**Severe Maternal Hypertension:**

**Optimizing Obstetrical Care**

In Association with The American College of Obstetricians and Gynecologists’ (ACOG)

Alliance for Innovation in Maternal Health (AIM) and The Tennessee Department of Health (TDH)

**Tennessee Initiative for Perinatal Quality Care (TIPQC)**

**Inter-Institutional Quality Improvement Project**

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**EXECUTIVE SUMMARY**

*This Executive Summary defines the 5 W’s (and 1 H) of the TIPQC “Severe Maternal Hypertension: Optimizing Obstetric Care” quality improvement (QI) project. The severe maternal hypertension care aspects of the overall project are also described.*

***WHY:*** *Nationally, and throughout Tennessee (TN) there remain unmet needs for pregnant and postpartum women with severe hypertension. There is urgent need to 1) increase recognition and timely medical treatment; 2) promote standardized, evidence-based clinical guidelines for management of patients with severe hypertension, preeclampsia and eclampsia; 3) outline and provide evidence based care during the prenatal, intrapartum, and postpartum periods; 4) standardize protocols and medical treatment of severe maternal hypertension; 5) improve follow up after delivery; assessment of long-term diagnosis/treatment; appropriate post-partum discharge instructions; and finally 6) decrease/eliminate racial and ethnic disparities.*

***WHAT****: TIPQC has chosen to partner with the American College of Obstetricians and Gynecologist (ACOG) in their Alliance for Innovation on Maternal Health (AIM) safety program to improve care for pregnant women impacted by the severe hypertension, preeclampsia, and eclampsia.  In addition to ACOG, AIM Core Partners include American College of Nurse Midwives (ACNM), Association of State and Territorial Health Officials (ASTHO), Association of Women’s Health, Obstetric, and Neonatal Nursing (AWHONN), California Maternal Quality Care Collaborative (CMQCC), Preeclampsia Foundation, Society for Maternal-Fetal Medicine (SMFM) and collaboration with the TN Dept of Health, the TN Regional Perinatal Centers, and other state initiatives.*

***WHO:****The maternal arm will consist of all members of outpatient and inpatient obstetric care teams, emergency departments (ED), birthing centers and Intensive care units (ICUs).  In addition, hospital administration support for the several maternal hypertension projects is essential to provide team leadership, process development, implementation oversight, and quality measurement.*

***WHERE:****The maternal arm involves outpatient obstetric clinics, outpatient clinics, emergency departments, inpatient delivering hospitals, birthing centers, and inpatient intensive care units (ICUs) in Tennessee.*

***HOW:*** *The maternal arm will improve outcomes by addressing Readiness, Recognition and Prevention, Response, and Reporting. These 4 R’s provide a framework for tackling the numerous barriers and gaps to optimal care for women with severe hypertension.****Readiness****focuses on patient, provider, and community education as well as development of institutional guidelines and protocols.****Recognition and Prevention****emphasizes the importance of standard protocol for measurement and assessment of blood pressure (BP) and urine protein for all pregnant and postpartum women including timely referrals and provision of treatment resources. The****Response****aspect of the bundle focuses on access to treatment, education on facility-wide standard protocols with checklists and escalation policies for management and treatment of severe hypertension, eclampsia, seizure prophylaxis, and magnesium over-dosage, as well as care coordination throughout pregnancy and postpartum period. This includes the development of protocols in diagnosis in conjunction with timely medical intervention and treatment. Finally,****Reporting/Systems Learning****supports the development of mechanisms to collect data and outcomes.*

*A major focus of the maternal arm will be a needs assessment, review of existing maternal protocols for the population, and extensive education for the care team on the perinatal effects of severe hypertension on mothers and their unborn child(ren). The overall format for coordination of the project, like other TIPQC projects, will be via a web-based conference tool. There will be monthly maternal web conferences. The purpose of the conferences is to share “what works and what does not work in our setting” as we realize that any global plan or protocol must work within the context of the local hospital, taking into account resources, staffing, time commitment, etc. This sharing will assist TIPQC to develop useful guidelines and management protocols/bundles that can be applied in most clinical settings. The final product will be a living product, undergoing constant modification as needed based on the context into which is applied.*

***WHEN:****A limited number of hospitals will participate in the obstetric pilot phase of implementation beginning in October 2020.  A full kick off for all state hospital teams will be in March 2021.*

**AIMS, POPULATION, AND MEASURES**

**GLOBAL PROJECT AIM**: To reduce the rate of severe morbidities in pregnant and postpartum women with severe hypertension by 20% by December 2021.

**TARGET POPULATION**: Pregnant and postpartum women (up to 6 weeks) that present to L&D, Triage, ED, Antepartum, or Postpartum that have an elevated blood pressure of ≥160 systolic and/or ≥110 diastolic twice within 15 minutes. Patients with chronic/gestational HTN should also be included.

**MEASURES**

**I. Outcome Measures**:

* Severe maternal morbidity (including and excluding transfusion codes) among
	+ All mothers during their birth admission (excluding ectopics and miscarriages);
	+ Preeclampsia cases, defined as all mothers during their birth admission (excluding ectopics and miscarriages) with one of the following diagnosis codes:
		- Severe Preeclampsia
		- Eclampsia
		- Preeclampsia superimposed on pre-existing hypertension

**II. Process Measures:**

* Obstetric (OB) maternal safety drills (number and topics)
* Provider education (cumulative proportion of delivering physicians and midwives that have completed within the last two years an education program on Severe Hypertension/Preeclampsia that includes the unit-standard protocols and measures)
* Nursing education (cumulative proportion of OB nurses (including L&D and postpartum) that have completed within the last two years an education program on Severe Hypertension/Preeclampsia that includes the unit-standard protocols and measures)
* Treatment of Severe HTN (percent of birthing patients with acute-onset severe hypertension that persists for 15 minutes or more, including those with preeclampsia, gestational or chronic hypertension who were treated within 1 hour with IV Labetalol, IV Hydralazine, or PO Nifedipine)

**III. Structure Measures**

* Patient, Family & Staff Support (hospital has developed OB specific resources and protocols to support patients, family and staff through major OB complications)
* Debriefs (hospital has established a system in your hospital to perform regular formal debriefs after cases with major complications)
* Multidisciplinary Case Reviews (hospital has established a process to perform multidisciplinary systems-level reviews on cases of severe maternal morbidity, including, at minimum, birthing patients admitted to the ICU or receiving ≥4 units RBC transfusions)
* Unit Policy and Procedure (hospital has a Severe HTN/Preeclampsia policy and procedure that provides a unit-standard approach to measuring blood pressure, treatment of Severe HTN/Preeclampsia, administration of Magnesium Sulfate, and treatment of Magnesium Sulfate overdose)
* Electronic Health Record (EHR) Integration (hospital has integrated at least some of the recommended Severe HTN/Preeclampsia bundle processes (i.e. order sets, tracking tools) into their Electronic Health Record system)

**CHARTER**

An inter-professional team of Tennessee obstetric providers selected optimizing Obstetric Care Project. TIPQC’s maternal arm, in conjunction with the Alliance in Innovation on Maternal Care (AIM). Additionally, TIPQC noticed “gaps” in statewide treatment of Maternal Hypertension, Preeclampsia, and Eclampsia and their affected infants. According to The Joint Commission, the new standards for Perinatal Safety require organizations to look at their processes and procedures surrounding the care of women experiencing severe hypertension/preeclampsia. The TIPQC Maternal Arm with AIM collaborated to bring this project to fruition in Tennessee. AIM is a **national data-driven maternal safety and quality improvement initiative** based on proven implementation approaches to improving maternal safety and outcomes in the US. AIM’s end goal is to eliminate preventable maternal mortality and severe morbidity across the United States (US). AIM works through state teams and health systems to align national, state, and hospital level quality improvement efforts to improve overall maternal health outcomes. AIM is funded through a cooperative agreement with the Maternal and Child Health Bureau (MCHB)-Health Resource Services Administration. Additionally, TIPQC noticed “gaps” in statewide treatment of Maternal Hypertension, preeclampsia, and eclampsia.

Equally clear, Tennessee has seen a marked increase in hypertensive related morbidity and mortality in the maternal population in recent years, and this trend has resulted in a growing number of women who require hospital care for management of severe hypertension. Stakeholders at the 2019 TIPQC Annual meeting selected the Maternal Hypertension/Preeclampsia project as the focus of 2020 Quality improvement efforts. Participating institutions will agree to the following: implementing the project as designed, collecting, and submitting the monthly data in a timely manner, and participating in monthly webinars (conferences) and statewide meetings. The TIPQC Maternal Arm’s goals are to work with the medical leaders across the state to implement policies, procedures, and protocols in delivering facilities within the state of Tennessee.

**TOOLKIT**

See “Appendices”. In addition, the maternal hypertension teams will be utilizing resources in the AIM Bundle.

**Data COLLECTIOn & REPORTS**

Participating teams will be capturing the “Treatment of Severe HTN within 1 hour” process measure each month – both in an internal Excel spreadsheet and in a TIPQC/TDH REDCap project. This process measure as well as the other remaining measures will also be captured in the AIM Data Center *quarterly*. Quarterly capture of the defined measures in the AIM Data Center is required for participation in this Maternal Safety Bundle.

The AIM Data Center is a secure online HIPAA secure system used to capture data from every state participating in any of their Maternal Safety Bundles. One individual from each participating hospital will be granted access to the Data Center. The identity of each participating hospital is masked in the Data Center – only TIPQC and each participating hospital will know the identity of each masked hospital. Each participating hospital will be able to generate any number of reports in the Data Center on their data – including a comparison of themselves to hospitals in other states.

The counts for the AIM specified *outcome measures* will be calculated by the Tennessee Hospital Association (THA) for each participating hospital team using specific ICD-10 codes pulled from claims data. TIPQC will receive the tallied counts from THA (on a 2-quarter lag basis) and upload them into the AIM Data Center on behalf of each participating hospital. TIPQC will provide THA with the list of participating hospitals. The participating hospital teams have granted permission for THA to calculate the required measures and for TIPQC to submit the measures to the AIM Data Center. TIPQC will label each participating hospital teams’ data with their masked identifier prior to uploading.

Participating teams will enter the *process and structure measures* directly into the AIM Data Center themselves every quarter.

**Record Retention**

Record retention described in the TIPQC Framework protocol will be followed.

**Recruitment of Participating Institutions**

The recruitment strategy described in the TIPQC Framework protocol will be used.

**Procedures for Participating Institutions**

The data procedures described in the TIPQC Framework protocol will be used. From the protocol: “Each team will be encouraged to develop procedures to support project implementation, data reporting, and change analysis by the local project team. Substantial local latitude is provided to allow flexibility for integration of TIPQC activities into local workflow and schedules, though a minimum frequency and timeliness of data entry is required and is outlined in the project application and data agreement. In this all-voluntary collaborative, multiple data reporting systems and paradigms will be supported to facilitate the broadest possible participation.”

**Training Plan for Participating Institutions**

In addition to the TIPQC Framework protocol, teams will be offered additional training at the TIPQC Annual Meeting in March 2021.

**Duration of the Project**

Several pilot teams will begin implementation for several months prior to the project kickoff for all teams. The duration of the project is 3 years. Participants or the TIPQC membership at large may ask the Oversight Committee to extend the project or use it as a building block for future projects with complimentary endpoints.

**Role of the TIPQC Oversight Committee**

The critical role of the TIPQC Oversight Committee is not anticipated to change during this QI project. From the protocol:

* “Throughout the selection, development, pilot testing, and implementation of a project the TIPQC Oversight Committee plays a vital role. The Committee oversees the selection process at the state meeting and is tasked with ensuring that stakeholders who are present have the opportunity to contribute to the selection process. Following project development and pilot testing, the pilot toolkit is reviewed and approved by the Oversight Committee. Upon completion of pilot testing and incorporation of pilot directed modifications, the Oversight Committee reviews and approves the final toolkit for release to potential participants.”
* “Throughout all phases of the project, the Oversight Committee will be informed of any concerning trends in balancing measures and of any potential safety issues. Further the Oversight Committee is empowered to halt any quality improvement project at any time. A project will be stopped if a simple majority of the entire Oversight Committee votes to halt the project. Should a majority of the Oversight Committee vote to stop a project, a message will be sent to all participating centers directing them to stop the project and data collection will be suspended. The message will include both a detailed explanation of the Committee’s concerns and a roll call listing of Committee members votes- yes, no, abstain, or not present. Given the multiple levels of evidence-based review employed prior to statewide release of the toolkit, early termination of a project by the Oversight Committee is not expected, but a formal mechanism is included should events arise that warrant pausing or halting project participation.
* “The Oversight Committee controls extensions of project duration, or changes in progress scope and is charged with balancing the cost vs. value of any proposed extension or change within the confines of the resources and mission of TIPQC. The Oversight Committee may vote, again by simple majority, to extend project duration or scope or opt to extend the project until the next state meeting for a general membership vote.”

**References**

ACOG Practice Bulletin 222 “Gestational Hypertension and Preeclampsia.” June 2020

ACOG Committee Opinion 743 “Low-Dose Aspirin Use During Pregnancy.” Am J Obstet Gynecol 2018;132(1)e44-e52

ACOG. "Chronic Hypertension in Pregnancy. Practice Bulletin No. 203." January 2019. *American College of Obstetricians and Gynecologists .* https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2019/01/chronic-hypertension-in-pregnancy.

CDC. "CDC/National Center for Health Statistics: Tennessee." 24 April 2020. *Centers for Disease Control and Prevention.* https://www.cdc.gov/nchs/pressroom/states/tennessee/tn.htm.

Cedars Sinai. "Gestational Hypertension." 2020. *cedars-sinai.org.* https://www.cedars-sinai.org/health-library/diseases-and-conditions/g/gestational-hypertension.html.

Geiger, H. Jack, et al. "Institute of Medicine (US) Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care." *Institue of Medicine (IOM) of The National Academies* (2003): https://www.ncbi.nlm.nih.gov/books/NBK220358/ doi: 10.17226/12875. National Academies Press (US).

Jones, Emily J., et al. "Continued disparities in postpartum follow-up and screening among women with gestational diabetes and hypertensive disorders of pregnancy: A systematic review." *J Perinat Neonatal Nurs* (2019): 33(2): 136–148. doi:10.1097/JPN.0000000000000399.

Levine, Lisa D., et al. "Persistent cardiac dysfunction on echocardiography in African Amercian women with severe preeclampsia." *Pregnancy Hypertension* (2019): 17: 127–132. doi:10.1016/j.preghy.2019.05.021.

Lui, Nicla A., Gajana Jeyaram and Amanda Henry. "Postpartum Interventions to Reduce Long-Term Cardiovascular Disease Risk in Women After Hypertensive Disorders of Pregnancy: A Systematic Review." *Front. Cardiovasc. Med.,* (2019): https://doi.org/10.3389/fcvm.2019.00160.

LeFevre, ML. U.S. Preventative Services Task Force. Low-dose aspirin use for the prevention of morbidity and mortality from preeclampsia. U.S. Preventative Services Task Force Recommendation Statement. Ann Intern Med 2014; 161(11);819-26

Mata-Greenwood, Eugenia and Dong-Bao Chen. "Racial Differences in Nitric Oxide-Dependent Vasorelaxation." *Reprod Sci* (2008): 15(1): 9–25. National Institutes of Health.

Meher S, Duley L, Hunter K, Askie L. Antiplatelet therapy before or after 16 weeks’ gestation for preventing preeclampsia: an individual participant data meta-analysis. Am J Obstet Gynecol 2017; 216:121–8.e2. (Systematic Review and Meta-Analysis)

Roberge S, Nicolaides K, Demers S, Hyett J, Chaillet N, Bujold E. The role of aspirin dose on the prevention of preeclampsia and fetal growth restriction: systematic review and meta-analysis. Am J Obstet Gynecol 2017; 216:110–20. e6. (Systematic Review and Meta-Analysis)

Saeed , Anum, Dave Dixon and Eugene Yang. "Racial Disparities in Hypertension Prevalence and Management: A Crisis Control?" 6 April 2020. *American College of Cardiology.* https://www.acc.org/latest-in-cardiology/articles/2020/04/06/08/53/racial-disparities-in-hypertension-prevalence-and-management.

Schiff E, Peleg E, Goldenberg M, Rosenthal T, Ruppin E, Tamarkin M, et al. The use of aspirin to prevent pregnancy-induced hypertension and lower the ratio of thromboxane A2 to prostacyclin in relatively high-risk pregnancies. N Engl J Med 1989; 321:351–6. (Level I)

Stevens, Warren, et al. "Short-term costs of preeclampsia to the United States health care system." *American Journal of Obstetrics & Gynecology* (2017): 217 (3). DOI: 10.1016/j.ajog.2017.04.032 .

Tsigas, Eleni. *Postpartum Preeclampsia: Risk after Delivery Remains*. 28 May 2019. https://www.dona.org/postpartum-preeclampsia-risk-after-delivery-remains/. 2 July 2020.

**Appendices**

* TIPQC Participation and Durable Data Use Agreement (TIPQC Participation and Durable Data Use Agreement.pdf)
* TIPQC Project Application
* Redcap data entry tool
* TIPQC Toolkit