July 7, 2021

Re: 2021 Iowa Maternal Mortality Review Committee Report

As the state continues its conversation around addressing the maternal health needs of our communities, examining the causes of maternal mortality are critical to identify solutions for improving maternal health outcomes. Attached is the most recent report from Iowa's Maternal Mortality Review Committee (MMRC) on the cause and contributing factors of maternal deaths in Iowa as well as recommendation of possible preventive strategies at the patient, provider, health system, and community levels.

For context, the mission of the MMRC is to:

- Identify pregnancy-associated deaths,
- Review deaths caused by pregnancy complications and other associated causes,
- Identify the factors contributing to these deaths, and
- Recommend public health and clinical interventions that may reduce these deaths and improve systems of care.

The scope of Iowa's Maternal Mortality Review Committee is to review all pregnancy-associated deaths of women with indication of pregnancy up to 365 days following the end of the pregnancy, regardless of cause, in compliance with Iowa Code section 135.40 and 641 IAC chapter 5. The Department plays an important role in ensuring the MMRC meets its legislated mandate. IDPH staff are responsible to identify maternal death using birth and death vital records, request medical records from hospitals, physicians, and other licensed health care providers, and perform thorough record abstraction to develop individualized case summaries for the MMRC members.

The Iowa Medical Society (IMS) appoints the MMRC members. The Department, in partnership with the IMS, ensures a timely, confidential review of all maternal deaths with a vision to eliminate preventable maternal deaths, reduce maternal morbidities, reduce racial disparity in birth outcomes and improve population health for women of reproductive age. New to the MMRC this year, and in alignment with public health best practices, the MMRC moved to an annual review of cases vs. the previous three-year review to help inform the state of maternal mortality in a more real-time manner. IDPH also implemented the use of the CDC tool Maternal Mortality Review Information Application (MMRIA) to support a standardized, multi-disciplinary and objective case review process. Additionally, MMRC membership was expanded to include additional maternal health professionals including: Certified Nurse Mid-Wife, Psychiatrist, and a Domestic Violence Prevention professional.

The MMRC report remains an important piece of information to help the Department assure that every Iowan experiences optimal birth outcomes.

Sincerely,

Kelly Garcia

Kelly Garcia, Interim Director, Iowa Department of Public Health

2021 IOWA MATERNAL MORTALITY REVIEW COMMITTEE REPORT

Report from Maternal Deaths that occurred from July 2018 through calendar year 2019

Background

Maternal mortality is higher in the United States (U.S.) compared to any other developed nations. Racial disparities persist in the U.S. and the maternal mortality rates for non-Hispanic black women are 3 to 4 times higher than the rates for white women. According to a 2018, publication "Report from Nine Maternal Mortality Review Committees," 63.2% of the pregnancy-related deaths were preventable.

Iowa's Maternal Mortality Review Committee (MMRC), coordinated by the Iowa Medical Society (IMS) in partnership with the Iowa Department of Public Health (IDPH), is responsible for reviewing identified maternal deaths for the purpose of reducing morbidity and mortality. Death certificates with the pregnancy indicator box checked and those with relevant obstetrical related ICD-10 codes identify possible maternal deaths. IDPH staff work with the Bureau of Health Statistics to identify and link each maternal death certificate to a live birth or fetal death certificate. IDPH staff then request medical records, and conduct a thorough record review to abstract event details and contributing causes leading up to a mother's death.

The Committee meets to determine if the pregnancy-associated death was pregnancy related or not, the cause of death (both primary and underlying causes), and whether the death was preventable. The Committee also looks for contributing factors and identifies opportunities for prevention after each case review. The contributing factors identified during Committee review present opportunities for preventing future maternal morbidity and mortality in Iowa. Details are provided so stakeholders in the state can understand some of the contributors to maternal death and can identify and implement improvement activities suited to their organizational and individual capacity.

Definitions of death in relation to pregnancy used by the Committee

These definitions are drawn from the Maternal Mortality Review Information Application (MMRIA) Facilitation Guide and Review to Action at https://reviewtoaction.org/learn/definitions.

- **Pregnancy-associated death**: A death during or within one year of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.
- **Pregnancy-related death**: A death during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy
- **Pregnancy–associated but NOT related**: A death during or within one year of pregnancy, from a cause that is not related to pregnancy.

A death is considered preventable if there is either a good chance or some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system and or community factors. If there was at least some chance that the death could have been averted, the Committee recommends actions that if implemented have the potential to reduce or prevent future deaths. The death is considered not preventable if the Committee felt there was no chance to alter the outcome.

The 2021 Maternal Mortality Review Committee (MMRC) met on February 27, 2021 to review deaths from July 2018 through calendar year 2019. The Iowa Medical Society appoints the MMRC members. Current members are as follows:

Thad Anderson, MD, Dubuque, OB-Gyn, Chair; Lastascia Coleman, CNM, University of Iowa Hospitals and Clinics; Monica Goedkin, MPA, Violence Prevention Coordinator, IDPH; Stephen Hunter, MD, MFM, University of Iowa Hospitals and Clinics, Secretary; Rebecca Lundquist, MD, Director of Psychiatric Residency program Broadlawns Hospital; Alison Lynch, MD, University of Iowa Hospitals and Clinics; Kimberly Marshall, MD, OB-Gyn, Great River Women's Health; Stephen Pedron, MD MFM, Unity Point Cedar Rapids; Debra Piehl, MD, OB-Gyn, Cedar Rapids OB-Gyn Associates; LeAnne Roberts, MD, OB-Gyn, Unity Point Rock Valley; Stephanie Stauffer, MD, Pathology, University of Iowa Hospitals and Clinics; Also in attendance were Kady Reese, MPH, CPHQ, Iowa Medical Society (meeting coordinator); and Stephanie Trusty, RN, BSN, Lead Maternal Health Clinician, IDPH, data abstractor.

Kokila Thenuwara, MD, Anesthesiologist at the University of Iowa, is a Committee member but was unable to attend the 2021 review.

2021 Maternal Mortality Review Committee Results – Summary Table:

Categories of Maternal Deaths	Preventable	Not Preventable	Undetermined
Pregnancy-Related	• Eclampsia-leading cause • Post-partum hemorrhage • Suicide		
Pregnancy-Associated but NOT related	• Blunt force trauma from motor vehicle crashes- leading cause • Drug overdose • Pneumonia • Cerebral artery hemorrhage, endocarditis related to IV drug use	• Blunt force trauma from motor vehicle crashes	
Pregnancy-Associated but Unable to Determine Pregnancy Relatedness	• Suicide • Cardiac Arrhythmia caused by cardiomegaly left ventricular hypertrophy • Homicide (Domestic violence)		• Cardiac Arrest

PREGNANCY-RELATED DEATHS

Of the pregnancy-related deaths, demographic factors included the following:

Timing of the deaths related to the pregnancy

- None of the pregnancy-related deaths occurred during pregnancy
- 75% were within 42 days of the end of the pregnancy
- 25% within 43 days to 1 year of the end of the pregnancy

Age

- Under 20 years (25%)
- 20-34 years (50%)
- 35 years and older (25%)

Race/Ethnicity

- Non-Hispanic white (50%)
- Ethnicity Hispanic (race not stated) (50%)

Cause of pregnancy-related deaths were preeclampsia/Eclampsia, hemorrhage and suicide.

Preventability of pregnancy-related deaths – The committee determined 100% were preventable.

Contributing factors to the pregnancy–related deaths

These contributing factors identify significant opportunities for prevention. The list identified by the Committee after review of each case is provided in its entirety so that additional state stakeholders can understand some of the contributing factors to maternal death and can participate in quality improvement activities suited to their organizational and individual capacity.

Preeclampsia/Eclampsia – Issues identified as contributing to poor clinical outcomes included:

- Lack of adherence to standard of care in treating preeclampsia/hypertension.
- Assessment of signs and symptoms of preeclampsia and of lab tests that might indicate preeclampsia were missing.
- Clinical skill/quality of care were lacking due to failure to recognize preeclampsia.
- Delay in use of antihypertensive medication during pregnancy or throughout the spectrum of pregnancy and delivery.
- Delay in clinical response to emergency hypertensive crisis.
- Failure by the nurse to communicate abnormal blood pressure to healthcare provider.
- Lack of a referral to higher level of care when there is pre-eclampsia with severe features.
  Preeclampsia with Severe Features Gestational Hypertension and Preeclampsia, Obstetrics & *Gynecology: June 2020 - Volume 135 - Issue 6 - p e237-e260 doi: 10.1097/AOG.0000000000003891*

  - *Systolic blood pressure of 160 mm Hg or more, or diastolic blood pressure of 110 mm Hg or more on two occasions at least 4 hours apart (unless antihypertensive therapy is initiated before this time)*
  - *Thrombocytopenia (platelet count less than 100,000 × 10^9/L*

- *Impaired liver function that is not accounted for by alternative diagnoses and as indicated by abnormally elevated blood concentrations of liver enzymes (to more than twice the upper limit normal concentrations), or by severe persistent right upper quadrant or epigastric pain unresponsive to medications*
- *Renal insufficiency (serum creatinine concentration more than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease)*
- *Pulmonary edema*
- *New-onset headache unresponsive to medication and not accounted for by alternative diagnoses*
- *Visual disturbances*

- Lack of written policy and procedures for hypertensive emergency, or failure to implement it.
- Possible discrimination, which led to differences in quality of care received, including delayed access to health care, specifically preventive care (screening and referral for treatment).
- Missing components of culturally appropriate care: consent in the patient's preferred language and education/communication to patient and family in the patient's preferred language.

Hemorrhage - Issues identified as contributing to poor clinical outcomes included:

- Obesity
- Assessment of the volume of blood lost was not quantified.
- Clinical skill/quality of care, in responding to the hemorrhage.
- Delay by health care provider in calling for assistance.
- Lack of written policy and procedure for obstetric hemorrhage or failure to implement it.

PREGNANCY-ASSOCIATED BUT NOT RELATED OR UNDETERMINED RELATEDNESS TO PREGNANCY

Of the pregnancy-associated but not related deaths or unable to determine pregnancy relatedness, demographic factors included the following:

Timing of the pregnancy-associated but not related deaths:

- 46 % occurred during pregnancy
- None occurred within 42 days of the end of the pregnancy
- 54% occurred within 43 days to 1 year of the end of the pregnancy

Age

- Under 20 years – 9.09%
- 20-34 years – 63.6%
- 35 years and older – 27.27%

Race/Ethnicity

- Non-Hispanic white – 90.9%
- Non-Hispanic black – 9.09 %

Cause of pregnancy-associated but not related deaths or unable to determine pregnancy

relatedness deaths were blunt force trauma from motor vehicle crashes, cerebral artery hemorrhage, pneumonia with sepsis, drug overdose, cardiac arrhythmia caused by cardiomegaly left ventricular hypertrophy, suicide, homicide (domestic violence), and cardiac arrest.

Preventability of pregnancy-associated but not related deaths or unable to determine pregnancy relatedness deaths: 81% were determined by the Committee to be preventable. For a few cases there was inadequate information to determine preventability.

Contributing factors of pregnancy-associated but not related deaths or unable to determine pregnancy relatedness deaths
The following contributing factors identify significant opportunities for prevention. The list identified by the Committee after review of each case is provided in its entirety so that additional state stakeholders can understand some of the contributing factors to maternal death and can participate in quality improvement activities suited to their organizational and individual capacity.

Mental Health | Suicide/Depression

- Assure anti-depressant prescribed medication is renewed postpartum.
- Universal depression screening should be done at least once during pregnancy and also postpartum with referral for treatment when there is a positive screen.
- Lack of employer policy to support paid time off for sick leave.

Substance Use Disorder

- Identified a need for provider education and system level changes for pregnant and postpartum women related to the following:
    - OB providers taking ownership of substance use disorder diagnosis, offering treatment options including medication assisted treatment (MAT), and provides referral to substance abuse treatment.
    - Coordination of care is lacking.
    - Prenatal and Post-partum support lacking.

Cardiac Disorders

- Risk factors and symptoms associated with cardiomyopathy were not recognized by healthcare providers.
- Warnings of cardiac symptoms were not included on postpartum discharge instructions when risk factors were present.
- Tobacco cessation not discussed or not documented.

Motor Vehicle Crashes

- Need for ongoing patient education on seat belt use; 25% of the women who died in motor vehicle crashes were not wearing a seat belt.

Common co-occurring conditions were mental health (45.4%), substance use disorder (36 %), domestic violence (27%), obesity (18%), hypertension (18%), tobacco use (18%), and diabetes (9%).

ALL PREGNANCY-ASSOCIATED DEATHS

Summary of all cases reviewed found that:

- Structural racism and/or discrimination were determined to be a contributing factor in 40% of the cases.
- Race and Ethnicity – 80% of deaths were non-Hispanic white, 6% non-Hispanic black, and 13% of deaths the ethnicity was self-identified as Hispanic with no race identified.
- 53% were post-partum deaths and of those 26.6% were Medicaid eligible at the time of birth and the death occurred between 60 days or up to one year after the end of the pregnancy.

COMMITTEE RECOMMENDATIONS

The following are specific and feasible actions that, if implemented or altered, could prevent future deaths or poor outcomes.

Patient and Family

- Buckling up through all stages of your pregnancy is the single most effective action you can take to protect yourself and your unborn child in a crash.
- Secure firearms if present in the home.

Provider/ Facility - Clinical Practice and Education

- Screen for intimate partner violence. This was a factor in homicide, suicide and substance related deaths.
- Ask every patient about tobacco use, advise them to quit and provide or refer them to treatment.
- Provide cultural specific care, including documents in preferred language and offer an interpreter.
- Provide appropriate referral to higher level of care when there is pre-eclampsia with severe features.
- Provider education/policy for those who refuse blood and blood products.
- Screen every patient for intimate partner violence.
- Screen for human trafficking.
- Liver function testing should be done when a patient has Hepatitis.
- Conduct provider education in Screening, Brief Intervention, and Referral to Treatment (SBIRT), motivational interviewing and Adverse Childhood Experiences (ACES)
- Training on how to talk to patients with Substance Use Disorder (SUD), basic interventions make a big difference, include tools for harm reduction.
- OB provider acknowledgment of and action on their role in SUD as chronic condition that is treatable.
- Screen for history of opioid use disorder when starting a new opioid prescription for postpartum pain.
- To decrease risk of re-use offer Medication Assisted Treatment (MAT) every visit, for patients with SUD.
- Give help line number to clients.
- Know where substance use treatment services are located.
- Conduct universal screening for depression.
- Provide education materials and screening tools for depression and intimate partner violence in the patients' preferred language.
- Use translator or translator services app.

Facility (Birthing Hospitals)

- Establish and implement policy and procedure for follow-up of mother and infant after positive newborn drug screen
- Establish and implement procedure when to call the Health care provider.
- Implement statewide use of Maternal Early Warning System (MEWS).
    - *Maternal Early Warning Criteria from ACOG Committee Opinion No. 590, March 2014; Preparing for Clinical emergencies in Obstetrics and Gynecology.,Mhyre, JM. The Maternal Warning Criteria. Obstetrics and Gynecology. 2014; 124:782–86.*
    - *The Maternal Early Warning System (MEWS) algorithm identifies prompts for bedside assessment by providers with the ability to activate resources required for diagnostic and therapeutic interventions. Escalation of concern may be initiated by any team member at any point in the patient's care. Patients may exhibit physiological changes that signify deterioration. These changes, or MEWS triggers are included below in this guideline.*

        - *Systolic BP; mmHg <90 or >160.*
        - *Diastolic BP; mmHg >100.*
        - *Heart rate; bpm <50 or >120.*
        - *Respiratory rate; bpm <10 or >30.*
        - *Oxygen saturation; % <95.*
        - *Oliguria; ml/hr x 2h <35.*
        - *Maternal agitation, confusion, or unresponsiveness.*

- Have a policy/procedure for treatment of hypertension.
- Every hospital should have a policy on Quantifying Blood Loss (QBL).

System

- Take steps to reduce systemic racism within patient care interactions and practices.
- Recommend that a member of law enforcement be on the Maternal Mortality Review Committee to provide insight on cases involving motor vehicle crashes, intimate partner violence and homicides.
- Implement AIM safety bundles Hypertension, Hemorrhage and Substance Use Disorders.
- Continue Obesity prevention efforts.
- Promote respectful care.
- Encourage EMS and ER staff to ask about and document OB provider.
- De-criminalize SUD.
- Mothers with substance use disorder should receive treatment without fear of losing their children. More family-centered SUD treatment programs are needed so mothers can receive treatment and keep parent-child relationships and families intact.
- Advocate for appropriate parental leave and sick leave.
- Investigate how MMRC can collaborate with Domestic Violence and Child Death Review teams.
- Improve access to care (Medicaid coverage) postpartum for 12 months.

Community

- Community efforts should make sure roads are well marked, and include bumper strips.
- Increase public awareness that drinking and driving has negative impacts.
- Provide education on seatbelt use.
- Slow down when roads become hazardous.
- Promote gun safety; guns should be stored in a lock cabinet, ammunition stored

separate from the guns and also locked.

- De-criminalize Substance Use Disorder (SUD). Eliminate stigma associated with substance use.
- Increased awareness of intimate partner violence.
- Increase awareness of Community Violence prevention programs.

Iowa's pregnancy-related maternal mortality rate was not calculated at this time due to the change to annual reviews (vs. three year reviews) which has resulted in a low number of cases compared to prior reviews which included three years of data. IDPH will evaluate the potential to calculate rates after the next MMRC review. At that time, if enough data is available, we will also calculate and report the rate disaggregated by race and ethnicity.