Application: Quality initiatives on decreasing racial disparities in maternal morbidity

2022 Bernard J. Tyson National Award for Excellence in Pursuit of Healthcare Equity

Organization(s) Name(s) (organizations involved in initiative)
Texas Children's Hospital, Pavilion for Women

Web site addresses for organization or initiative
https://www.texaschildrens.org/

Name/Title of Initiative
If selected as an award winner, this will be used in press material; Do not include name of the organization submitting award within title. (limit 250 characters, including spaces)

Examining the effect of quality improvement initiatives on decreasing racial disparities in maternal morbidity

Executive Summary of Initiative (2,500 character limit, including spaces; approximately 1 single-spaced page)
Provide a short summary of the initiative's equity-related achievements and the importance of these achievements, including their specific impact to reduce healthcare disparities, improve health equity, and improve health care outcomes. Please note – if your submission is selected, this excerpt might be used in publications. This section should be written similar to a journal abstract with a few sentences addressing key concepts related to the project such as:

- Describe the problem identified;
- Explain the improvement need/performance gap identified;
- Describe the intervention/solution implementation;
- Quantify the improvement, and
- Describe how the improvement was sustained.
- If the intervention/solution was replicated after the initial project (e.g., in other locations, for other
- performance gaps identified), please explain.

The objective of this study was to evaluate the impact of quality improvement (QI) and patient safety initiatives and data disaggregation on racial disparities in severe maternal morbidity from hemorrhage (SMM-H). Our hospital began monitoring and reporting on SMM-overall and SMM-H rates in 2018 using administrative data. In March 2019, we began stratifying data by race and ethnicity and noted a disparity in rates, with non-Hispanic Black women having the highest SMM rates. The data was presented as run charts at monthly department meetings. During this time, our hospital implemented several QI and patient safety initiatives around obstetric hemorrhage and used the stratified data to inform guideline development to reduce racial disparity. The initiatives included implementation of a hemorrhage patient safety bundle and in-depth case reviews of adverse patient outcomes with a health equity focus. We then retrospectively analyzed our data. Our outcome of interest was SMM-H prior to data stratification (preintervention: June 2018-February 2019) as compared to after data stratification (post-intervention: March 2019-June 2020). During our study time period, there were 13,659 deliveries: 37% Hispanic, 35% White, 20% Black, 7% Asian and 1% Other. Pre-intervention, there was a statistically significant difference between Black and White women for SMM-H rates ($p<0.001$). This disparity was no longer significant post-intervention ($p=0.138$). The rate of SMM-H in Black women decreased from 45.5% to 31.6% ($p=0.011$). Our findings suggest that QI and patient safety efforts that incorporate race and ethnicity data stratification to identify disparities and use the information to target interventions have the potential to reduce disparities in SMM.

Describe the healthcare disparity that was the target for the improvement initiative and the

importance of this target for the population your organization serves.
Articulate the health equity problem/opportunity addressed and its importance.
(2,500 character limit, including spaces; approximately 1 single spaced page)

Persistent racial and ethnic disparities in maternal mortality and morbidity exist in the United States. Compared to White women, Black women are 3-4 times more likely to die during childbirth and have twice the risk of severe maternal morbidity. Non-Hispanic (NH) Black women have had the fastest rate of increase in maternal deaths between 2007 and 2014 and have higher case-fatality rates from a range of conditions, though the leading causes of maternal death for Black and White women are similar. Severe maternal morbidity (SMM) is much more common than maternal death, with nearly 100 cases of SMM for every death. SMM can be thought of as the unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman's health.

In 2013, Texas established a Maternal Mortality and Morbidity Task Force to address the rising maternal mortality rate and began reviewing cases of maternal deaths in 2015. The 2018 Texas Maternal Mortality and Morbidity Task Force and Department of State Health Services (DSHS) Joint Biennial Report reported on the finding that Black women were affected by pregnancy-related death more than any other race or ethnicity and that the pregnancy-related mortality rate for NH-Black women was 2.3 times higher than the rate for NH-White women (13.9 versus 6.0 per 100,000 live births). Consistent with nationally reported morbidity and mortality data, the increased risk for maternal death among Black women was present regardless of income, education, marital status, or other health factors. Additionally, Black women in Texas were also at higher risk of SMM involving hemorrhage. AIM is a national data-driven maternal safety and quality improvement (QI) initiative that works to reduce preventable maternal mortality and severe morbidity across the United States.

Our hospital, enrolled and participated in the TexasAIM obstetric hemorrhage learning collaborative. While implementing the AIM obstetric hemorrhage bundle, our hospital also decided to incorporate elements of the AIM safety bundle on reduction of peripartum racial and ethnic disparities to identify and eliminate any disparities in care that may exist in our hospital from hemorrhage. Our project aimed to evaluate the impact of a hemorrhage QI and patient safety initiative along with data disaggregation on racial disparities in severe maternal morbidity from hemorrhage.

Describe how the healthcare disparity was identified at your organization and your baseline measurement of the disparity.
Be sure to provide baseline data demonstrating the healthcare disparity in the targeted population.
(1,250 character limit, including spaces; approximately 1/2 single spaced page)

The TexasAIM outcome measure was the SMM rate from hemorrhage (SMM-H), using definitions as defined by the CDC, with a goal of a 25% reduction. Based on the national and state data regarding disparities in maternal morbidity and mortality for Black women, we decided to overlay the AIM bundle on Reduction of Peripartum Racial and Ethnic Disparities onto our hemorrhage efforts. The hospital quality team started reporting on SMM and SMM-H data at monthly hospital department meetings beginning in January of 2019, our quality team presented our SMM-H and SMM data since October 2015 in the form of run charts, stratified by race and ethnicity, to determine if we had disparities in outcomes. For purposes of reporting our hospital outcomes, we adopted the following categories: NH-Black, NHWhite, Hispanic, NH-Asian and Other. Based on this categorization, we identified a disparity in our outcomes, with NH-Black women having higher SMM and SMM-H rates compared to all other races and ethnicities delivering in our hospital. In fact, the rates in NH-Black women were steadily increasing year over year with rates that were double those seen in our NH-White population.

Explain what factors you identified as the causes of the disparity and possible targets for your intervention to reduce the disparity.
Specifically, describe the analysis of the causes of the disparity within the healthcare organization or in the community that you identified through literature review or, optimally, through an analysis of your healthcare organization data or data about the community you serve (e.g., access to care, communication barriers, unequal diagnostic testing or treatment, social determinants of health, implicit/subconscious bias,

and/or institutional/structural racism) (2,500 character limit, including spaces; approximately 1 single spaced page)

We continued to present stratified SMM and SMM-H data at monthly department meetings and incorporated discussions on national disparities in maternal morbidity and mortality and potential root causes. In an attempt to reduce the disparities in outcomes identified, bundle elements under development took health equity into consideration. This was primarily applied by the workgroups developing the postpartum hemorrhage (PPH) risk assessment and the multidisciplinary reviews of serious hemorrhages for systems issues. The PPH risk assessment workgroup decided to include Black/African-American race as a medium risk factor for hemorrhage. Our rationale for doing this was based on the hypothesis that the increased morbidity in Black women in our hospital was due to delayed recognition and response, possibly from implicit bias, and that a systematic approach to creating a heightened awareness around their increased morbidity from hemorrhage may lead the healthcare team to intervene sooner (e.g., earlier use of uterotonic agents). Implicit racial bias among physicians regarding treatment decisions has been shown to exist, even when physicians do not portray conscious (explicit) bias. The effects are greatest in situations marked by ambiguity, stress, and time constraints. Research shows that the higher the level of implicit/unconscious bias in providers, the less likely they are to offer treatment to Black patients. Furthermore, literature on clinician bias demonstrates that clinicians' perceptions and beliefs about the race and socioeconomic status of the patient influence the care that they deliver, resulting in disparities in patient outcomes. This may be particularly salient in labor management decisions, which are subject to the interpretation of individual clinicians. Additionally, the PPH risk assessment correlated with duration of postpartum oxytocin administration, and we developed an accompanying stratification for post-delivery management based on either the risk assessment performed on admission or the QBL at delivery. We also restructured our quality and safety case reviews to include hemorrhage-specific questions and to consider the role of race, ethnicity, language and social determinants of health, using the framework set forth by the Council on Patient Safety's SMM reporting forms. This approach to clinical case reviews satisfied one of the reporting and systems learning elements of the disparities bundle.

Describe team and stakeholder engagement throughout the initiative. (1,250 character limit, including spaces; approximately 1/2 single spaced page)

Our team consisted of a physician clinical leader, who was also the hospital's Chief Quality Officer for Obstetrics and Gynecology and principal investigator of this study; a nurse clinical leader, who was also the hospital's Associate Director for Labor and Delivery and Obstetric triage; a data specialist; and two quality and safety specialists. Following the first learning collaborative session and gap analysis, our hospital AIM team then organized a hospital AIM Obstetric Hemorrhage Committee comprised of workgroups for each bundle element requiring enhancement or development and implementation with a paired physician and nurse lead of each group. The AIM hospital physician and nurse clinical leader participated in each workgroup, assisting with resources and references and a timeline guide. Workgroups were encouraged to recruit additional members as appropriate. Workgroup meeting frequency was determined and scheduled by team leads, with a suggestion of at least every two weeks. The full AIM Obstetric Hemorrhage Committee met monthly, with each workgroup providing an update about progress, successes, and barriers. Updates were shared at monthly hospital department meetings
with all hospital providers and nurse leaders.

Describe the intervention/solution and its implementation. (2,500 character limit, including spaces; approximately 1 single-spaced page). Specifically, describe details of the interventions/solutions implemented (e.g., improvement methodology and tools used, strategy adjustments, evidence-based best practices employed, change management strategy).

The interventions began with a gap analysis of the AIM obstetric hemorrhage bundle where 7 areas for improvement were identified. 1) assessment of hemorrhage risk; 2) quantitative blood loss (QBL) measurement (i.e., the use of weighing and blood collection devices to determine the actual amount of blood loss rather than a visual estimation); 3) unit education on protocols and unit-based drills with postdrill debriefs; 4) active management of the 3rd stage of labor; 5) post-event debriefs to identify successes and opportunities; 6) multidisciplinary review of serious hemorrhages for systems issues; and 7) support program for patients, families, and staff for all significant hemorrhages.

We used the IHI Model for Improvement and the breakthrough series collaborative model as quality

improvement tools with this work. Along with the Texas AIM resources we used plan-do-study-act (PDSA) cycles to build consensus and make strategic adjustments.

In August of 2019, our hemorrhage risk assessment, QBL, and post-hemorrhage debriefs were implemented. In November 2019, the quality review committee held its first restructured meeting which included nurse reviewers and the fully expanded SMM case review format. We then conducted a retrospective cohort study around implementation of the Obstetric Hemorrhage bundle and data disaggregation to examine whether the interventions influenced reduction of morbidity from hemorrhage in our Black population and the Black-White disparity. We chose the date that SMM and SMM-H data were initially presented to our department stratified by race and ethnicity as the delineation between our baseline pre-intervention period and our post-intervention period because we noted a reduction in morbidity in Black women with monthly discussion of the data even prior to full implementation of the bundle elements. We included all women with a delivery code in our hospital (excluding miscarriages and ectopic pregnancies) from June 2018 – June 2020. Our pre-intervention time period of June 2018 – February 2019 (before data disaggregation) was compared to our post-intervention time period of March 2019 – June 2020 (after data disaggregation). The main outcome measure was the rate of SMM-H among Black women. We also evaluated the overall SMM and the Black-White disparity. $P<0.05$ was considered statistically significant.

Describe measurable improvement(s) in the targeted disparity.
This section should be supported with data in this section and in the supplemental upload document; meant to illustrate improvements in processes of care, health outcomes, and/or experience of care; i.e., results tables, statistical tests, run charts, and other quantitative methods. (2,500 character limit, including spaces; approximately 1 single spaced page)

In this retrospective cohort analysis of deliveries in our hospital, we showed that overall SMM and SMM from hemorrhage decreased significantly in NH-Black women and the NH-Black vs. NH-White disparity in morbidity from hemorrhage was eliminated following the implementation of QI and patient safety interventions that focused on standardizing care around hemorrhage with a health equity framework. Our interventions were informed by results of data disaggregation at the outset of our project. This allowed us to consider root causes of the disparities, such as implicit bias and lack of standardized care, and factor them into our interventions that were under development. Of particular interest, we noted a reduction in SMM and SMM-H rates in Black women delivering in our hospital immediately following data disaggregation and monthly departmental presentation, even before all hemorrhage bundle elements had been implemented. Additionally, we achieved a 22% reduction in SMM-H in the entire delivery population in the post-intervention phase as compared to baseline, which approaches the state goal of reducing morbidity from hemorrhage by 25% and was a statistically significant reduction in our population. This reduction was primarily attributed to a significant reduction in blood product transfusion of amounts less than four units of PRBCs since there was no change in the rate of massive transfusion in the post-intervention phase compared to baseline. We presume this is a direct consequence of earlier interventions to prevent and treat hemorrhage as a result of full implementation of the hemorrhage bundle elements. The rate of SMM-H decreased significantly from 34.10% in the pre-intervention group to 26.67% in the post-intervention group, corresponding to an almost 22% reduction in rate ($p<0.01$). The rate of SMM-H in NH-Black women, however, decreased significantly from 45.5% in the pre-intervention group to 31.6% in the post-intervention group ($p=0.011$). There was also a significant reduction in the rate of SMM-H in Hispanic women (33.2% pre- vs 25.3% post-intervention, $p=0.028$). The overall rate of SMM in NH-Black women decreased from 7.1% in the pre-intervention group to 5.1% in the postintervention group ($p=0.038$). No other race or ethnicity experienced a significant change in the overall SMM rates.

Describe whether the improvements seen were sustained and any processes put in place to monitor and ensure that the improvement will be sustained in the future.
(2,500 character limit, including spaces; approximately 1 single spaced page)

Process measures continue to be submitted to TexasAIM quarterly and include the compliance rate with measurement of QBL at delivery and performance of PPH risk assessment on admission. Since quarter four of 2019, we have strived to maintain at least an 80% compliance rate with both interventions. The

Ob/Gyn Quality Assessment and Performance Improvement committee continues to conduct quality and safety case reviews that include hemorrhage-specific questions and the role of race, ethnicity, language and social determinants of health, using the framework set forth by the Council on Patient Safety's SMM reporting forms. We continue to present stratified SMM and SMM-H data using an internal dashboard and routinely share those results at department meetings. We continue to have incorporated discussions on national disparities in maternal morbidity and mortality and potential root causes, including implicit bias and lack of standardized clinical care. Additional bias questions were added to the case review forms. The sustained improvement as of 2020 is reflected in the data below. The SMM stratified by race and ethnicity remains a statistically significant decrease on the pre-intervention period.

If applicable, describe how the interventions/solutions were replicated (disseminated) to other parts of the organization or other care sites.
(1,250 characters, including spaces; approximately 1/2 single spaced page)

We anticipated that our inclusion of Black race as a medium risk factor would lead to a heightened response when presented with heavier than expected bleeding, such as early use of uterotonic agents and longer duration of postpartum oxytocin. Our findings add to the body of work that highlights the impact of QI initiatives aimed at standardizing delivery care as well as data disaggregation to allow hospitals and healthcare systems to become aware of disparities within their hospitals. The findings from this work were shared with the organization which impacted the way our entire system looked into outcome data. Data began to be stratified by race and ethnicity in multiple forums and changed the way we looked at data. Additionally, education around approaching QI work with a health equity lens has been incorporated into our organization's Advanced Quality Improvement course, in which our primary investigator, Christina Davidson, MD, presents an overview of population health and disparities. This course is offered biannually at our institution. These results were also shared amongst the TexasAIM collaboratives and nationally by our primary investigator at over 15 different conferences.

Describe innovative aspects of the work, including principles that are applicable to other disparities and/or any lessons learned that may be beneficial to other organizations.
(1,250 character limit, including spaces; approximately 1/2 single spaced page)

Our project design is unique in that we disaggregated our data at the outset of the QI initiative, thereby allowing us to prospectively work to identify strategies to provide equitable care and target interventions that could reduce or eliminate the specific disparity identified. Once identified, we not only presented the data to organization leaders, but we also presented it to bedside clinicians who were actively engaged in direct patient care. In our study, there is evidence that simply sharing the data with the providers and staff of the disparity led to an initial reduction in SMM and SMM-H among Black women.
Our study has several strengths. Our hospital admissions team collects self-reported race and ethnicity on all deliveries, which are generally regarded as the gold standard. The prospective monitoring of disparities throughout bundle implementation informed our efforts and would have allowed for different approaches through multiple plan-do-study-act cycles if we were not seeing a reduction in disparities from our initial efforts. Our targeted approach to outcome disparity recognition and reduction is also generalizable in that it can be applied to any health outcome disparity and QI initiative.

Supplemental Documentation
Upload Supplemental Document, exclusively containing Figures and/or Tables that illustrate baseline, improvement, and sustained results. Limit seven (7) pages total; content in excess of 7 pages will not be considered in evaluation. Combine all supplemental documentation within 1 PDF document.
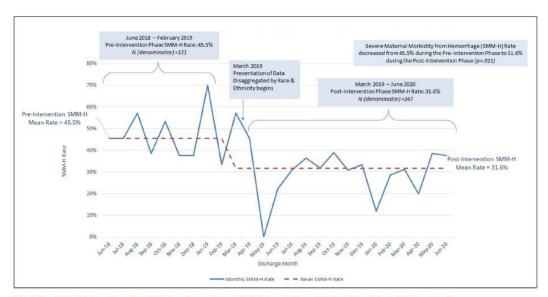
Figure 2 Rate of severe maternal morbidity from haemorrhage (SMM-H) in non-Hispanic black mothers (created by the authors).
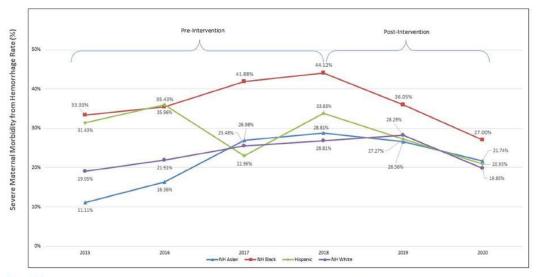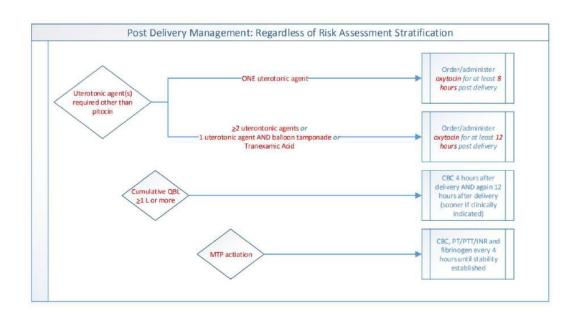

Figure 3 Rate of severe maternal morbidity from haemorrhage by race and ethnicity, October 2015–June 2020 (created by authors). NH, non-Hispanic.

Appendix 3: Postpartum Hemorrhage Risk Assessment and Stratification

PPH Risk Assessment & Stratification		(Patient label)
	Risk Factor	**Interventions**
Low Risk	☐ Singleton ☐ ≤4 prior vaginal births ☐ 0-1 prior cesareans ☐ No known bleeding disorder ☐ No history of PPH	✓ T&S if indirect coombs (IDC) negative ✓ T&C if IDC positive ✓ Postpartum oxytocin for 4 hours
Medium Risk	☐ BMI ≥ 40 kg/m^2 ☐ 2 or more prior cesareans OR 1 uterine incision (myomectomy) ☐ History of PPH ☐ EFW > 4,000 g ☐ Multiple gestation ☐ >4 prior vaginal deliveries ☐ Intrapartum magnesium sulfate administration ☐ Black/African American ☐ Jehovah's Witness or any woman who refuses blood products ☐ Chorioamnionitis ☐ Hgb < 9.0 g/dl ☐ Hct < 30% ☐ Platelets < 100,000 ☐ Large uterine fibroids >5cm	**One Medium Risk Factor:** ✓ T&S if IDC negative ✓ T&C if IDC positive ✓ Discuss potential PPH interventions with patient and RN ✓ Postpartum oxytocin for 8 hours **Two Medium Risk Factors:** ✓ T&C 2 Units PRBCs
High Risk	☐ Known coagulopathy ☐ Active bleeding at admission ☐ Placental abruption ☐ Placenta previa or low-lying placenta ☐ Suspected placenta accreta spectrum disease	✓ T&C 4 units PRBCs ✓ Discuss potential PPH interventions with patient and RN ✓ Extended recovery for 4 hours ✓ Postpartum oxytocin for 12 hours

Post Delivery Management: Regardless of Risk Assessment Stratification

- Uterotonic agent(s) required other than pitocin
  - ONE uterotonic agent → Order/administer *oxytocin for at least 8 hours* post delivery
  - ≥2 uterontonic agents *or* 1 uterotonic agent AND balloon tamponade or Tranexamic Acid → Order/administer *oxytocin for at least 12 hours* post delivery
- Cumulative QBL ≥1 L or more → CBC 4 hours after delivery AND again 12 hours after delivery (sooner if clinically indicated)
- MTP actiation → CBC, PT/PTT/INR and fibrinogen every 4 hours until stability established

Severe Maternal Morbidity among Hemorrhage Population by Race/Ethnicity
October 2016 – December 2021

Legend:
- Asian
- Black Non-Hispanic
- Hispanic
- White Non-Hispanic

Data labels:
- 2016: 48.15%, 33.96%, 28.81%, 23.08%
- 2017: 40.52%, 26.98%, 23.47%
- 2018: 44.68%, 33.58%, 27.12%, 26.78%
- 2019: 36.42%, 27.91%, 27.27%
- 2020: 27.47%, 19.05%
- 2021: 29.71%, 28.57%, 27.97%, 22.08%