ANNUAL REPORT 2021

Public Health Maternal Mortality Review

A report of data from years 2013-2019

Kentucky Department for Public Health
Division of Maternal and Child Health

KENTUCKY
CABINET FOR HEALTH
AND FAMILY SERVICES

MCH
Maternal and
Child Health

Kentucky Public Health
Prevent. Promote. Protect.

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The Maternal Mortality Report in Kentucky Annual Report is prepared by the Division of Maternal and Child Health, within the Kentucky Department for Public Health, under Commissioner Dr. Steven Stack. This report was made possible by the many individuals who contributed their time and efforts toward the prevention of MMR. Although this report emphasizes the maternal deaths within the 2018 cohort, the most up to date data available including 2019 is provided in respective sections.

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Executive Summary

Maternal mortality is a key indicator of a state's health and has a long-term impact on other related health factors such as infant mortality. Given the rise of maternal mortality within the United States, it is pertinent to track and implement means to reduce maternal mortality rates. To reduce mortality, Kentucky is promoting optimal health before, during, and after pregnancy. This includes addressing healthy nutrition, chronic health conditions, substance use, health equity, social determinants of health, prenatal care, and early elective deliveries. **All maternal deaths during pregnancy and within a year of delivery are reviewed by the Maternal Mortality Review Committee.** The current CDC standard for "maternal deaths" currently only includes those with pregnancy related causes.

Key Findings for 2018

- 16% of maternal deaths were pregnancy related deaths.
- 52% of maternal deaths were pregnancy-associated.
- 52% of maternal mortality cases had substance use disorder linked to their death.
- 91% of maternal mortality cases were deemed to be preventable.

Key Recommendations

Prenatal and pregnancy

- Public Health to provide education and promote well woman and peri-conceptional care.
- Improve collaboration of care between OB and primary/subspecialists for medical conditions such as hypertension, diabetes, obesity, and those that may be aggravated during pregnancy.
- Continuing evaluation of maternal respiratory and cardiac complications throughout gestation.
- Providers screening for depression, anxiety, post-traumatic stress disorder, domestic violence and other mental and psychosocial conditions for appropriate referral, treatment, and continued monitoring of these issues.
- Providers and health facilities to consider the influence of social determinants of health (SDoH) in the management of pregnancy and its complications.
- Providers assure delivery of comprehensive healthcare evaluations during prenatal care to include screening for substance use disorder (SUD) and referral for treatment.
- Careful tracking and medical record documentation of which providers saw patient during pregnancy.
- To educate providers of the pregnancy treatment options for SUD care in Kentucky, develop local resources, and refer them to additional resources: www.findhelpnowky.org
- As a standard care of, providers access the Kentucky all schedule prescription electronic report (KASPER) during the first prenatal visit.
- SUD providers for pregnant women receiving MOUD determine if women are receiving prenatal care and make appropriate referral for OB care.
- Continue tracking source of patient prescriptions and efficacy of dosage prescribed.

Post-delivery

- Establish guidelines for mothers with or without prenatal care with coordinated referral between primary physician, obstetric provider, substance use disorder specialist, and infant's provider, with follow-up and plan of safe care for her infant.
- Continue to screen for mental health problems such as post-partum depression and post-traumatic stress.
- Integrate treatment access and tracking in cases of separation of mother and baby.
- Institute a postpartum follow up within 7-10 days of delivery especially for high-risk deliveries and for women with SUD prior to the standard 6 weeks postpartum visit.
- Referral of infant to Health Access Nurturing Development Services (HANDS) for home visits postpartum.
- Consideration of a policy that will extend OB and post-partum health coverage till one year post delivery.
- Access to full information that is available including, newborn chart, newborn medical records, neonatal abstinence syndrome (NAS), Medicaid, and coroner reports for maternal death review.

General Safety

- Kentucky Perinatal Quality Collaborative (KyPQC), Kentucky as a state participating in Alliance for Innovation on Maternal Health (AIM), and MMRC to develop treatment management or protocols that address the social determinants of health.
- Child Protective Services to provide follow-up of infants and children for a few years in the event of maternal death.
- Policy implemented to address the importance of autopsy, especially for complex medical cases which prove necessary in determining risk factors/cause relevant to mortality prevention.
- Assure stabilization of patients prior to transfer to a higher level of maternal care.
- Link patients to a community health worker.
- Providing adequate education on seatbelt use for everyone, especially during pregnancy; education on proper infant restraint for rear facing car seats.
- Policy consideration for toxicology on all drivers and passengers involved in a motor vehicle accident.
- Creation of a fire evacuation plan for every person.

Background

Maternal health and its Importance

To reduce the maternal mortality rate and improve the health of the state, the first step is to identify those women whose death occurred during pregnancy or within one year of the pregnancy from:

- Pregnancy-associated death: Death of a woman while pregnant or within one year of the termination of the pregnancy regardless of the cause.

- Pregnancy-associated, but not related death: Death of a woman during pregnancy or within one year of the end of the pregnancy from a cause unrelated to pregnancy.

- Pregnancy-related death: Death of a woman during pregnancy or within one year of the end of the pregnancy, from a pregnancy complication, a chain of events initiated by a pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

The World Health Organization defines maternal death or mortality as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." The Centers for Disease Control and Prevention expanded this definition to include pregnancy-related deaths occurring within one year of the end of the pregnancy. Kentucky further expanded the CDC definition to include all maternal deaths from any cause for its maternal mortality reviews.

The Centers for Disease Control and Prevention report nearly 700 women die each year in the United States of pregnancy or delivery complications. The American College of Obstetricians and Gynecologists reported that more women die from pregnancy-related complications in the United States than in any other developed country. The national maternal mortality rate has increased by 26% in recent years. Racial disparities are apparent, as black women are three to four times more likely to die from a pregnancy-related complication than non-Hispanic white women (Centers for Disease Control and Prevention, 2019).

Disparities in Kentucky vary by geography, race, ethnicity, and access to care. Kentucky's population is 87.5% White/Caucasian, 8.5% Black/African American, and 3.9% Hispanic (United States Census Bureau). Death certificates show maternal deaths appear to be higher among black women in the two largest urban areas in Kentucky (Lexington and Louisville).

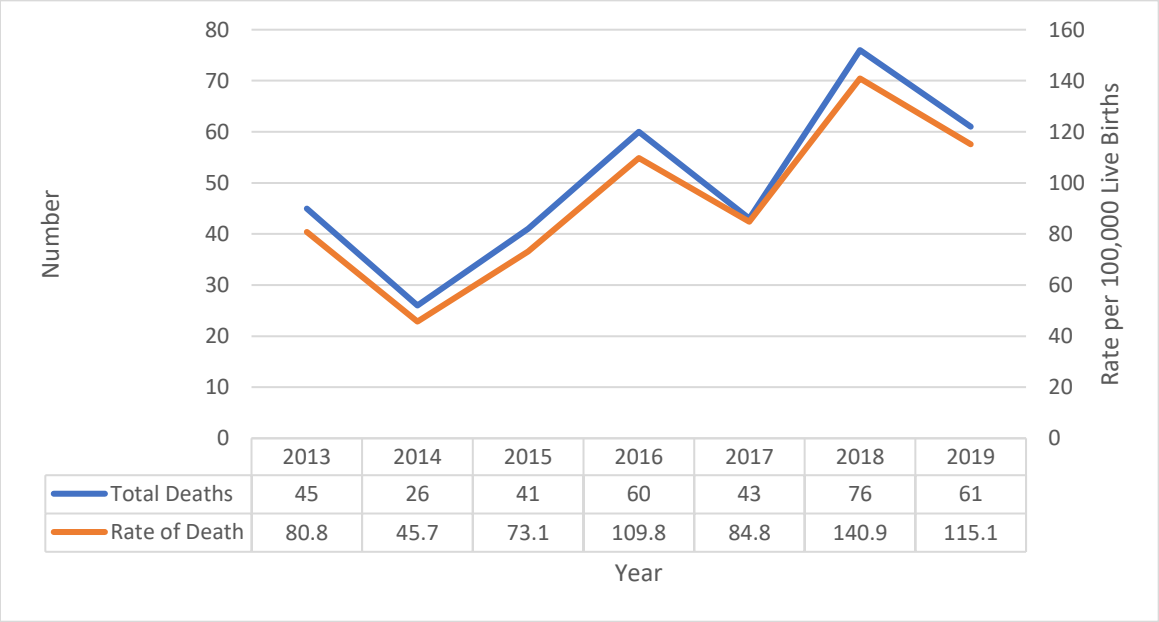
The 2018 maternal mortality rate in the U.S. was 17.4 deaths per 100,000 live births. That has increased significantly, as the 2019 rate was 20.1 per 100,000 live births (National Center for Health Statistics). Almost half of all pregnancy-related deaths are reported to be caused by hemorrhage, cardiovascular and coronary conditions, cardiomyopathy, or infection. However, it is estimated more than 60% of pregnancy-related deaths are preventable.

Maternal Mortality from Vital Statistic Records

The importance of Kentucky's maternal health and well-being has a significant impact on the overall health of the state. Risk factors impacting maternal mortality include tobacco use, obesity, racial disparities, depression, opioid use, and other social determinants of health such as transportation, access to care, domestic violence, and a rural state. Morbidities such as diabetes, hypertension, or other health conditions require additional follow-up and management during the pregnancy.

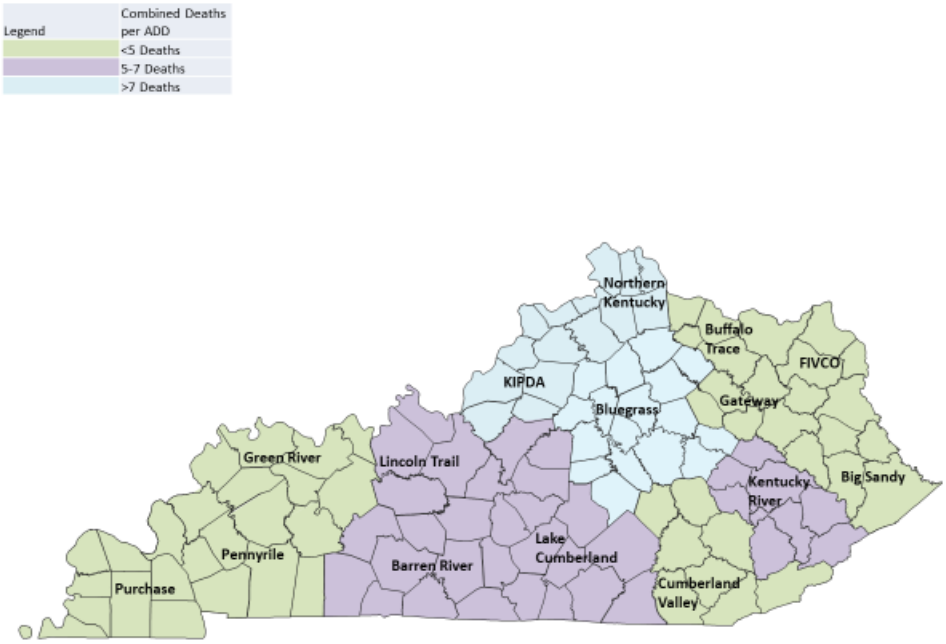
Figure 1 displays the finite count of maternal deaths of those pregnant within one year before their death or pregnant at the time of death and the number of maternal deaths per 100,000 live births within the state of Kentucky. There was a small drop in this rate in 2014, but it has shown a startling increase in both 2016 and 2018. These figures both display data by their respective years from 2013 to 2019 and is inclusive of any cause of death. As well, the total number of deaths reviewed by area development district is presented in figure 2.

Figure 1: **Total Number of Maternal* Deaths and Rate of Death; Kentucky, 2013-2019**



*Maternal death is defined as any female between the ages of 15-55 that was pregnant within one year prior to death or pregnant at death and died from any cause. **2016-2019 data is preliminary, and numbers may change
Data Sources: KY Vital Statistics files, linked live birth, and death certificate files years 2013-2019

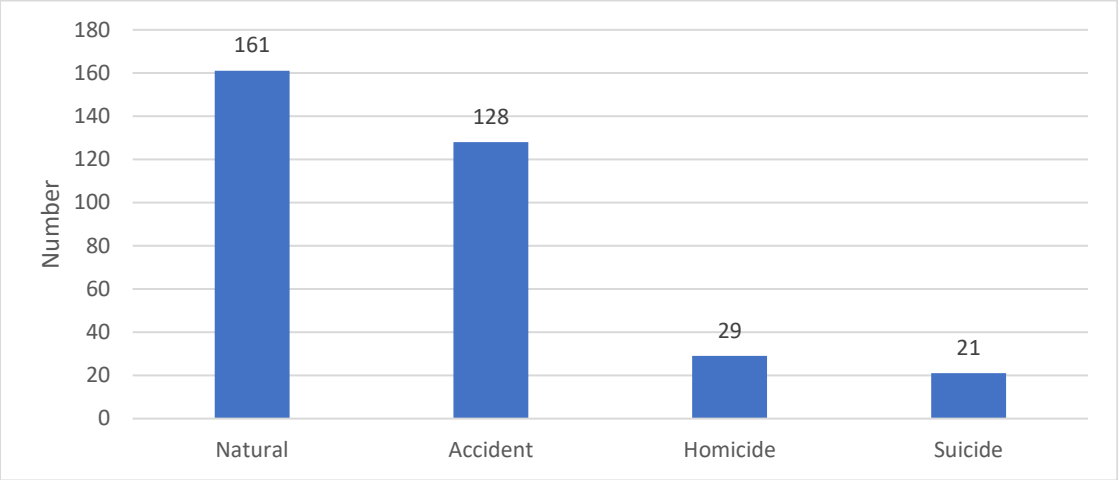
Figure 2: **Total Number of Maternal Deaths Reviewed by Area Development District 2017-2018**



On the death certificate, the manner of death is defined as natural, accidental, homicide, suicide, or undetermined. Figure 3 shows the total number of maternal deaths based on the manner of death. Natural deaths include any death occurring because of disease or a natural process. Accidental deaths are categorized as resulting from an inadvertent event. Homicide deaths are considered to occur due to the action of another party directly causing the death of a person. Suicide deaths are from self-inflicted injury with evidence of intent to die. Outside of the prior criteria are undetermined deaths, in which very little information is available, and other classification is unavailable.

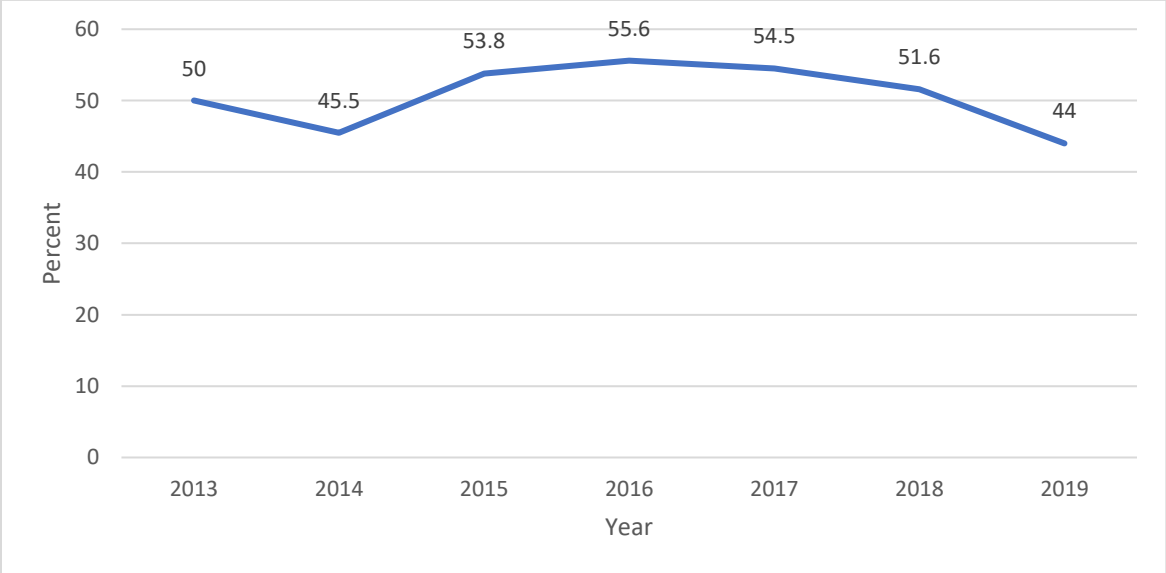
In Kentucky, suicide deaths require clear evidence of intent such as a history of suicidal ideation documented in a note. A concern of our Kentucky maternal mortality reviews in some overdose deaths listed as accidental may have been suicide attempts. This presents as a clear limitation to some of the categorizations of Kentucky maternal deaths. Risk factors such as depression, other mental health disorders, or domestic violence for deaths not pregnancy related or associated, have been noted during the abstraction of these cases for reference. Many death certificates have causes of death consistent with substance use or infected injection sites based on the International Classification of Diseases 10 revision (ICD-10). Those accidental deaths that have met the classification of being accidental and related to substance overdose are noted within Figure 4.

Figure 3: **Total Number of Maternal* Deaths by Manner of Death; Kentucky 2013-2019** Combined**



*Maternal death is defined as any female between the ages of 15-55 that was pregnant within one year prior to death or pregnant at death and died from any cause.
**2016-2019 data is preliminary, and numbers may change
Data Source: KY Vital Statistics files, linked live birth, and death certificate files years 2013-2019

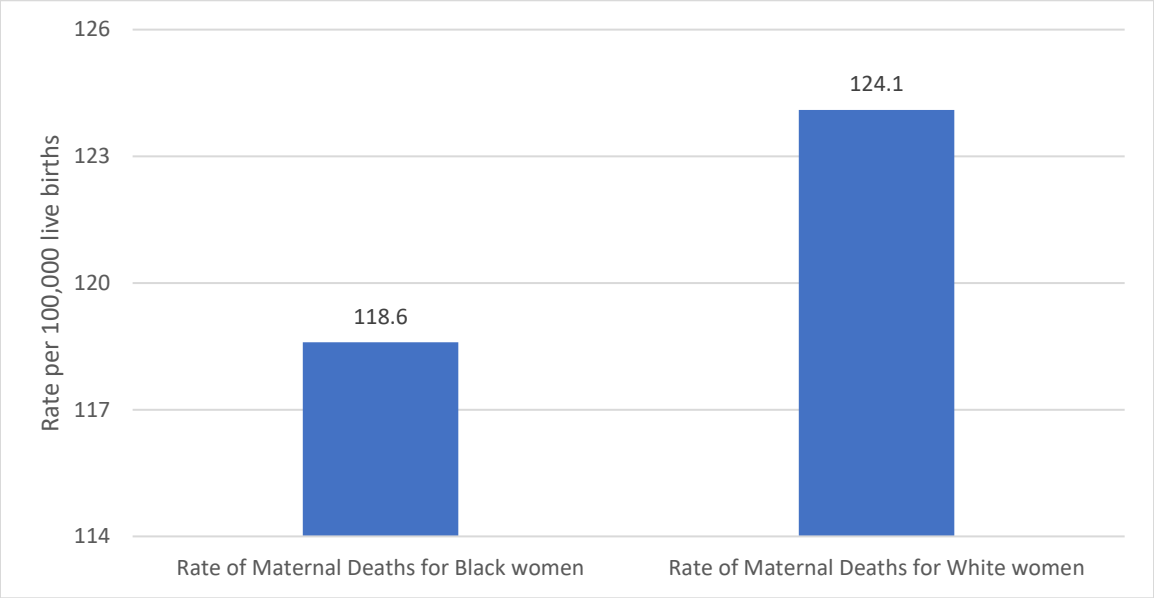
Figure 4: **Percent of Accidental Maternal Deaths due to Drug Overdose, Kentucky (2013- 2019)**



*Maternal death is defined as any female between the ages of 15-55 that was pregnant within one year prior to death or pregnant at death and died from any cause.
Drug overdose is defined by the ICD10 code X40-X49
**2016-2019 data is preliminary, and numbers may change
Data Source: KY Vital Statistics files, linked live birth, and death certificate files years 2013-2018

Shown in Figure 5 are the maternal death rate from any cause in 2019. The higher rate for white women may be explained by number of cases that are not pregnancy-related deaths (see Figure 9 for race-specific pregnancy related deaths).

Figure 5: **Difference in Maternal Deaths by Race in 2019***



*In the case of Black maternal deaths N=6, and for White maternal deaths N=54

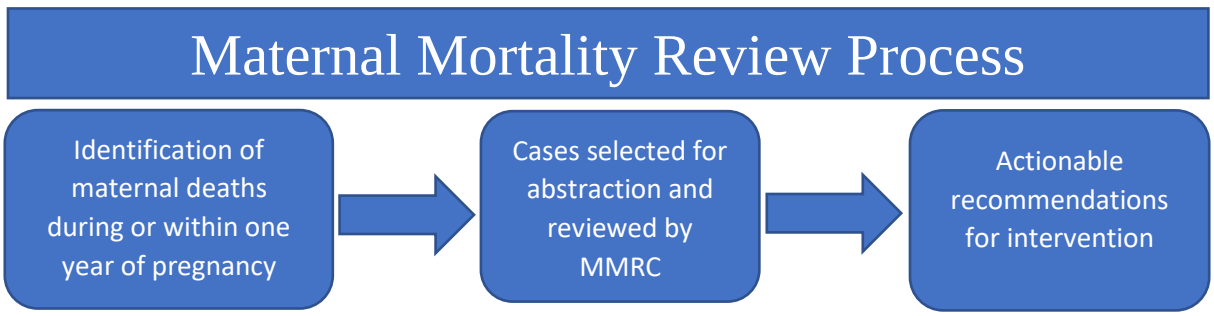
Maternal Mortality Review Assessment and Strategic Plans

The mission of maternal mortality review is to:

- Identify all causes of maternal death in Kentucky
- Review cause and manner of maternal deaths to identify risk factors, system deficits, or preventable causes
- Prevent pregnancy complications related to or associated with maternal deaths

The maternal mortality review committee (MMRC) meets to determine program process and planning with the analysis of available data and technical assistance from the Centers for Disease Control and Prevention.

Figure 6: **Summary of MMRC review process**



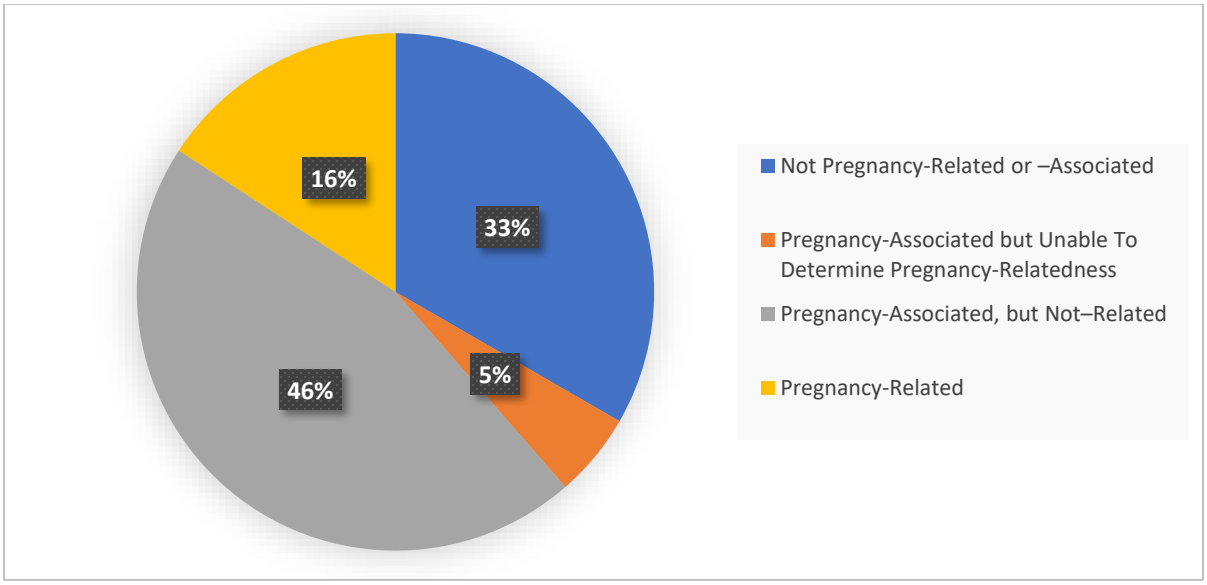
The MMRC works to answer a variety of questions including the following core questions:

- Was the death pregnancy related?
- What was the cause of the death?
- Was the death preventable?
- What factors contributed to the death?
- What recommendations and actions are needed to address the contributing factors?
- What is the anticipated impact if the recommendations and actions were implemented?

Review Findings for 2018 cohort

Using established review criteria, the Division of Maternal and Child Health had determined more than half of the 2018 maternal deaths in Kentucky were pregnancy-associated. Those deaths were due in part to pregnancy-associated causes such as substance use, motor vehicle collisions, or other accidental deaths, as shown in Figure 7.

Figure 7: **Pregnancy Relatedness in 2018 Maternal Deaths****



*Underlying causes for pregnancy related deaths included amniotic fluid embolism, esophageal intubation, malnutrition and cardiac event, mental health and inter-partner issues, obesity, psychiatric and seizure disorder, substance use, and thrombophlebitis respectively.

As the CDC definition for maternal deaths includes only pregnancy-related deaths, Figure 8 illustrate the total number and the rate of pregnancy-related deaths as reviewed by the MMRC for 2017 to 2018. **The 2018 pregnancy-related mortality rate for Kentucky decreased from 2017 and is at 16.6 per 100,000 live births slightly lower than the 2018 US rate of 17.4 per 100,000 live births**. Figure 8 illustrates the race disparity for pregnancy-related deaths for the 2018 cohort.

Figure 8: **Total Number of MMRC Pregnancy Related Deaths and Rate of Deaths; Kentucky 2017-2018**

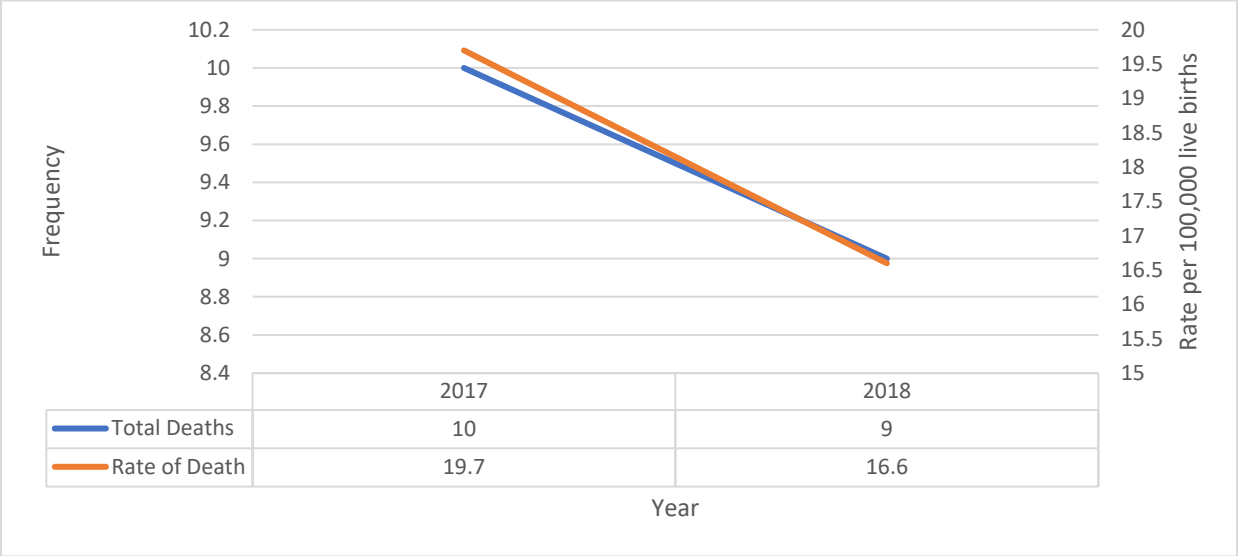
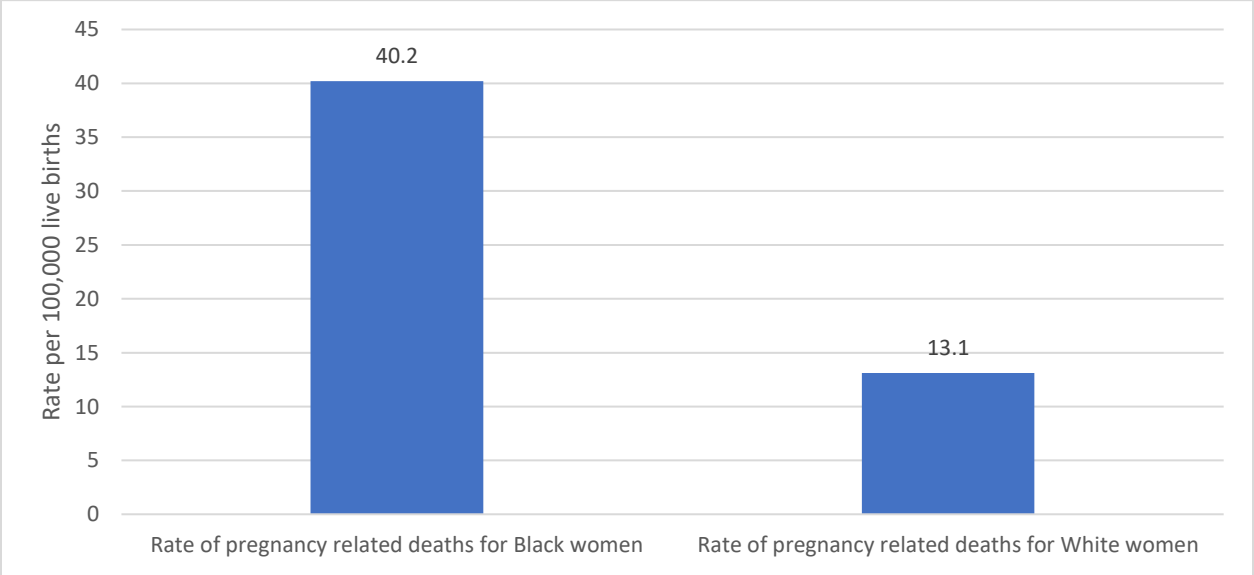


Figure 9: **Difference in Pregnancy Related Death Rate by Race 2018***



*In the case of Black pregnancy related deaths N=2, and for White pregnancy related deaths N=6

The MMRC determines agreement with the coroner's cause of death. The committee did agree with the cause of death in 78% of reviewed cases. Differences between committee determinations and coroner determinations were related to the committee having more information and medical records. The coroner's determination may have been based on limited information if the decedent had multiple providers in different facilities or jurisdictions in Kentucky or surrounding states. Abstraction of medical records and review of individual cases by the committee is necessary to confirm the causes of death based on all available details.

Preliminary conclusions found more than half of the accidental maternal deaths were directly related to drug overdose. The committee agreed that in more than half of 2018 cases reviewed, substance abuse contributed to the death (Figure 10). More specific substance with emphasis on opioid and methamphetamine use where it contributed to maternal death is displayed within Figure 11. The number of maternal deaths attributed to substance abuse strengthen the need to address its impact before or during early pregnancy and the need for ongoing care management after delivery.

Figure 10**: Substance Use as a Contributing Factor in 2018 Maternal Accidental Deaths**

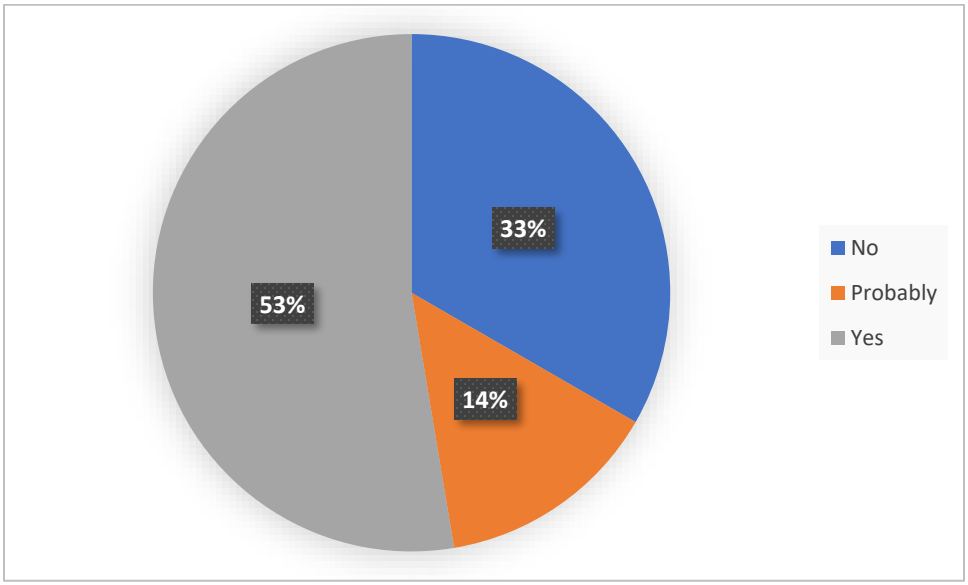
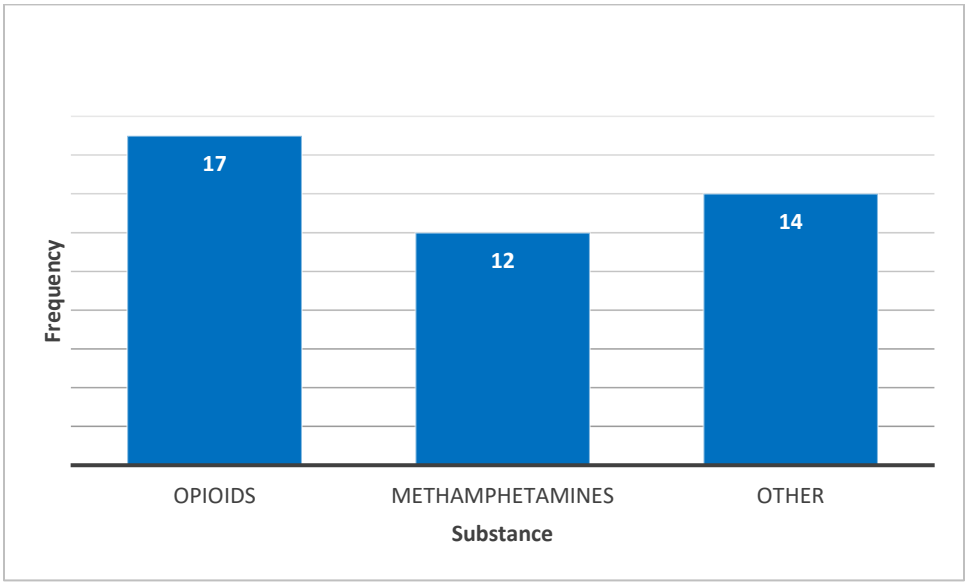


Figure 11: **Substance Use Breakdown* where it contributed to death 2018 cohort**

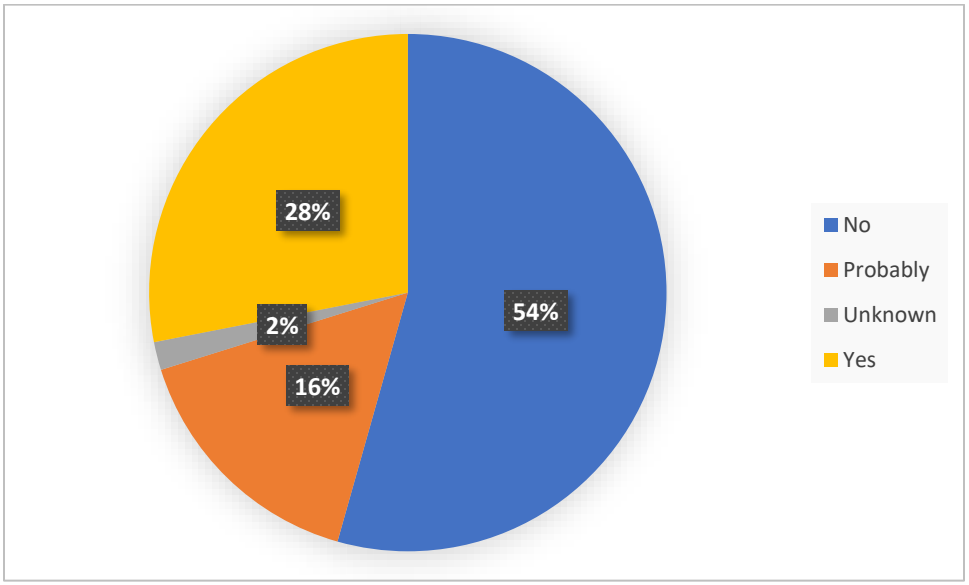


*Numbers across the categories in Figure 11 are not mutually exclusive

It is beneficial to learn if early identification and treatment for substance use have been undertaken for mothers throughout Kentucky. If depression screening was completed, it is necessary to understand if women were subsequently referred to community services that could help prevent accidental death. Psychosocial and environmental risk factors associated with maternal health conditions such as social inequality, lack of access, homelessness, chronic disease management, substance use, and food insecurity are pertinent to address. These factors impact a person's mental health and are continually being considered during the review process (Figure 12).

The MMRC has previously voiced concerns regarding follow-up of pregnant women who are enrolled in treatment programs, who may be doing well in their recovery. However, many women return to previous patterns of substance use without understanding that their tolerance to substances is lowered after pregnancy. Another major issue is the continuity of care in providing support to these mothers post-delivery, considering the comorbidities such as depression and traumatic stress are experienced when they lose custody of their newborn infant. An existing barrier to this is financial stability, although to date the only information available on this is maternal health coverage. The 2017 cohort of mothers presented with 27 (69.2%) mothers with Medicaid coverage, and 48 (84.2%) mothers with Medicaid coverage in the 2018 cohort.

Figure 12: **Mental Health Conditions as a Contributing Factor in 2018 Maternal Deaths**



Evaluation

During the review process, the categorization of the case occurs with the consensus of the MMRC. This information is collected using the Centers for Disease Control and Prevention decision form.

A great challenge posed during abstraction is obtaining records for review. The treatment provider location of the birth or end of pregnancy is often not where prenatal care or treatment for substance use or other health issues occurs. Abstractors spend a substantial amount of time researching many data sources (e.g., Medicaid claims data, hospital data, death certificate information, and pregnancy

linked birth certificate to verify that delivery occurred). Abstractors may need to call healthcare providers for additional information. Reviews are greatly impacted by the availability and amount of information for review. This includes things such as the number of maternal prenatal care visits shown in Figure 13. The interval between delivery and death in Figure 14 has been provided to better understand meaningful timing for intervention. Figure 15 depicts the completeness of overall records available through the efforts of MMRC abstractors.

Figure 13: **Prenatal care visits across the 2018 cohort**

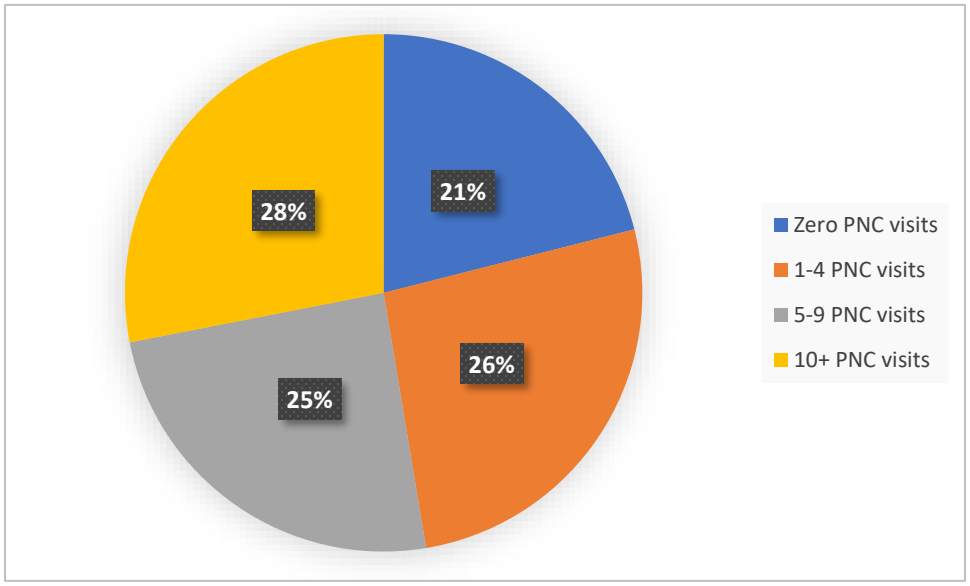


Figure 14: **Timing of Maternal Deaths 2018 Cohort**

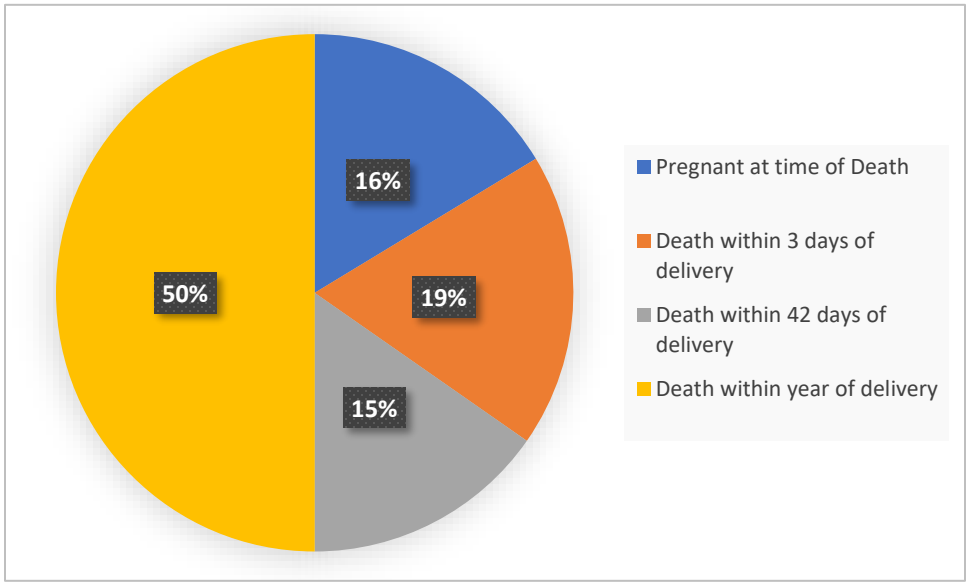
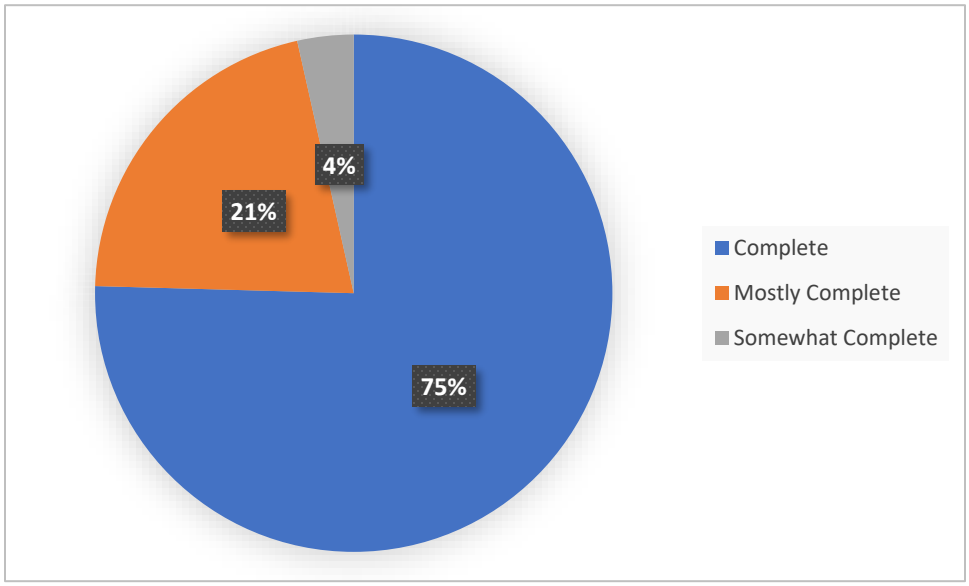


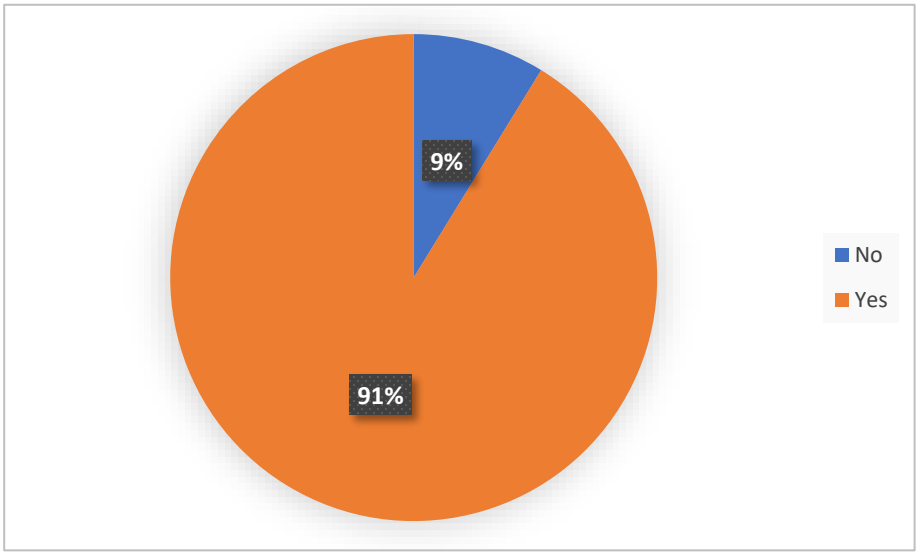
Figure 15: **Degree of Complete Records/Information in 2018 cohort**



- **Complete**: All records necessary for adequate review of the death were available
- **Mostly Complete**: Minor gaps (i.e., information that would have been beneficial but was not essential to the review of the death)
- **Somewhat Complete**: Major gaps (i.e., information that would have been crucial to the review of the death)

Overall, 91% of the maternal deaths reviewed from the 2018 cohort were considered preventable. This is higher than the CDC predicted average that 60% of maternal deaths in the United States are preventable. It is pertinent for Kentucky to continue reviewing maternal deaths, providing meaningful recommendations, and actionable interventions to prevent these outcomes.

Figure 16: Was the Death Preventable? 2018 Cohort*



*88% of Kentucky's pregnancy related deaths were considered preventable.

Continued Public Health Prevention Efforts

The Division of Maternal and Child Health (MCH) led the implementation of the MMRC and provides and recommends prevention measures to reduce maternal mortality through the following efforts:

- Maternal and Child Health Title V Block Grant supports evidence-informed perinatal education and strategies including assessment of health, chronic health conditions, substance use, tobacco use, domestic violence screening, and mental health screening. Referrals are made to various community programs and providers for evaluation and treatment.
- The MCH Division through its programs promotes health of mothers and babies through its home visiting program, the Health Access Nurturing Development Services (HANDS); the Special Supplemental Nutrition Program for Women, Infant, and Children Program (WIC), and provides early intervention for families directed to the child to achieve its optimal developmental potential.
- Continued collaboration with local health departments, birthing facilities, and Kentucky Chapter of March of Dimes to reduce early elective deliveries using evidence-informed strategies from Healthy Babies are Worth the Wait.
- Statewide education to promote positive health outcomes through a joint effort with the Kentucky Perinatal Association.
- Encouraging local health departments to assist mothers with applying for presumptive eligibility for Medicaid.
- MCH participates in a Social Determinants of Health Collaborative Improvement and Innovation Network workgroup with the Office of Health Equity, March of Dimes, and Louisville Healthy Start Program. The workgroup provides ongoing training about social bias with long-term plans to address health equity in the local health departments.
- Kentucky's newly formed Kentucky Perinatal Quality Collaborative (KyPQC) is developing a workgroup to take the recommendation of the MMRC and incorporate these recommendations into the appropriate agencies/programs to address these needed changes. The activities of the KyPQC and MMRC have paved the way for Kentucky to become an AIM (Alliance for Innovation on Maternal Health) state and Kentucky is now incorporating the bundle *Obstetric Care for Women with Opioid Use Disorder*.

Maternal Mortality Review Committee Organizations and Specialties

- Maternal Fetal Medicine specialist
- Neonatologists
- OB anesthesiologist
- Women's Cardiology
- American College of Obstetrics and Gynecology
- Association of Women's Health Obstetric and Neonatal Nurses
- Department for Community Based Services
- KASPER (KY's prescription drug monitoring program)
- Certified Nurse Midwife
- Kentucky Hospital Association
- Chief Medical Examiner
- Domestic Violence and Human Trafficking – Office of the Attorney General
- Department for Behavioral Health, Developmental and Intellectual Disabilities
- Kentucky State Police
- Department for Medicaid Services