



# Pregnancy-Associated Mortality Review

Florida Department of Health, Bureau of Family Health Services

## Pregnancy-Related Deaths Due to Cardiomyopathy 2005-2014

The myocardium (heart muscle) can be affected by a multitude of diseases other than the most common: Ischemic heart disease and hypertensive heart disease. A primary abnormality of the heart muscle is called a cardiomyopathy.<sup>1</sup> There is one cardiomyopathy that affects women only. It is called peripartum cardiomyopathy and occurs in the last month of pregnancy or within five months postpartum in the absence of prior heart failure with no identifiable cause and echocardiogram indicative of left ventricular (LV) dysfunction.<sup>2</sup> This brief provides an overview of pregnancy-related deaths (PRDs) due to cardiomyopathy in Florida from 2005 to 2014.

Florida's Pregnancy-Associated Mortality Review (PAMR) is an ongoing system of surveillance that collects and analyzes information related to maternal deaths in order to promote care and system improvements through evidence-based actions intended to lower risks for PRDs.<sup>3</sup>

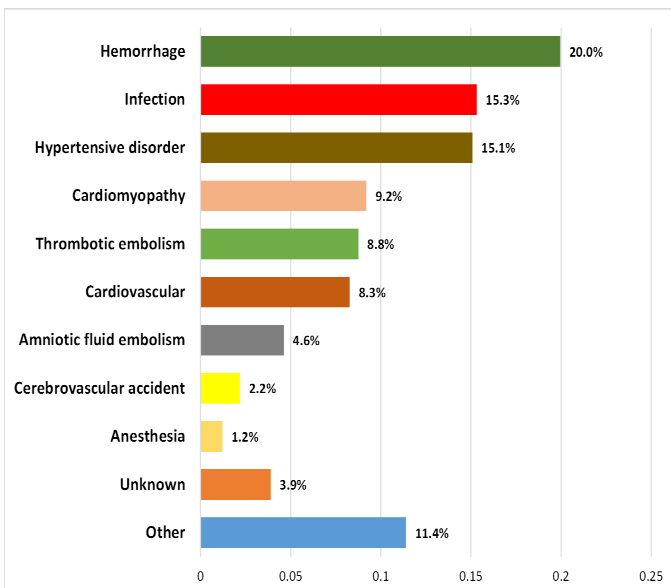
From 2005-2014, the Florida PAMR Committee classified 411 cases as PRDs. Figure 1 shows the distribution of these 411 deaths by cause of death. During this period (2005-2014), cardiomyopathy was the fourth leading cause of PRD with 9.2% of all PRDs.

Of the 411 PRDs, 38 were due to cardiomyopathy. The pregnancy-related mortality ratio due to cardiomyopathy (PRMRC) fluctuated from 2.7 deaths per 100,000 live births during the year 2014 to 0.4 deaths in 2008 (see Figure 2). The trend was not statistically significant for the 2005-2014 period.

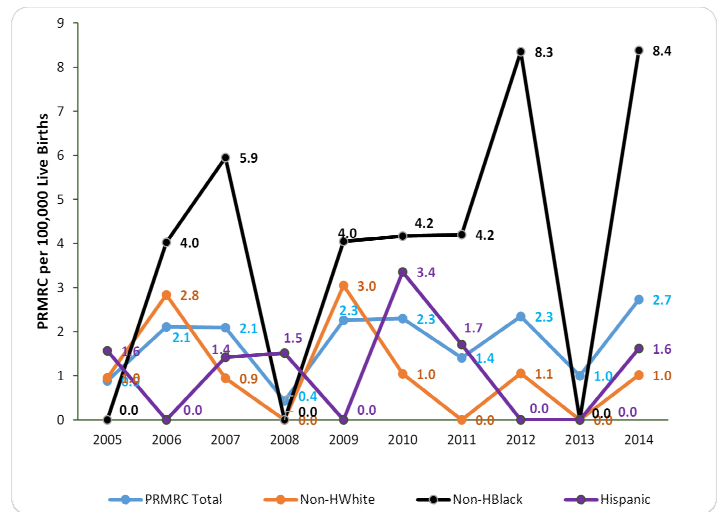
Differences in PRMRC were found for maternal characteristics of race and Hispanic ethnicity, delivery type, prenatal care, body mass index (BMI), and parity.

The ages of the women who died from cardiomyopathy ranged between 20 and 41 years with a median age of 28 years. There were no statistically significant differences by age.

**Figure 1. Distribution of Pregnancy-Related Causes of Death. Florida, 2005-2014 (N=411)**



**Figure 2. Pregnancy Mortality Ratio Due to Cardiomyopathy (PRMRC), by Total and Race/Ethnicity, Florida, 2005-2014**



Fifty percent of women who died from cardiomyopathy were non-Hispanic Black, 29% were non-Hispanic White, and 21% were Hispanic and other races. Non-Hispanic Black women had a higher PRMRC of 3.9 compared with non-Hispanic White of 1.1 or Hispanic and other races of 1.1 PRDs per 100,000 live births.

Cardiomyopathy is associated with cesarean delivery. Sixty three percent of women who died from cardiomyopathy had a cesarean delivery. Women who delivered by cesarean had a higher PRMRC of 2.4 compared with 0.9 PRDs per 100,000 live births for women who had a vaginal delivery.

Women who had late or no prenatal care had a higher PRMRC of 4.6 compared with women who had prenatal care during the first trimester of pregnancy of 1.0 PRDs per 100,000 live births.

Most of the women who died from cardiomyopathy (83%) were overweight (BMI 25-29.9) or obese (BMI ≥ 30.0). Obese women had a higher PRMRC of 4.4 compared with 0.4 PRDs per 100,000 live births for women with normal weight (BMI 20-24.9).

Women with parity two or more had a higher PRMRC of 3.7 compared with women with parity zero (0.6) or parity one (1.0) PRDs per 100,000 live births.

**Table 1. Pregnancy-Related Mortality Ratios due to Cardiomyopathy: Rates per 100,000 Live Births (PRMRC\*) and Unadjusted Relative Ratios (RR), Florida, 2005-2014 (n=38)**

Characteristics	Deaths	PRMRC*	RR (95%CI)
<b>Age</b>			
<25	11	1.4	Ref.
25-34	20	1.8	1.2 (0.6-2.6)
35+	7	2.1	1.5 (0.6-3.7)
<b>Race/Hispanic</b>			
Non-Hispanic White	11	1.1	Ref.
Non-Hispanic Black	19	3.9	3.6* (1.7-7.5)
Hispanic/Other races	8	1.1	1.0 (0.4-2.5)
<b>Marital Status</b>			
Married	23	1.9	Ref.
Not Married	15	1.4	0.7 (0.4-1.4)
<b>Mode of Delivery</b>			
Vaginal	12	0.9	Ref.
Cesarean <sup>1</sup>	20	2.4	2.8* (1.4-5.7)
<b>Prenatal Care Initiation</b>			
First Trimester	16	1.0	Ref.
Second-Third or None	20	4.6	4.6* (2.4-8.8)
<b>Body Mass Index Categories</b>			
Underweight (BMI <20)	2	1.9	5.0 (0.9-27.2)
Normal (BMI 20-24.9)	4	0.4	Ref.
Overweight (BMI 25-29.9)	10	1.9	5.0* (1.6-15.8)
Obese (BMI 30 or +)	19	4.4	11.2* (3.8-32.9)
<b>Parity</b>			
Zero (First Viable Pregnancy)	6	0.7	Ref.
One (Second Viable Pregnancy)	7	1.0	1.5 (0.5-4.5)
Two or More (Third + Viable Pregnancies)	22	3.7	5.7* (2.3-14.1)

<sup>1/</sup> Excluded one emergency cesarean delivery. Note: Missing information was not included.

Overall characteristics of women at increased risk of PRDs due to cardiomyopathy were (see Table 1):

- Non-Hispanic Black
- Second or third trimester entry to care, or no prenatal care
- Obese (BMI ≥ 30)

Cardiomyopathy is associated with:

- Cesarean deliveries
- Parity 3 or more

References:

1. Women's Heart Foundation. Cardiomyopathy and Pregnancy. Retrieved from: [http://womensheart.org/content/heartdisease/cardiomyopathy\\_and\\_pregnancy.asp](http://womensheart.org/content/heartdisease/cardiomyopathy_and_pregnancy.asp)
2. Whitehead S, Berg C, Chang J. (2003). Pregnancy-Related Mortality Due to Cardiomyopathy: United States, 1991-1997. The American College of Obstetrician and Gynecologists 02(6): 1326-31
3. Burch, D., Noell, D., Washington, H., Delke, I. (2012). Pregnancy-Associated Mortality Review. The Florida Experience. Seminars in Perinatology. 36(1): 31-36.

Of the 38 cardiomyopathy deaths during 2005-2014, 33 (86.8%) were due to peripartum cardiomyopathy and 5 (13.2%) as other cardiomyopathy. Among cardiomyopathy cases 16 (42.1%) had a history of hypertension, 5 (13.2%) had diabetes and 3 (7.9%) had asthma.

Among the cardiomyopathy deaths, 84.2% of deaths occurred after a live birth, 7.9% after an abortion, and 7.9% died before delivery.

**Florida PAMR Committee Cardiomyopathy Recommendations for Actions:**

Since 2013 the PAMR Committee has assessed the preventability of maternal deaths. Seventeen percent of PRDs due to cardiomyopathy were deemed to be preventable while 16.7% had factors that definitely contributed. Factors that definitely contributed were significant comorbidities (40%) and delay of diagnosis (20%). The Florida PAMR Committee identified the following recommendations as opportunities to reduce the risk of PRDs due to cardiomyopathy.

**Clinical Factors - Recommendations for Clinicians:**

- It is important to increase awareness for all medical providers of signs and symptoms of cardiomyopathy.
- High risk women may require longer postpartum stay.
- Provide aggressive management of hypertension prenatally and postpartum.
- Patients presenting during pregnancy or postpartum with shortness of breath and dizziness require thorough assessment.

**System Factors**

- Increase provider awareness of the importance of educating patients about how shortness of breath or severe headaches during pregnancy or postpartum may signify a complication.
- Providers should promote the use and significance of Florida Prenatal Screening results to obstetrician providers and medical residents.
- Improve access to family planning services postpartum to women with risk factors such as obesity, hypertension and cardiac disease.

**Individual and Community Factors**

- Every woman of reproductive age with a chronic condition should understand the risk of pregnancy.
- It is important to identify barriers for non-compliant patients.
- It is important to teach patients about shortness of breath and severe headaches as warning signs of complications.