# *Reducing Maternal Morbidity Initiative – Final Report*

Final results from the Louisiana Perinatal Quality Collaborative Hemorrhage and Hypertension Initiative.

## Overview of Work

Louisiana birthing facilities have been working on statewide quality improvement initiatives for many years. Efforts include *The Gift* quality designation program started in 2006 to support breastfeeding initiation and early attachment, the Louisiana Department of Health's (LDH) 39-Week Initiative that concluded in 2012, and the Louisiana Hospital Association's Health Engagement Network (HEN) hypertension initiative that concluded in 2016. As a result of these efforts, Louisiana has seen important improvements in care and health outcomes. In 2017, the LDH Bureau of Family Health worked with the Louisiana Commission on Perinatal Care and the Prevention of Infant Mortality and the Institute for Healthcare Improvement (IHI) to begin building capacity and laying the groundwork for the Louisiana Perinatal Quality Collaborative (LaPQC) – a voluntary network of hospitals, providers, public health officials, and birth advocates all working together, using improvement science methods, to improve maternal and neonatal outcomes in Louisiana.

In August 2018, the LaPQC launched the *Reducing Maternal Morbidity Initiative* (RMMI), which sought to address preventable maternal mortality and morbidity related to hemorrhage and hypertension, while also focusing on reducing racial disparities in these maternal outcomes. Blood loss and hypertension were two of the leading causes of maternal death in Louisiana between 2011 and 2016, with around 50% of these deaths deemed preventable by the Pregnancy Associated Mortality Review committee.[i] Specifically, the RMMI sought to 1) **reduce Severe Maternal Morbidity (SMM)[ii] by 20% among those persons who experience hemorrhage and/or severe hypertension by May 2020**; and 2) **decrease the Black-white disparity in SMM among hemorrhage and hypertension in the same time period**. Originally, 31 of the state's 52 birthing facilities signed on to the LaPQC *RMMI Initiative*, designed as an IHI collaborative model for "achieving breakthrough improvement."

From August 2018 to May 2020, the LaPQC grew from 32 to 41 birthing facilities, meaning **9 out of every 10 births in Louisiana occurred in a LaPQC participating facility by the end of the RMMI**. Through the guidance of the LaPQC, facilities worked to implement evidence-based best practices related to the management of hemorrhage and hypertension, as well as health equity. During the RMMI, the LaPQC Planning Team held 18 Coaching Calls, three in-person Learning Sessions, conducted in-person visits through their Listening Tour, and worked with hospitals to engage sound improvement science principles to bring about sustainable change. At each stage of this work, the LaPQC sought to elevate the patient experience by elevating patient stories and incorporating health equity work throughout all elements of improvement.

## Measurement and Definitions

While using quality improvement methodology to implement best practices related to hemorrhage, hypertension, and health equity, facility teams were tasked with collecting and submitting monthly data on the new patient care and clinical processes they were testing. Using a secure data portal, teams tracked their implementation progress and used their own data to identify new areas of improvements.

Healthcare quality improvement is based on the Donabedian Framework:[iii] structure, process, and outcome. In healthcare, this means when you improve the structure of care, clinical processes improve, and this results in improved patient outcomes. Facility teams worked on the following structures and processes (See Table 1 for abbreviated view).

**Table 1: Structure, Process, and Outcome Measures for the Reducing Maternal Morbidity Initiative**

| improvement area | structure measures | process measures | outcome measures |
|---|---|---|---|
| **severe hypertension** | unit drills<br><br>debriefs after SMM events | timely treatment of severe hypertension | SMM among hypertension |
| **hemorrhage** | unit drills<br><br>debriefs after SMM events | risk assessment on admission<br><br>quantification of blood loss | SMM among hemorrhage |
| **health equity** | implicit bias training | treatment of hemorrhage and hypertension measures stratified by race | SMM stratified by race/ethnicity |

*Severe Maternal Morbidity*

Severe Maternal Morbidity events are the "unexpected outcomes of labor and delivery that result in significant short or long-term consequences to a woman's health".[iv] For this initiative, we utilized the Centers for Disease Control and Prevention's definition of SMM identified through hospital discharge data. Not all SMM events are preventable; the RMMI sought to address those best practices related to preventable severe maternal morbidity events. SMM among severe hypertension refers to those severe morbidity events occurring in pregnant persons with severe preeclampsia, eclampsia, or superimposed preeclampsia with chronic hypertension. Similarly, SMM among hemorrhage denotes events that occur in persons with a diagnosis of hemorrhage who experience one or more SMM events.

Because data are not risk-adjusted, SMM should not be used to compare one hospital to another, but rather for a hospital to compare its own data over the time period of improvement cycles and from year to year.

*Severe Hypertension in Pregnancy*

In a review of maternal deaths in Louisiana from 2011-2016, of the 36 confirmed pregnancy-related deaths, 3 were due to pre-eclampsia or eclampsia and 15 were due to cardiovascular disease with hypertension being an underlying cause. Based on recommendations from the Alliance for Innovation on Maternal Health (AIM) Severe Hypertension Patient Safety Bundle,[v] facilities can address several structural and process measures to improve SMM related to hypertension. The LaPQC selected unit-based drills, debriefing of SMM events related to hypertension, and timely treatment of hypertension. Teams were expected to perform unit-based drills at least once per quarter and perform multi-disciplinary review of any cases that met severe maternal morbidity criteria. Timely treatment of hypertension is defined as treating elevated, persistent (twice within 15 minutes), new-onset blood pressures with an evidence-based first-line medication within 60 minutes of presentation.

*Severe Hemorrhage in Pregnancy*

Hemorrhage accounted for 17% of the pregnancy-related maternal deaths from 2011-2016. Based on recommendations from the AIM Severe Hemorrhage Patient Safety Bundle,[vi] the LaPQC selected unit-based drills, review of SMM events secondary to hemorrhage, risk assessment on admission to labor and delivery and postpartum, and quantification of blood loss as our structure and process measures. A risk assessment is a tool that classifies a patient's risk for hemorrhage based on the presence or absence of certain diagnoses or past medical events. The assessment, then, translates a patient's risk and triggers different degrees of preparation. Quantifying blood loss was defined as measuring blood loss – either by volume or by weight – during delivery instead of estimating.

*Health Equity*

The LaPQC sought to elevate health equity and the reduction of racial and ethnic disparities through the thoughtful, consistent integration of health equity at every stage of improvement. This approach positioned equity in the forefront of the work, and not an afterthought or secondary outcome. The LaPQC worked with facility teams to focus on health equity while working on structure and process measures to improve recognition and treatment of severe hypertension and severe hemorrhage in pregnancy. Based on recommendations from the AIM Reduction of Peripartum Racial/Ethnic Disparities[vii] and other best practices, we worked with teams to educate and address implicit bias in their facilities and to stratify data by race and ethnicity.

## Final Initiative Results

Though the RMMI began in August 2018, many facilities began maternal improvement work in 2016. For this reason, we chose the 1st quarter of 2016 (Q1 2016) as our outcome measure baseline. The baseline for our process measures is August 2018. Final results can be found in Table 2.

**Table 2: Final results of the Reducing Maternal Morbidity Initiative[1]**

| | outcome measures | | | process measures | | |
|---|---|---|---|---|---|---|
| measure | Q1 2016 | Q2 2020 | change | August 2018 | May 2020 | change |
| SMM among hypertension | 823.2 per 10,000 | 727.6 per 10,000 | -11.6% | | | |
| SMM among hemorrhage | 1037.3 per 10,000 | 676.1 per 10,000 | -34.8% | | | |
| SMM among hypertension, Black-white disparity ratio | .7 | 1.1 | .4 | | | |
| SMM among hypertension, non-Hispanic Black | 733.9 per 10,000 | 793.7 per 10,000 | 8.1% | | | |
| SMM among hypertension, non-Hispanic white | 1095.9 per 10,000 | 751.5 per 10,000 | -31.4 | | | |
| SMM among hemorrhage, Black-white disparity ratio | 2.1 | 1.3 | -.8 | | | |
| SMM among hemorrhage, non-Hispanic Black | 1423.2 per 10,000 | 722.0 per 10,000 | -49.3% | | | |
| SMM among hemorrhage, non-Hispanic white | 682.73 per 10,000 | 575.5 per 10,000 | -15.7% | | | |
| % of patients receiving timely treatment of hypertension | | | | 14.7% | 45.7% | 210.8% |
| % of patients receiving risk assessment at admission | | | | 48.9% | 87.2% | 78.3% |
| % of patients receiving quantification of blood loss | | | | 21.3% | 57.9% | 171.8% |

[1] The baseline SMM rates in this report are slightly different from the baseline SMM rates included in the Interim Report due to revisions in the coding used to calculated SMM overall and by race/ethnicity subgroups.

*Hypertension*
In Louisiana, SMM events among birthing persons with hypertensive disorders in the 1st quarter of 2016 were 823.2 per 10,000 deliveries in participating facilities. By the 2nd quarter of 2020, SMM events among birthing persons with hypertensive disorders in participating facilities were 727.6 per 10,000 deliveries. This represents a 11.6% decrease in SMM events among birthing persons with hypertensive disorders.

Regarding process measures, at baseline, 14.7% of patients were being treated for severe range blood pressures within 60 minutes of presentation. During the initiative, our hospitals demonstrated consistent improvement in this process measure. There has been a 210.8% increase in the number of persons receiving timely treatment of severe hypertension.

*Hemorrhage*
In the 1st quarter of 2016 1037.3 per 10,000 deliveries of birthing persons experiencing hemorrhage also experienced at least one SMM event. By the 2nd quarter of 2020, SMM events among birthing persons experiencing hemorrhage was 676.1 per 10,000 deliveries, representing a 34.8% decrease over the initiative.

At baseline, about half of our hospitals were performing risk assessment on persons being admitted to labor and delivery. During the initiative, there has been a steady increase in facilities performing risk assessment, with over 9 out of every 10 persons admitted to labor and delivery receiving a hemorrhage risk assessment on admission. At the launch of the initiative, only 23.8% of facilities were performing quantitative blood loss procedures (QBL – measuring blood loss through systematic means rather than though estimation); now, almost 80% of the facilities in the collaborative are routinely performing QBL.

*Health Equity*
At baseline, the ratio of SMM events of non-Hispanic Black birthing persons (733.9 per 10,000 deliveries) to non-Hispanic White birthing persons (1095.9 per 10,000 deliveries) among those with hypertensive disorders was 0.7. By the 2nd quarter of 2020, the Black-white racial disparity ratio from SMM due to hypertension was 1.1 (793.7 per 10,000 deliveries for non-Hispanic Black persons compared to 751.5 per 10,000 deliveries for non-Hispanic white birthing persons). While there was improvement in SMM among hypertension among Hispanic white birthing persons, SMM among hypertension among non-Hispanic Black birthing persons increased by 8.1%.

The Black-white disparity ratio in SMM among birthing persons experiencing hemorrhage was 2.1 at baseline (1423.2 per 10,000 deliveries for non-Hispanic Black persons compared to 682.7 per 10,000 deliveries for non-Hispanic white birthing persons). By the 2nd quarter of 2020, the ratio was 1.3 indicating an overall decrease in the disparity among SMM (722.0 per 10,000 deliveries among non-Hispanic Black birthing persons and 575.5 per 10,000 deliveries among non-Hispanic white birthing persons). While non-Hispanic Black birthing persons are still more likely to experience SMM among hemorrhage, the rate decreased almost 50% from baseline compared to a 15.7% decrease among non-Hispanic white birthing persons.

## Making Sense of the Progress

SMM data demonstrates that the maternal morbidity among birthing persons who experience hemorrhage and severe hypertension is decreasing among birthing facilities in the LaPQC; in particular, the LaPQC surpassed the goal of a 20% reduction in SMM among hemorrhage, but did not meet the goal of a 20% reduction in SMM among hypertension. While the SMM disparity gap still exists, there were overall decreases in disparity for both SMM among hemorrhage and SMM among hypertension, though SMM among hypertension increased slightly for non-Hispanic Black birthing persons. The differences between outcomes in SMM among hemorrhage and hypertension may be due to Louisiana's longer history of engaging quality improvement work to reduce outcomes related to hemorrhage. Improvement work related to hypertension began over two years after work

related to hemorrhage, so processes that reduce SMM among hemorrhage are more resilient and engrained in birthing facilities. The first wave of COVID-19 started to peak in the second quarter of 2020, resulting in staffing and resource shortages; less resilient processes – like those attached to reduction of SMM among hypertension – could be affected by such dramatic shifts in the healthcare landscape. It is still too early to determine the impact of the COVID-19 pandemic on these and other maternal health outcomes. Because systemic inequities are a major contributor to disparities[viiiix] systems-level work will need to continue for many years to see a consistent and constant change.

There are, limitations to using SMM as a measure of morbidity. Because the SMM data is based on hospital discharge codes, it only reflects an estimation of morbidity events. Coding practices are variable and unvalidated. SMM should only be used to understand trends over time at the facility level and not used to compare one facility to another.

Structure and process drive outcomes. The data over the time of the initiative demonstrate our facilities strengthened both. As a structure measure, implementation of drills and structured debriefs of severe maternal morbidity events, not only reinforced processes to improve outcomes but also improved teamwork. Additionally, the collaborative nature of the LaPQC helped to create a culture of sharing, improvement, and readiness for change. With each month of the initiative, as evidenced by team-sharing on coaching calls, as well as during the Listening Tour, our teams demonstrated increased confidence in the ability to implement new processes and create change in their facility to reach their goals.

## What's Next?

Structured, continuous quality improvement work is important and necessary for Louisiana birthing persons to experience safe, equitable, and dignified birth, and programs like the LaPQC are successful in supporting these changes. As such, in January 2021, the LaPQC launched the *Safe Births Initiative* which continues improvement work related to hemorrhage and hypertension, while also serving as a vehicle for a new focus on reducing Louisiana's low-risk first time Cesarean delivery rate. With this constellation of improvements, the goal of *Safe Births* is the implementation of practices that promote safe, equitable, and dignified birth for all birthing persons in Louisiana where:

- a **safe birth** is one where evidence-based best practices are employed by health care providers at all levels in an effort to increase readiness, decrease response time, and ensure high quality communication across a care team;
- an **equitable birth** is one where best practices are not only employed with every patient, every time, but that birthing persons of color – particularly Black and African American birthing persons – are given access to the life-saving and sustaining resources they need throughout the birthing process;
- a **dignified birth** is one where, throughout the birth process, birthing persons experience timely and accurate communication with their health care providers, are acknowledged as informed health care consumers, and are included in decision-making about their health care.

[i] Kieltyka L. Mehta P. Schoellmann K. Lake C. Louisiana Maternal Mortality Review Report 2011-2016. August 2018.
[ii] Severe Maternal Morbidity in the United States. Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. January 31, 2020. Last accessed on April 29, 2020.
[iii] Types of Health Care Quality Measures. Content last reviewed July 2011. Agency for Healthcare Research and Quality, Rockville, MD. Last accessed on May 1, 2020.
[iv] Severe Maternal Morbidity in the United States. Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion. January 31, 2020. Last accessed on April 29, 2020.
[v] Patient Safety Bundle: Hypertension. Council on Patient of Women's Health Care. 2015. American College of Obstetricians and Gynecologists. Last accessed on May 1, 2020.
[vi] Patient Safety Bundle: Obstetric Hemorrhage. Council on Patient of Women's Health Care. 2015. American College of Obstetricians and Gynecologists. Last accessed on May 1, 2020
[vii] Patient Safety Bundle: Reduction of Peripartum Racial/Ethnic Disparities. Council on Patient of Women's Health Care. 2016. American College of Obstetricians and Gynecologists. Last accessed on May 1, 2020.
[viii] Howell EA. Reducing Disparities in Severe Maternal Morbidity and Mortality. Clin Obstet Gynecol. 2018 Jun; 61(2):387-399. doi: 10.1097/GRF.0000000000000349
[ix] Gillispie-Bell V. (2021). The Contrast of Color: Why the Black Community Continues to Suffer Health Disparities. *Obstetrics and gynecology*, *137*(2), 220–224. https://doi.org/10.1097/AOG.0000000000004226