Florida Maternal Mortality Review Committee

Pregnancy-Related Deaths Due to Hemorrhage, 2010-2019

Florida Department of Health, Division of Community Health Promotion

In 2010-2019, hemorrhage was among the leading causes of pregnancy-related deaths (PRDs) before, during, or after delivery in Florida. This brief presents an overview of PRDs due to hemorrhage in Florida during 2010-2019, and provides evidence-based recommendations intended to reduce the risk of maternal deaths due to hemorrhage.

The Florida Maternal Mortality Review Committee (FLMMRC) 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.[1] In 2010-2019, FLMMRC classified 393 cases as PRDs. Figure 1 shows the distribution of these 393 PRDs by cause of death. During this period, the top two leading causes of PRDs were hemorrhage (19.6%) and infection (13.5%).

Of the 393 PRDs, 77 (19.6%) were due to hemorrhage. Between 2010 and 2019, the pregnancy-related mortality ratio due to hemorrhage (PRMRH) declined from a rolling three-year average of 3.4 hemorrhage deaths per 100,000 live births in 2010-2012 to 2.1 deaths in 2017-2019. The downward trend for single-year data was not statistically significant for the same period (Figure 2). At the same time, a statistically significant downward trend in PRMRH was detected for non-Hispanic Black women (Figure 2).

Characteristics of women at increased risk of a PRD due to hemorrhage were (see Table 1):

- 35 years or older
- Non-Hispanic Black
- Not married
- Cesarean delivery
- Late or no prenatal care
- Obese (BMI ≥ 30)

Figure 1. Distribution of PRDs by Cause, Florida, 2010-2019

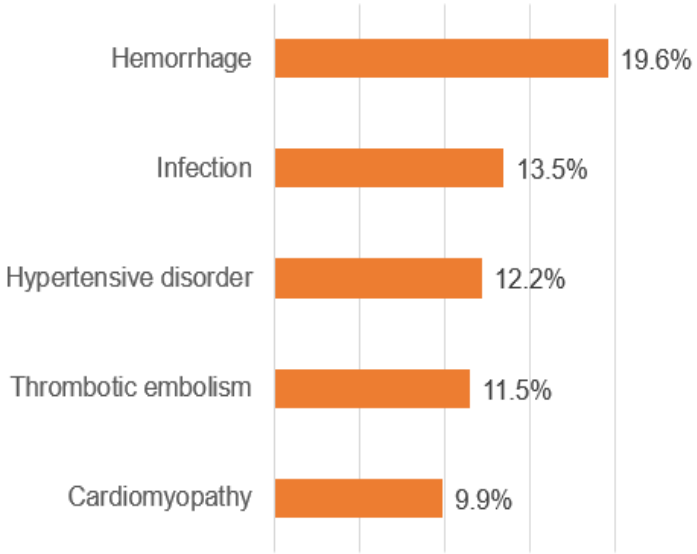
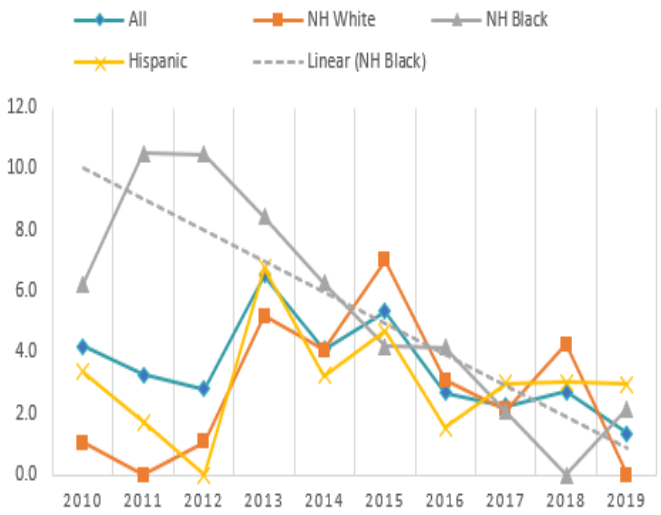


Figure 2. Pregnancy-Related Mortality Ratios per 100,000 Live Births due to Hemorrhage by Race-Ethnicity, Florida, 2010-2019



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

- Women ages 35 and older had a higher PRMRH of 8.8 compared with the PRMRH of women ages 25-34 at 3.2 PRDs per 100,000 live births.
- Non-Hispanic Black women had a higher PRMRH of 5.5 compared with non-Hispanic White or Hispanic women at 3.0 PRDs per 100,000 live births.
- Women who had late or no prenatal care had a higher PRMRH of 4.1 and 3.8, respectively, compared with women who had prenatal care during the first trimester of pregnancy at 2.1 PRDs per 100,000 live births.
- Obese (BMI ≥ 30) women had higher PRMRH of 4.7 compared with 2.7 PRDs per 100,000 live births for women with a normal BMI (18.5-24.9) (see Table 1).

Leading causes of PRDs due to hemorrhage were (see Table 2):

- Placenta accreta, increta, percreta, and uterine atony/postpartum hemorrhage were the two leading causes of hemorrhage PRDs in women with an intrauterine pregnancy (37.9% and 20.6%).
- Ectopic pregnancy accounted for 24.7% of all PRDs due to hemorrhage.

Prepared by Vera Beloshitzkaya, PhD and Leticia Hernandez, PhD, MS. For more information about FLMMRC contact Angela Thompson, RN, BSN, FLMMRC Coordinator at (850) 558-9686 or Angela .Thompson@flhealth.gov

Table 1. Pregnancy-Related Mortality due to Hemorrhage: Rates per 100,000 Live Births (PRMRH) and Unadjusted Relative Ratios (RRs), Florida, 2010-2019 (n=77)

Characteristics	Deaths	PRMRH	RR (95% CI)
Age			
<25	6	1.0	0.3 (0.1-0.7)*
25-34	39	3.2	Ref.
≥35	32	8.8	2.7 (1.7-4.4)*
Race			
Non-Hispanic White	29	3.0	Ref.
Non-Hispanic Black	26	5.5	1.8 (1.0-3.1)*
Hispanic	19	3.0	0.9 (0.6-1.8)
Marital Status			
Married	33	2.9	Ref.
Not Married	44	4.2	1.5 (0.9-2.3)
Mode of Delivery			
Vaginal	16	1.5	Ref.
Cesarean	35	4.3	3.7 (2.0-6.6)*
Prenatal Care Initiation			
First Trimester	33	2.1	Ref.
Second-Third Trimester	16	4.1	1.9 (1.0-3.5)*
None	4	3.8	5.4 (1.9-15.2)*
Body Mass Index			
Underweight (BMI<18.5)	5	5.6	2.0 (0.8-5.4)
Normal (BMI 18.5-24.9)	26	2.7	Ref.
Overweight (BMI 25-29.9)	14	2.6	0.9 (0.5-1.8)
Obese (BMI ≥30)	23	4.7	1.7 (1.0-3.0)

* Statistically significant (p<0.05).

Obstetric Hemorrhage Initiative (OHI) PROVIDE Initiative

Two initiatives were developed and implemented to address the issue of preventable morbidity and mortality related to postpartum hemorrhage.

The Obstetric Hemorrhage Initiative (OHI) *was successfully implemented in 2013-2015, with a sustainability round running during July 2015-June 2016. The toolbox, developed by the FPQC and its partners under contract with Florida Department of Health (FDOH), is available at: https://health.usf.edu/publichealth/chiles/fpqc/OHI.*

In 2017, FDOH and FPQC launched ***the PROVIDE (Promoting Primary Vaginal Deliveries) Initiative*** *to reduce primary cesarean delivery in low-risk, first-time mothers. For most low-risk, nulliparous, term, singleton, vertex (NTSV) pregnancies, cesarean birth increases risk of hemorrhage, infection, uterine rupture, abnormal placentation, cardiac events, and other complications. Participation in this initiative helps hospitals work as a collaborative and implement evidence-based, quality improvement recommendations. This initiative will run through 2022. For more information visit: https://health.usf.edu/publichealth/chiles/fpqc/provide.*

FLMMRC Hemorrhage Recommendations for Actions:

In 2014, the FLMMRC initiated the assessment of preventability of PRDs. The Committee determined that 37.2% of all PRDs (n=43) had a good chance to alter the outcome in 2019. Additionally, deaths from hemorrhage were determined to be 100% preventable. The FLMMRC identified the following recommendations to reduce the risk of hemorrhage PRDs:

Clinical Factors - Providers should raise awareness on the importance of early recognition of the signs of hemorrhage and implement a standard treatment protocol as outlined in the Florida Perinatal Quality Collaborative's (FPQC) Obstetric Hemorrhage Toolkit.[2]

System Factors - Providers should promote the use of the "*Checklist for Management of Pregnant Women who Decline Transfusions*" from the FPQC's Obstetric Hemorrhage Toolkit to plan for high risk deliveries.

Individual and Community Factors - Providers should raise community awareness about the need for women of reproductive age who are experiencing abdominal pain to seek prompt medical attention.

For more information visit: https://hscweb3.hsc.usf.edu/health/publichealth/news/urgent-maternal-mortality-message-from-fl-pamr/

1. Burch, D., Noell, D., Washington, H., Del, I. (2012). Pregnancy-Associated Mortality Review. The Florida Experience. Seminars in Perinatology. 36(1): 31-36.
2. Florida Perinatal Quality Collaborative (2013). Florida Obstetric Hemorrhage Initiative Toolkit: A Quality Improvement Initiative for Obstetric Hemorrhage Management.

Table 2. PRDs Due to Hemorrhage by Cause, Florida, 2010-2019 (n=77)

Causes^	Vaginal	Cesarean	ND*	Total Deaths (%)
Uterine atony, postpartum hemorrhage	6	5	-	12 (20.6%)
Placenta accreta, increta, percreta	6	13	-	22 (37.9%)
Other (uterine artery laceration, Intra-abdominal, other sites)	-	7	-	8 (13.7%)
Placenta previa, abruption placentae	-	-	-	5 (8.6%)
Uterine laceration, rupture spontaneous, forceps, therapeutic abortion	-	-	-	5 (8.6%)
Total intrauterine pregnancies	**16**	**35**	**7**	**58 (75.3%)**
Ruptured ectopic pregnancy and complications	**N/A**		**19**	**19 (24.7%)**
Total deaths due to hemorrhage	**16**	**35**	**26**	**77**

^Other causes of death with less than five cases include: uterine bleeding, not otherwise specified; coagulopathies including disseminated intravascular coagulation; retained placenta/postpartum hemorrhage.

* Not delivered or no record of delivery type. -- Count is less than five.

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