than 45 % in the absence of another identifiable cause of heart failure.
- The etiology of PPCM is unknown
- A number of risk factors for PPCM have been identified, including age, multiple gestation, African descent, and hypertensive disorders
- The clinical presentation of PPCM is variable and can mimic 3rd trimester symptoms
- The management of heart failure due to PPCM is similar to that of HF due to other causes
- Decisions regarding the timing and mode of delivery in PPCM should be made based upon combined input from cardiology, obstetrics, anesthesiology, and neonatology services.

SUMMARY

- All women with PPCM should receive counseling on the potential risk of recurrence with future pregnancies.
- PPCM is a leading cause of maternal mortality among non-Hispanic black women
- PPCM is a leading cause of maternal mortality in women 20-24 years of age



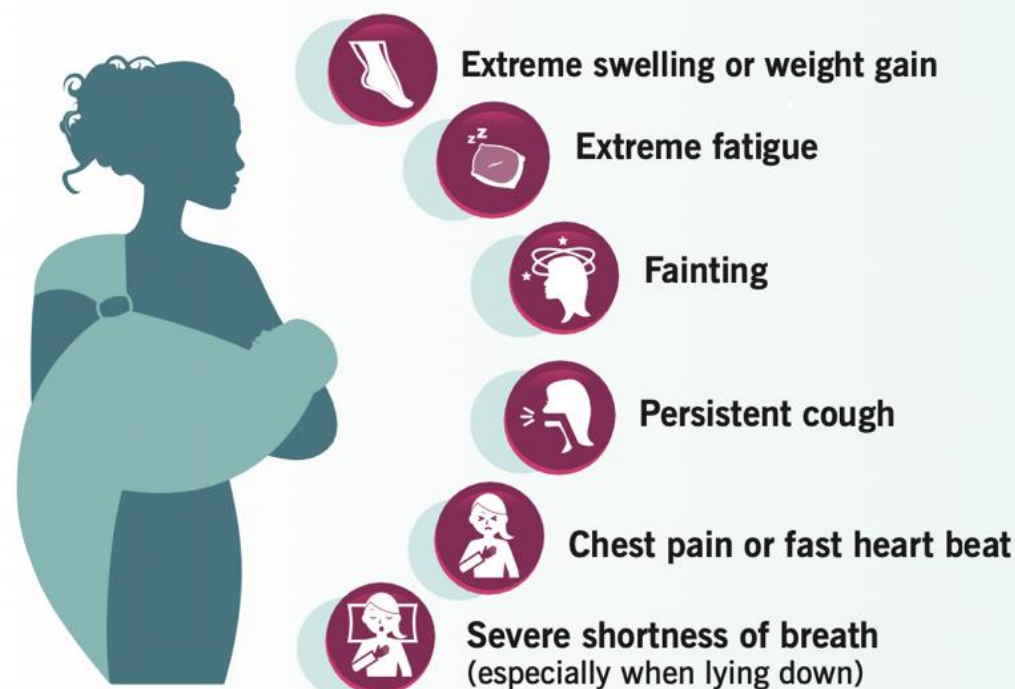
QUESTIONS

Signs & Symptoms of Heart Disease

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).

During Pregnancy and Postpartum

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



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.

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.

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

- * Trust your instincts when you feel something is wrong
- * When you see a healthcare provider, bring your partner, friend or family member who can support you and help explain these symptoms are not normal for you
- * Seek a second opinion if you don't feel listened to or your symptoms are not taken seriously

Get online support and information: www.myheartsisters.com | www.womenheart.org

CMQCC
CALIFORNIA MATERNAL
QUALITY CARE COLLABORATIVE
www.cmqcc.org



Funding for the development of this Infographic was provided by Federal Title V MCH block grant funding from the California Department of Public Health; Maternal Child Adolescent Health Division, and Stanford University.



DID YOU HAVE COMPLICATIONS DURING PREGNANCY?

♥ You may be at a higher risk for heart disease over your lifetime

Which pregnancy complications can increase your risk for heart disease as you age?



HIGH BLOOD PRESSURE

5-10% of all pregnant women



GESTATIONAL DIABETES

7-14% of all pregnancies



PRETERM BIRTH

11.5% of babies were born preterm in 2012.

Can include:

- ♥ Gestational hypertension
- ♥ Preeclampsia (once known as Pregnancy Induced Hypertension (PIH) and Toxemia)
- ♥ Eclampsia
- ♥ HELLP syndrome



Mothers who had gestational diabetes are more likely to have the condition again in a future pregnancy.



Babies born before 37 completed weeks of pregnancy are preterm, or premature.

If you had **PREECLAMPSIA**, you have **2x** the risk of **stroke, heart muscle damage, or blood clot** and **4x** the risk of developing **high blood pressure** for the rest of your life!

If you had **GESTATIONAL DIABETES**, you are **50%** more likely to develop **Type II diabetes** within 5 years, putting you at higher risk for heart disease.

Women with **PRETERM BIRTH AND PREECLAMPSIA** have an **8-10x** higher chance of **death** from heart disease.

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/m2



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
CALIFORNIA MATERNAL
QUALITY CARE COLLABORATIVE



WOMEN AND HEART DISEASE  

HEALTH PROBLEMS DURING PREGNANCY can signal trouble for your heart.

Women are at greater risk of having heart disease or a stroke if they had the following:

-  **HIGH BLOOD PRESSURE WITH PREGNANCY, PREECLAMPSIA OR ECLAMPSIA**
-  **GESTATIONAL DIABETES**
-  **PRETERM BIRTH DELIVERY BEFORE 37 WEEKS OF PREGNANCY**

Try to lose weight gained during pregnancy within 12 months of delivery to lower your risk of heart disease.

WHAT YOU CAN DO

- Make sure your primary care doctor knows if you had these pregnancy problems 
- Know your risk for heart disease now and as you age 
- Adopt healthy habits: exercise daily, eat a heart-healthy diet, maintain a healthy weight 

Pregnancy can be nature's stress test on the heart.

For more information, visit CardioSmart.org/Women
@CardioSmart

Information provided for educational purposes only. Please talk to your health care professional about your specific health needs. To download or order posters on other topics, visit CardioSmart.org/Posters.

WOMEN AND HEART DISEASE  

Thinking of getting pregnant?

Certain heart conditions can increase your chance (risk) of serious problems. If you have one of these conditions, it's important to talk with your heart doctor before becoming pregnant.

Some conditions that can cause serious health problems for you and your baby:

- Congenital heart disease - a defect in the heart that you were born with
- Valve disease - a heart valve isn't working properly or has been replaced
- Heart transplant
- Heart rhythm problems
- Heart attack
- Heart failure or heart damage
- Aortic disease - problems with the body's main artery
- Pulmonary hypertension - high blood pressure in the arteries of your lungs

Start the conversation

Patients and clinicians can work together by discussing:

- Risks of pregnancy in patients who have these conditions in a timely manner
- Safe and effective contraception choices to prevent pregnancy
- Steps to take for a safer pregnancy

Pregnancy is a stress test for the heart. It affects the heart and blood circulation. Going into pregnancy with heart issues can be dangerous, especially without planning ahead.

Visit CardioSmart.org/Women to learn more.
@ACCTouch #CardioSmart

Information provided for educational purposes only. Please talk to your health care professional about your specific health needs. To download or order posters on other topics, visit CardioSmart.org/Posters.

WOMEN AND HEART DISEASE  

HEART HEALTH AFTER PREGNANCY

Your health is important to you and your baby. Look out for these symptoms of heart disease after you give birth.

KNOW THE SIGNS

- Headache
- Vision changes
- Chest pain
- Heart palpitations
- High blood pressure > 140/90 mmHg
- Shortness of breath
- Difficulty breathing when lying flat
- Leg swelling

WHAT YOU CAN DO

If you experience any of these signs:

- Call your obstetrician
- Call your primary care physician

If you think you are having a heart attack or stroke, call 911 right away. 

CAUSES OF HEART DISEASE AT DELIVERY OR SOON AFTER

- High blood pressure
 - Preeclampsia
 - Gestational high blood pressure
 - Chronic high blood pressure
- Heart failure
- Stroke
- Blood clot traveling through the bloodstream and getting caught in the lung (pulmonary embolism)

Heart disease is the leading cause of maternal death (death during pregnancy, at delivery, or soon after)

For more information, visit CardioSmart.org/Women
@CardioSmart

Information provided for educational purposes only. Please talk to your health care professional about your specific health needs. To download or order posters on other topics, visit CardioSmart.org/Posters.

CardioSmart.org/Women



Thank you!

Happy Holidays

