

From the National Perinatal Information Center: Cardiovascular Awareness Month: Exploration of Hypertension on Maternal Health and Outcomes

Elizabeth Rochin, PhD, RN, NE-BC

The National Perinatal Information Center (NPIC) is driven by data, collaboration and research to strengthen, connect and empower our shared purpose of improving patient care.

For over 30 years, NPIC has worked with hospitals, public and private entities, patient safety organizations, insurers and researchers to collect and interpret the data that drives better outcomes for mothers and newborns.



“In 2021, the American Heart Association published a new scientific statement that brought attention to the growing concerns of maternal morbidity and mortality directly related to cardiovascular disease and risk factors that elevate a woman’s risk of heart disease after pregnancy and later in life (1).”

In 2021, the American Heart Association published a new scientific statement that brought attention to the growing concerns of maternal morbidity and mortality directly related to cardiovascular disease and risk factors that elevate a woman’s risk of heart disease after pregnancy and later in life (1). One of the most described conditions within this statement is hypertension. Cardiovascular disease (CVD) is the leading cause of maternal death, with a higher prevalence when including hypertensive disease (2).

An overview of pregnancy-related deaths during the years 2007 – 2016 by the United States Department of Health and Human Services, in conjunction with the Centers for Disease Control (3) found that cardiovascular conditions were the leading cause of death, with higher rates of hypertension among Black women than any other demographic. Additional studies related to disparities include similar findings of increased risk of CVD in Black women (4,5). Research and studies have begun to focus on women’s health not only during childbearing years but also later in life. Benschop and colleagues (6) describe the risk associated with hypertensive disorders in pregnancy and the risk associated with CVD later in life, including a twofold risk compared with women with no history of hypertensive disease.

“Benschop and colleagues (6) describe the risk associated with hypertensive disorders in pregnancy and the risk associated with CVD later in life, including a twofold risk compared with women with no history of hypertensive disease.”

Each February, many healthcare and professional organizations recognize American Heart Month, a month dedicated to the intentional focus on cardiovascular health and issues impacting heart health. In 2018, the American Heart Association declared CVD the primary cause of death in women (7). Conditions such as hypertension, stroke, and heart disease have taken on greater emphasis with COVID-19 as case studies and papers continue to document lingering and significant cardiovascular conditions associated with COVID-19 sequelae and long-COVID-19 (8).

To further explore cardiovascular conditions in pregnancy, the National Perinatal Information Center (NPIC) reviewed outcomes data from 2017 – 2021, focusing on hypertensive disease, as hypertensive disease has a higher prevalence in later CVD in women in later life (2). NPIC provides multiple levels of comparison for every metric reported, including individual hospital, subgroup, 5-year trended database, and overall NPIC database, including comparison with other national benchmarks. During the development of hospital-level data, national algorithms are incorporated, includ-

ing All Patient Refined Diagnosis Related Groups (APR-DRGs) version 37.1, APR-DRG Severity of Illness or Risk of Mortality Subclass, Major Diagnostic Category (MDC), and International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes. ICD-10-CM diagnosis codes O10, O11, O13, O140, O141, O142, O149, O15, and O16.

The following NPIC cohorts were used for this exploration, which includes total deliveries during the years 2017 – 2020:

NPIC Total Deliveries CY 2017 – 2020				
	2017	2018	2019	2020
Total Deliveries	329,856	296,775	308,760	299,609

Table 1. NPIC Total Deliveries CY 2017 – 2020

Hypertension continues to drive postpartum readmissions within the NPIC database and is the primary reason for readmission within 42 days of discharge. 55.7% of reasons for readmission were coded to Hypertension diagnoses in 2020, up from 40.1% in 2017. The reasons for this rate increase are multifactorial and important to track and trend. Continuing to reinforce education about signs and symptoms of emergencies and urgency for care must continue, as well as the accuracy of diagnosis coding at discharge

and upon return to care.

“Hypertension continues to drive postpartum readmissions within the NPIC database and is the primary reason for readmission within 42 days of discharge. 55.7% of reasons for readmission were coded to Hypertension diagnoses in 2020, up from 40.1% in 2017.”

At the beginning of the COVID-19 pandemic, there were emerging case studies and concerns regarding comorbidities having a significant impact on the severity of SARS-CoV-2 disease. In response to those concerns, NPIC ran comorbidity reports for member hospitals and a database evaluation of comorbidities, including asthma, obesity, hypertension, and diabetes, during calendar years 2018 – 2019. Upon reviewing these comorbidities, there

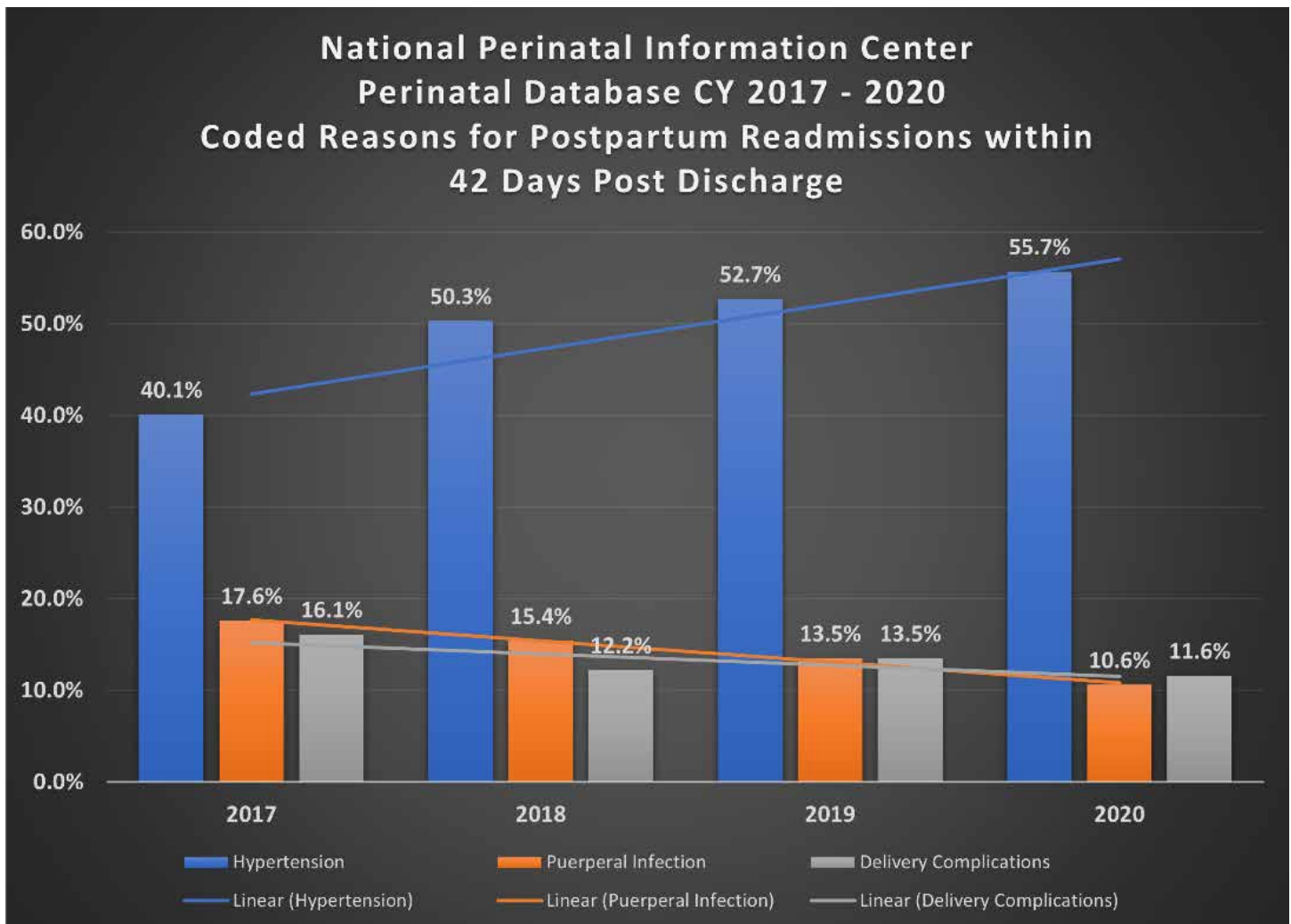


Figure 1. NPIC Perinatal Database CY 2017 – 2020 Coded Reasons for Postpartum Readmissions within 42 Days: Hypertension, Puerperal Infection and Delivery Complications (Deliveries)

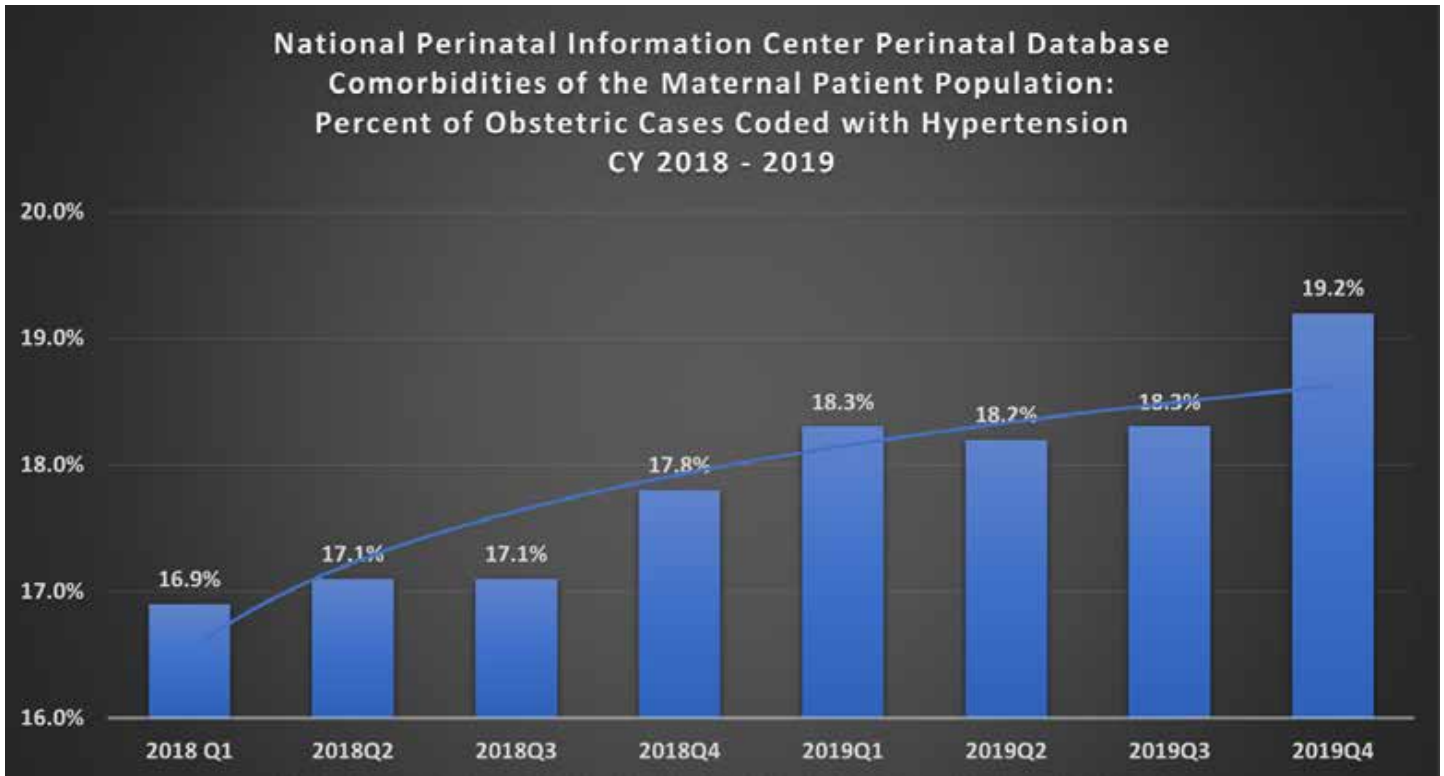


Figure 2. NPIC Perinatal Database Comorbidities of the Maternal Patient Population, Percent of Obstetric Cases with Hypertension CY 2018 – 2019 (Deliveries)

appeared to be an increase in cases coded with hypertension. There could be many potential reasons for this, including better coding practices, better recognition of hypertensive disease, or increasing rates of hypertension among women in childbearing years. Regardless, this trend will be important to follow nationally to inform national practices and policy development to support

cardiovascular health programs for childbearing women.

Over this 4-year period, there has been a decline in coded maternal conditions with neonatal special care admissions associated with a hypertension diagnosis. While the rate of patients with hypertension diagnosis codes is increasing year-over-year

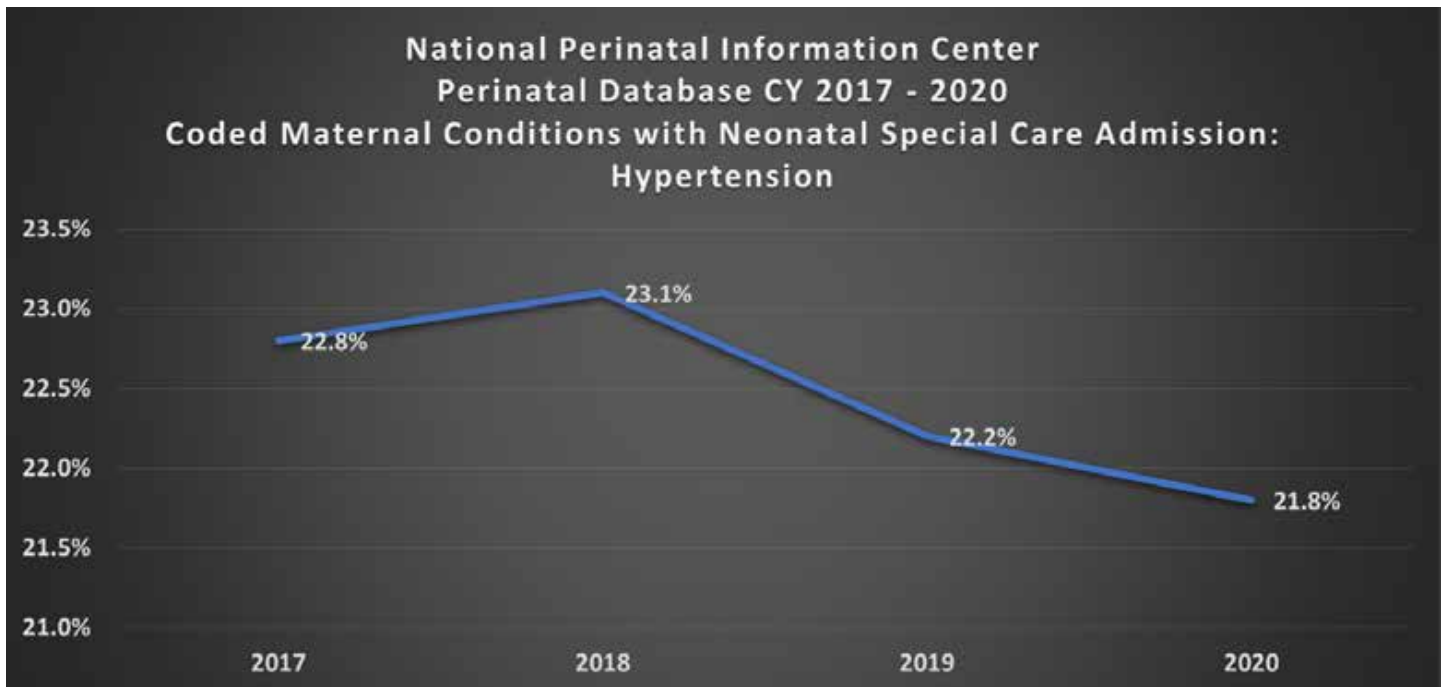


Figure 3. NPIC Perinatal Database CY 2017 – 2020 Coded Maternal Conditions with Neonatal Special Care Admission: Hypertension (Deliveries)

within the NPIC database, this is one area that will continue to receive attention, particularly for those hospitals associated with or routinely transfer to NICU-level care. Effective multidisciplinary collaborations, current transfer agreements, and sharing of data trends that impact NICU care are essential.

“These reports also include the 21 SMM Indicators, including cardiovascular impacts, which can create additional conversations on individual and population-level priorities. NPIC is committed to stratifying additional metrics by race and ethnicity to continue building upon health disparities efforts across the United States.”

Discussion

Cardiovascular disease continues to be an area of intense focus within obstetrics and neonatology. More women are diagnosed with hypertension every year. Among adults who are 20 and older, 31.1 percent of white non-Hispanic women and 44.8% of Black non-Hispanic women have hypertension (9). The disparities within cardiovascular outcomes, particularly for Black women, must continue to be a priority for healthcare teams and communities. NPIC provides maternal and neonatal outcome metrics stratified by race and ethnicity, including Severe Maternal Morbidity (SMM) metrics (overall, preeclampsia, and hemorrhage). These reports also include the 21 SMM Indicators, including cardiovascular impacts, which can create additional conversations on individual and population-level priorities. NPIC is committed to stratifying additional metrics by race and ethnicity to continue building upon health disparities efforts across the United States. Continued emphasis on CVD and its impact on maternal health, including childbearing years and health later in life, must be a daily priority and continue beyond February and American Heart Month.

References:

1. Parikh NI, Gonzalez JM, Anderson CAM, et al. Adverse Pregnancy Outcomes and Cardiovascular Disease Risk: Unique Opportunities for Cardiovascular Disease Prevention in Women: A Scientific Statement From the American Heart Association. *Circulation*. 2021;143(18):e902-e916. doi:[10.1161/CIR.0000000000000961](https://doi.org/10.1161/CIR.0000000000000961)
2. Ramlakhan KP, Johnson MR, Roos-Hesselink JW. Pregnancy and cardiovascular disease. *Nat Rev Cardiol*. 2020;17(11):718-731. doi:[10.1038/s41569-020-0390-z](https://doi.org/10.1038/s41569-020-0390-z)
3. Petersen EE, Davis NL, Goodman D, et al. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016. *MMWR Morb Mortal Wkly Rep*. 2019;68(35):762-765. doi:[10.15585/mmwr.mm6835a3](https://doi.org/10.15585/mmwr.mm6835a3)
4. Grandi SM, Filion KB, Yoon S, et al. Cardiovascular Disease-Related Morbidity and Mortality in Women With a History of Pregnancy Complications. *Circulation*. 2019;139(8):1069-1079. doi:[10.1161/CIRCULATIONAHA.118.036748](https://doi.org/10.1161/CIRCULATIONAHA.118.036748)
5. Gad MM, Elgendy IY, Mahmoud AN, et al. Disparities in Car-

- diovascular Disease Outcomes Among Pregnant and Postpartum Women. *Journal of the American Heart Association*. 2021;10(1):e017832. doi:[10.1161/JAHA.120.017832](https://doi.org/10.1161/JAHA.120.017832)
6. Benschop L, Duvekot JJ, Lennep JER van. Future risk of cardiovascular disease risk factors and events in women after a hypertensive disorder of pregnancy. *Heart*. 2019;105(16):1273-1278. doi:[10.1136/heartjnl-2018-313453](https://doi.org/10.1136/heartjnl-2018-313453)
7. Heart Disease and Stroke Statistics—2018 Update: A Report From the American Heart Association. doi:[10.1161/CIR.0000000000000558](https://doi.org/10.1161/CIR.0000000000000558)
8. Xie Y, Xu E, Bowe B, Al-Aly Z. Long-term cardiovascular outcomes of COVID-19. *Nat Med*. Published online February 7, 2022:1-8. doi:[10.1038/s41591-022-01689-3](https://doi.org/10.1038/s41591-022-01689-3)
9. CDC. Facts About Hypertension | [cdc.gov](https://www.cdc.gov/bloodpressure/facts.htm). Centers for Disease Control and Prevention. Published September 27, 2021. Accessed February 7, 2022. <https://www.cdc.gov/bloodpressure/facts.htm>

The author has no conflicts of interests to disclose.

NT

Corresponding Author:



Elizabeth Rochin, PhD, RN, NE-BC
President
National Perinatal Information Center
225 Chapman St. Suite 200
Providence, RI 02905
401-274-0650
Email: inquiry@npic.org