



ALABAMA
MMR
MATERNAL MORTALITY REVIEW

Alabama Department of Public Health
Bureau of Family Health Services

Alabama Maternal Mortality Review Report for 2020 - 2021



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We extend our gratitude to our sponsors and supporters at the March of Dimes and the American College of Obstetricians and Gynecologists (ACOG)-Alabama Chapter.



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Introduction

Maternal mortality is higher in the United States than in other developed countries, and significant racial disparities exist. State maternal mortality review committees are best positioned to comprehensively review deaths that occur during or within one year of the end of pregnancy and to identify opportunities for prevention. The AL-MMRC was established in 2018 under the leadership of ADPH and the BFHS. The committee is composed of experts and stakeholders who are familiar with the unique aspects of maternal health in Alabama, as well as the resources available to the state.

A “pregnancy-associated death” is the death of a woman during pregnancy or within one year of the end of pregnancy, regardless of cause. This definition encompasses all qualifying deaths that the AL-MMRC reviews. Pregnancy-associated deaths can further be classified into pregnancy-related deaths or pregnancy-associated but not related deaths. The AL-MMRC uses the definitions of both terms from the Centers for Disease Control and Prevention (CDC) Maternal Mortality Review Committee Decisions Form. A “pregnancy-related death” is a death that occurs during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition from the physiological effects of pregnancy. A “pregnancy-associated, but not related death” is a death that occurs during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy.

The Alabama Center for Health Statistics (AL-CHS) first identified cases for possible review by linking birth and fetal death certificates to women ages 10-75 years old who died during 2020 and 2021. They also used the pregnancy checkbox response on the death certificate to identify potential cases for review. Some pregnancy-associated deaths, such as those that occur early during pregnancy, will not have birth or fetal death registrations to link. The AL-CHS can use the International Classification of Disease, Tenth Revision (ICD-10) codes, or the literal cause of death fields that contain certain pregnancy-related terms to identify those deaths. Cases identified using these sources are confirmed by MMRP staff using obituaries, hospital records, news reports, autopsy reports, physician office records, social media, etc. To be eligible for committee review, the decedent must be an Alabama resident at the time of death. Each death certificate is also evaluated for possible errors.

After the deaths are deemed eligible for review by the MMRP, any pertinent records relating to the pregnancy and death are abstracted. These records may include prenatal records, hospital and emergency room records, coroner and autopsy reports, law enforcement reports, news reports, and obituaries. MMRP staff then create de-identified case summaries for the committee’s review.

The AL-MMRC utilized the CDC Maternal Mortality Review Committee Decision Form to answer the following questions during the review process:

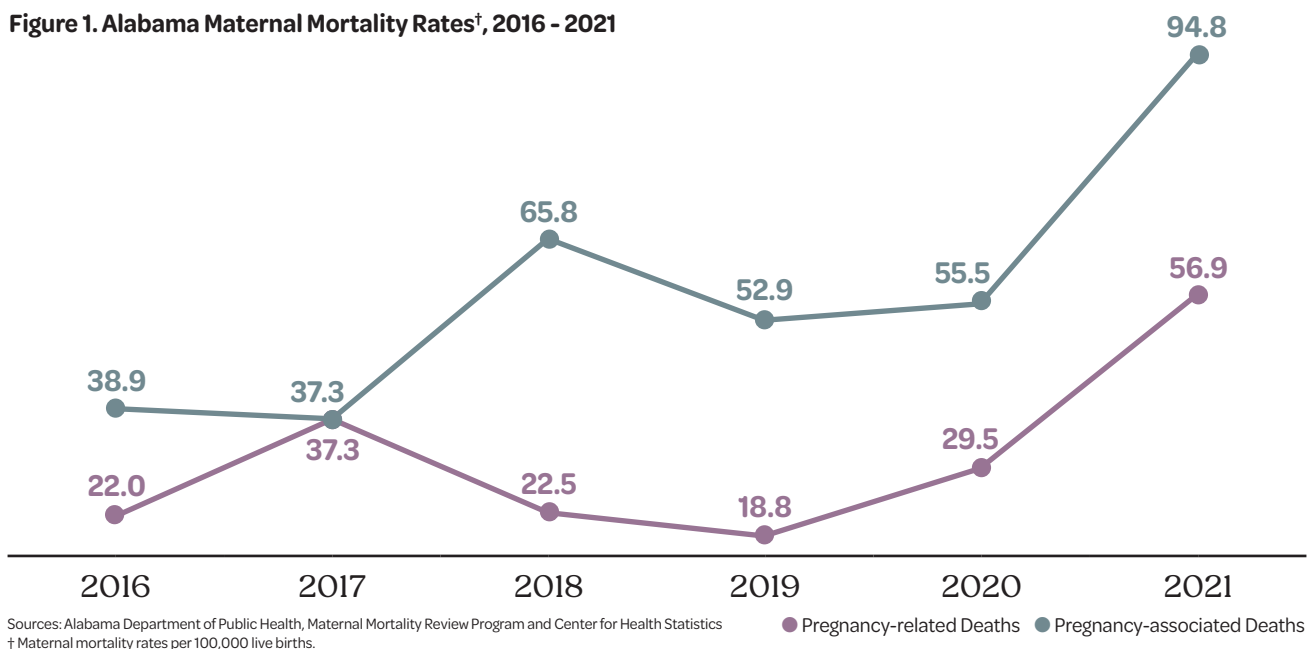
1. Was the death pregnancy-related?
2. What was the underlying cause of death?
3. Was the death potentially preventable, and what was the chance to alter the outcome?
4. What were the factors that contributed to the death?
5. What are the recommendations and actions that address the contributing factors?

Trends in Alabama Maternal Mortality

Maternal Mortality Rate (MMR)

The MMR is the number of maternal deaths per 100,000 live births. As shown in Figure 1, the MMRs for pregnancy-related and pregnancy-associated deaths increased between 2016 and 2021.

Figure 1. Alabama Maternal Mortality Rates[†], 2016 - 2021



The next three pages show key findings from the 2020 and 2021 death reviews.

- Map 1 shows the distribution of counties meeting the CDC case definition for rural and urban status as defined in Table 1.
- Table 2 compares the MMRs between urban and rural status as defined by the CDC.
- Figures 2 and 3 depict the leading causes of death among pregnancy-related and pregnancy-associated deaths.
- Figure 4 shows the timing of death among pregnancy-related and pregnancy-associated deaths.
- Figure 5 highlights the age breakdown among pregnancy-related and pregnancy-associated deaths.
- Figure 6 reports the preventability determinations for pregnancy-related and pregnancy-associated deaths.
- Figures 7 and 8 depict the relationship between preventability and timing of death among pregnancy-related and pregnancy-associated deaths.
- Figure 9 examines how many AL-MMRC reviewed cases died from COVID-19.
- Figure 10 demonstrates the impact of COVID-19 on the timing of death among pregnancy-related deaths.

The impact of age, education, insurance status, and race/ethnicity are also reviewed. Based on these findings, the AL-MMRC made recommendations to address potential barriers identified at the patient/family, provider, facility, community, and system levels.

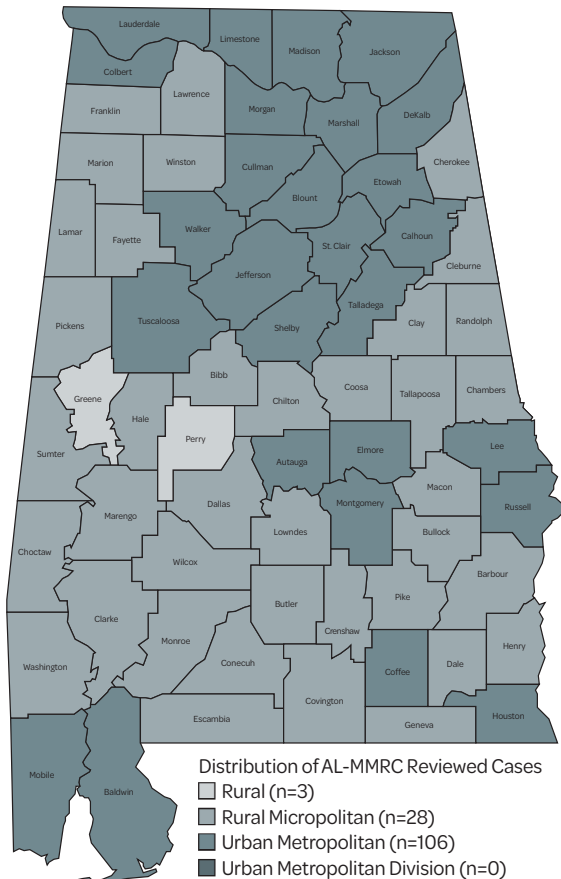
Key Findings

Residential Status

As shown in Table 1, the CDC classifies counties as urban or rural using population ranges. Urban status is divided into either metropolitan division or urban metropolitan, while rural status is divided into either rural micropolitan or rural. Map 1 depicts rural and urban Alabama counties using the CDC's definition and 2021 American Community Survey (ACS) 5-year population estimates. Alabama is primarily rural, with the majority of the state's 67 counties classified as either rural micropolitan or rural (**n=40/67, 59.7 percent**) and the remaining counties classified as urban metropolitan (**n=27/67, 40.3 percent**). No Alabama county meets the population threshold to be classified as a metropolitan division.

Between 2020 and 2021, 137 cases were reviewed by the AL-MMRC. As shown in Table 2, over 75 percent (**n=106/137, 77.4 percent**) lived in an urban metropolitan county, while less than 25 percent (**n=31/137, 22.6 percent**) lived in a rural county (either a rural micropolitan or rural). Although the majority of maternal deaths occurred in an urban county, the rural MMR (n=154.4) was higher than the urban MMR (n=110.9), indicating disparities among mothers living in rural counties.

Map 1. Distribution of AL-MMRC Reviewed Maternal Deaths (N=137) by Rural and Urban Classifications, 2020 - 2021†



Source: [2021 American Community Survey 5-Year Population Estimates](#), Table DP05. Centers for Disease Control and Prevention (CDC), National Maternal Mortality Program. Alabama Department of Public Health, Maternal Mortality Review Program.
† Urban and rural classifications are based on the CDC definition shown in Table 1. Alabama has no counties meeting the population range for the metropolitan division.

Table 1. Residential Categories

Urban Classifications	
Metropolitan Division	2,500,000 or More
Metropolitan	50,000-2,499,999
Rural Classifications	
Micropolitan	10,000-49,999
Rural	Less than 10,000

Source: Centers for Disease Control and Prevention, National Maternal Mortality Program.

Table 2. AL-MMRC Maternal Mortality Rates, 2020 - 2021

Residential Classifications	Deaths ¹	Rate [†]	Births ²
Urban	106	110.9	95,606
Rural	31	154.4	20,077
Total	137	118.4	115,683

Sources: [2021 American Community Survey 5-Year Population Estimates](#), Table DP05. Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².
† Maternal mortality rates per 100,000 live births.
Note: Rural status combined rural micropolitan and rural.

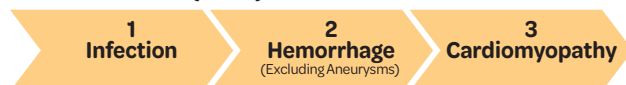
During the reviews of 2020 and 2021 deaths, the AL-MMRC determined whether each death was pregnancy-related or pregnancy-associated, but not related. Additionally, the AL-MMRC made recommendations on how to prevent future maternal deaths within Alabama.

Pregnancy-related Deaths: **50**

Pregnancy-associated, but Not Related Deaths: **67**

Pregnancy-associated, but Unable to Determine Relatedness Deaths: **20**

Figure 2. Leading Causes of Pregnancy-related Deaths (n=50), 2020 - 2021



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Figure 3. Leading Causes of Pregnancy-associated Deaths (n=87), 2020 - 2021†

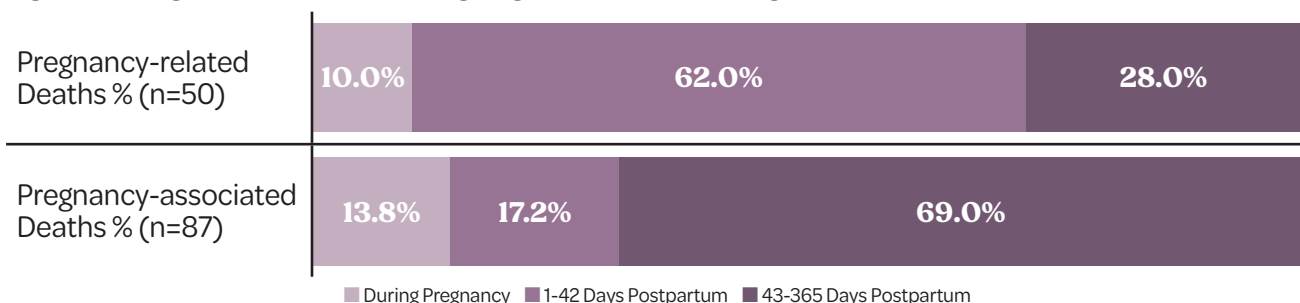


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Note: All Other included pulmonary embolism, traumatic brain hemorrhage, sepsis, anoxic brain injury, and complications of diabetic ketoacidosis.

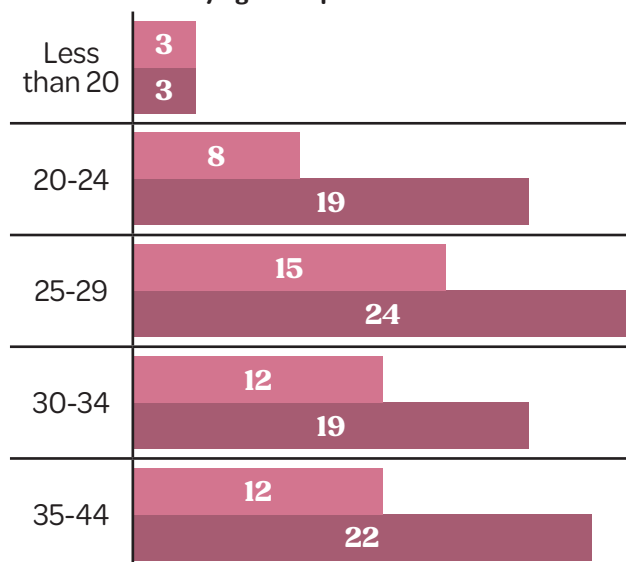
Figure 4. Timing of Death Overview Among Pregnancy-related and Pregnancy-associated Deaths, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Figure 5. Pregnancy-related and Pregnancy-associated Deaths by Age Group



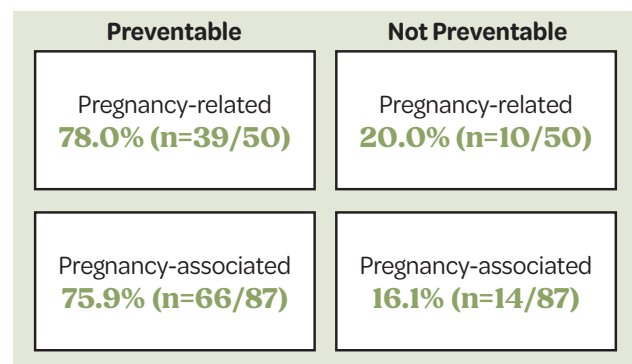
■ Pregnancy-related Deaths (n=50) ■ Pregnancy-associated Deaths (n=87)

Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Figure 6. Preventability Determination, 2020 - 2021†

Over 75 percent (n=105/137) of the deaths reviewed were deemed preventable by the AL-MMRC. A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors.

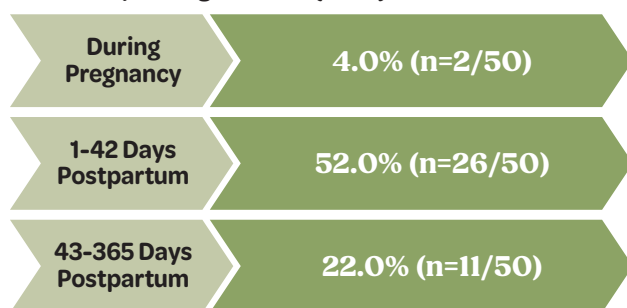


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

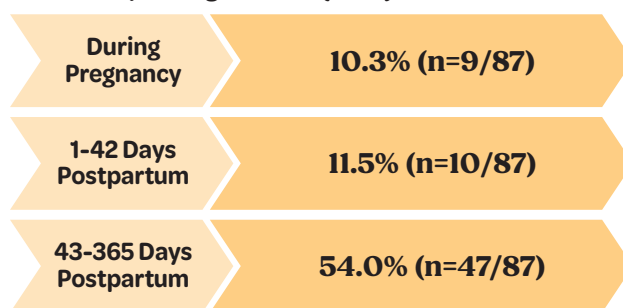
Note: One pregnancy-related death and seven pregnancy-associated deaths were marked unknown for preventability.

Figure 7. Preventable Pregnancy-related Deaths by Timing of Death (n=50), 2020 - 2021



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Figure 8. Preventable Pregnancy-associated Deaths by Timing of Death (n=87), 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Figure 9. Deaths Caused by COVID-19, 2020 - 2021†



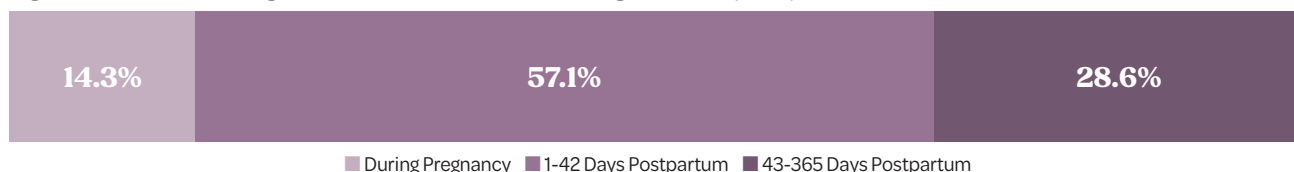
Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

COVID-19 Impact

Compared to the 2018-2019 Alabama Maternal Mortality Review Annual Report, the number of deaths increased in 2020-2021 from 93 to 137. Infection was the leading cause of death for pregnancy-related deaths. There were 17 pregnancy-related deaths with infection listed as the primary cause of death, of which **82.3 percent (n=14/17)** were attributed to COVID-19. According to the AL-CHS, there were 381 women of childbearing age 15-45 years with an ICD-10 code on their death certificate related to COVID-19. During the reviews of COVID-19 pregnancy-related deaths, the committee found that none of these women received a COVID-19 vaccine prior to their death. In addition, the majority were diagnosed with COVID-19 after the ACOG and the Society for Maternal-Fetal Medicine (SMFM) recommended that all pregnant women be vaccinated against COVID-19. Obesity was identified as a contributing factor for **78.7 percent (n=11/14)** of the COVID-19 pregnancy-related deaths. The AL-MMRC defined obesity as a body mass index (BMI) greater than or equal to 40 without co-morbidities, and 35 or greater for those with co-morbidities. As shown in Figure 10, over half of pregnancy-related deaths occurred from COVID-19 within 1-42 days postpartum. Based on these findings, the AL-MMRC made recommendations to address prevention and adequate treatment of COVID-19.

Figure 10. COVID-19 Pregnancy-related Deaths by Timing of Death (n=14), 2020 - 2021



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Key Recommendations

- Expansion of Medicaid for preconception, interconception, and postpartum.
- Women, especially those with chronic conditions, should be encouraged to seek prenatal care early and maintain follow-up visits during and after pregnancy as advised.
- Increased access to primary care during the preconception, interconception, and postpartum periods.
- Enhanced state funded assistance for transportation to medical therapy should be arranged, funded, and implemented, especially in rural areas.
- Maintain labor and delivery services at rural hospitals to prevent further closures.
- Pregnant women should be educated on the risks of COVID-19 during pregnancy and should be encouraged to be vaccinated, especially those with high risk factors.
- Continue to build systems across the state that address social determinants of health to support the health and well-being of pregnant women, including housing assistance, access to care, and social support.
- Increased recognition of risk factors and symptoms of cardiovascular disease and provide referrals to the appropriate level of care.
- Increase funding and access to mental health and substance use disorder services for pregnant and postpartum women.
- Educate patients regarding maternal warning signs during pregnancy and in the postpartum period and when they need to seek evaluation/treatment.
- Decriminalization of substance use disorder in pregnancy as a way to promote voluntary treatment.
- Provide comprehensive family planning and contraceptive counseling to all women of childbearing age, especially those with chronic health conditions.
- Educate pregnant and postpartum women on the importance of seat belts and safe driving.
- Provide education about the risks that obesity can contribute to pregnancy outcomes and provide opportunities for support.
- Educate patients regarding chronic disease processes, management of those diseases, and the potential consequences of non-adherence to medical recommendations at any point during care.

In addition to the key findings, the AL-MMRC expanded on the following data topics for pregnancy-related and pregnancy-associated deaths.

- Annual Trends
- Maternal Characteristics (Education, Insurance, Race/Ethnicity, Age, and Residential Status)
- Leading Cause of Death by Race/Ethnicity
- Preventability Status among Alabama's Top Three Leading Causes of Death
- Timing of Death by Residential Status and Race/Ethnicity
- Initiation of Prenatal Care by Residential Status and Race/Ethnicity
- Circumstances Surrounding the Death

Overview of Pregnancy-related Deaths

Pregnancy-related Deaths as Determined by the AL-MMRC

During 2023 and 2024, 137 deaths from 2020-2021 were reviewed by the AL-MMRC (all COVID-19-related deaths were reviewed in 2021 and 2022). Of these, 50 of the reviewed deaths were determined by the committee to be pregnancy-related. The number of pregnancy-related deaths increased over the past 4 years of review, from 13 in 2018 to 33 in 2021. As shown in Table 3, there were nearly twice the number of pregnancy-related deaths in 2021 compared to 2020.

Table 3. Annual Trend for Pregnancy-related Deaths, 2020 - 2021

Alabama Maternal Mortality Rates [†]			
Year of Death	Deaths ¹	Rate [†]	Births ²
2020	17	29.5	57,643
2021	33	56.9	58,040
Total	50	43.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

[†] Maternal mortality rates per 100,000 live births.

Maternal Characteristics of Pregnancy-related Deaths

Education Status

Eighty-four percent (n=42/50) of the pregnancy-related deaths completed at least a high school education. As shown in Figures 11 and 12, this trend is consistent between black, non-Hispanic, and white, non-Hispanic populations.

Figure 11. Education Status of Black, non-Hispanic (n=27), 2020 - 2021

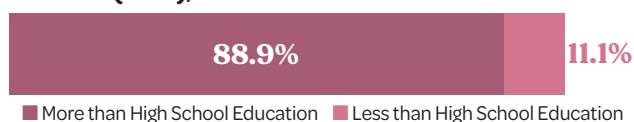
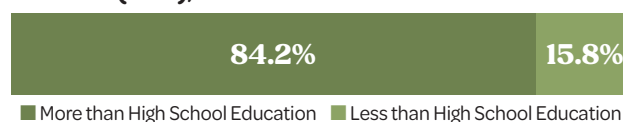


Figure 12. Education Status of White, non-Hispanic (n=19), 2020 - 2021

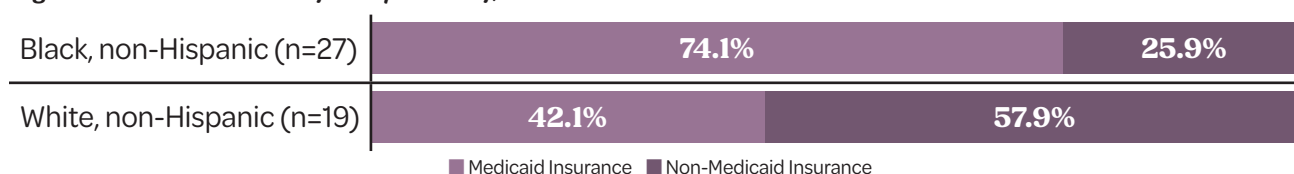


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Insurance Status at Delivery

Sixty percent (n=30/50) of pregnancy-related deaths were Medicaid recipients at the time of delivery, while the remaining **40 percent (n=20/50)** used another (non-Medicaid) form of insurance (private, self-pay, Tricare, other, or unknown). As shown in Figure 13, **74.1 percent (n=20/27)** of black, non-Hispanic pregnancy-related deaths had Medicaid insurance compared to **42.1 percent (n=8/19)** of white, non-Hispanic pregnancy-related deaths.

Figure 13. Medicaid Status by Race/Ethnicity, 2020 - 2021



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Note: Two cases were marked unknown for insurance status at delivery. Both cases have been included in the non-Medicaid insurance category.

Race and Ethnicity

In Table 4, the 2020-2021 MMRs were calculated for pregnancy-related deaths by race and ethnicity. The MMR was almost three times higher among black, non-Hispanic women when compared to white, non-Hispanic women. As shown in Figure 14, the 2020-2021 pregnancy-related mortality rates for black, non-Hispanic and white, non-Hispanic, were both higher than the 2018-2019 pregnancy-related mortality rates. The rate for black, non-Hispanic women more than doubled.

Table 4. Pregnancy-related Deaths by Race/Ethnicity, 2020 - 2021

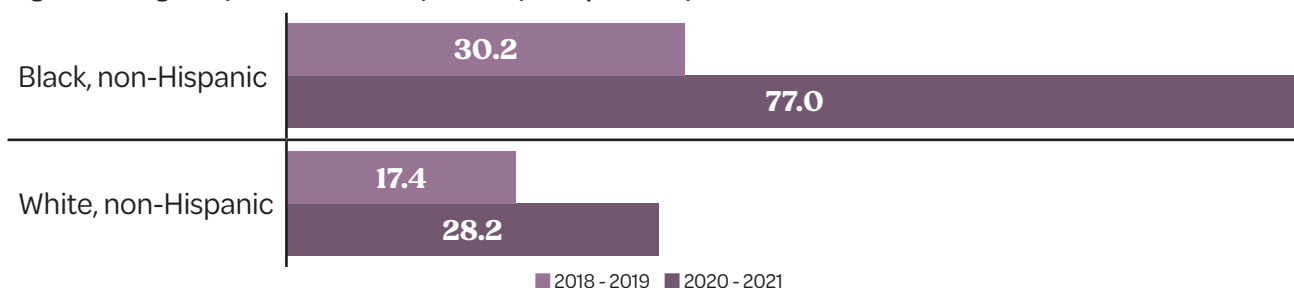
Alabama Maternal Mortality Rates [†]			
Race and Ethnicity	Deaths ¹	Rate [†]	Births ²
Black, non-Hispanic	27	77.0	35,050
White, non-Hispanic	19	28.2	67,471
Hispanic	-	-	10,746
Other/Unknown	-	-	2,416
Total	50	43.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

[†] Maternal mortality rates per 100,000 live births.

Note: Rates with less than 10 deaths were excluded from analysis.

Figure 14. Pregnancy-related Mortality Rates by Race/Ethnicity, 2018 - 2021



Sources: Alabama Department of Public Health, Maternal Mortality Review Program and Center for Health Statistics.

Maternal Age

As shown in Table 5, close to a third of all deliveries in 2020 and 2021 (n=36,387/115,683) occurred among mothers between the ages of 25 and 29. MMRs increase with age due to the lower number of deliveries occurring within older age groups.

Table 5. Pregnancy-related Deaths by Age, 2020 - 2021

Alabama Maternal Mortality Rates [†]			
Age (in Years)	Deaths ¹	Rate	Births ^{2‡}
Less than 20	-	-	7,537
20-24	-	-	28,963
25-29	15	41.2	36,387
30-34	12	42.4	28,323
35-44	12	83.7	14,339
45 or Older	-	-	129
Total	50	43.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

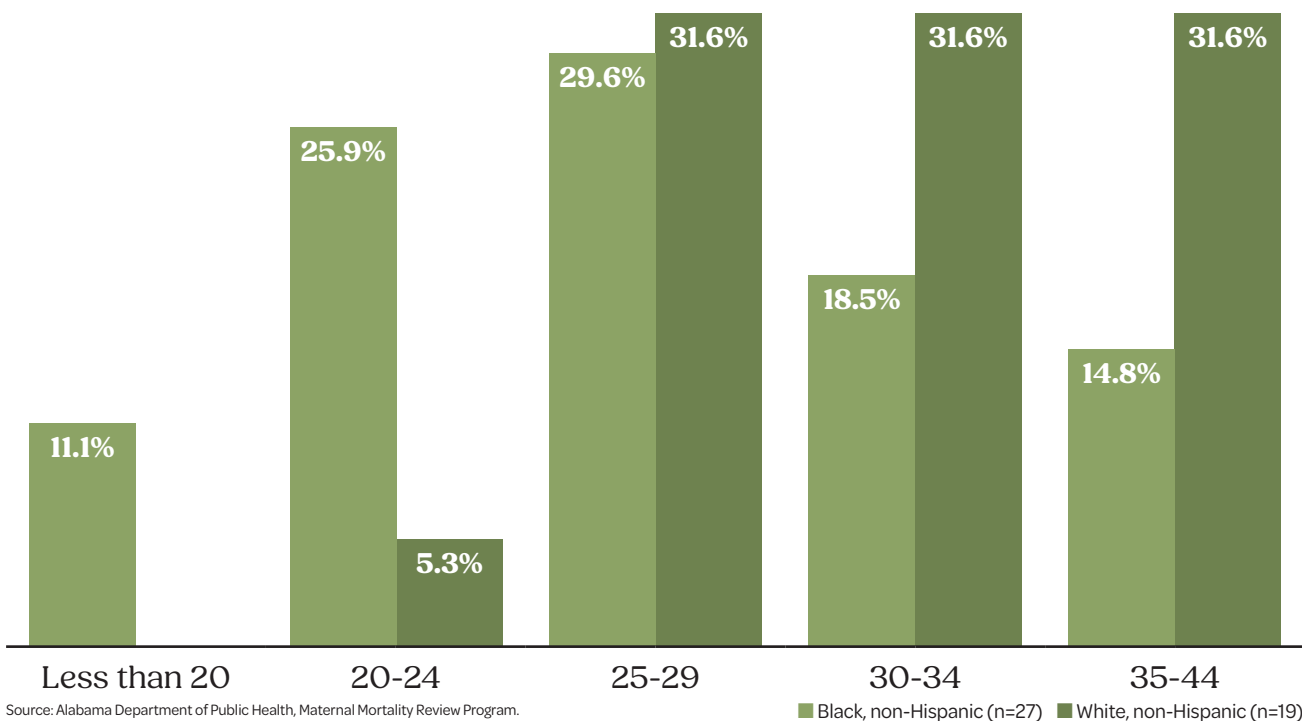
[†] Maternal mortality rates per 100,000 live births. Rates with less than 10 deaths were excluded from analysis.

[‡] The mother's date of birth was marked unknown for five birth certificates.

Maternal Age and Race/Ethnicity

While Tables 4 and 5 reviewed the impact of race and age separately, Figure 15 reviews the combined impact of age and race/ethnicity on pregnancy-related deaths. Over half of the deaths (n=15/27) among black, non-Hispanic women occurred between ages 20 and 29, while almost all pregnancy-related deaths among white, non-Hispanic women occurred between ages 25 and 44.

Figure 15. Pregnancy-related Deaths by Age and Race/Ethnicity, 2020 - 2021†



Residential Status

The 2021 ACS 5-year population estimates were used to determine which counties meet the rural and urban classifications set by the CDC. Alabama is considered largely rural, with 40 of the state's 67 counties classified as either rural or rural micropolitan, and all remaining 27 counties classified as urban micropolitan. No Alabama county meets the population threshold for an urban metropolitan division. As expected, for the majority of pregnancy-related deaths, the decedents lived in urban areas of the state where the county populations are highest (Figure 16). However, mortality rates per 100,000 live births were higher in rural counties.

Figure 16. Pregnancy-related Deaths by Residential Status (n=50), 2020 - 2021†



Source: 2021 American Community Survey 5-Year Population Estimates, Table DP05.
Alabama Department of Public Health, Maternal Mortality Review Program.
† Urban includes urban metropolitan and rural status includes rural micropolitan and rural.

Table 6 calculates the MMRs by residential status among pregnancy-related deaths. The findings are consistent with what was presented in the key findings. Although the majority of maternal deaths occurred in an urban county, the rural MMR was higher than the urban MMR, indicating disparities among mothers living in rural counties.

Table 6. Pregnancy-related Maternal Mortality Rates by Residential Status, 2020 - 2021

Alabama Maternal Mortality Rates [†]			
Residential Classifications	Deaths ¹	Rate [†]	Births ²
Urban	37	38.7	95,606
Rural	13	64.8	20,077
Total	50	43.2	115,683

Sources: [2021 American Community Survey 5-Year Population Estimates](#), Table DP05.

Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

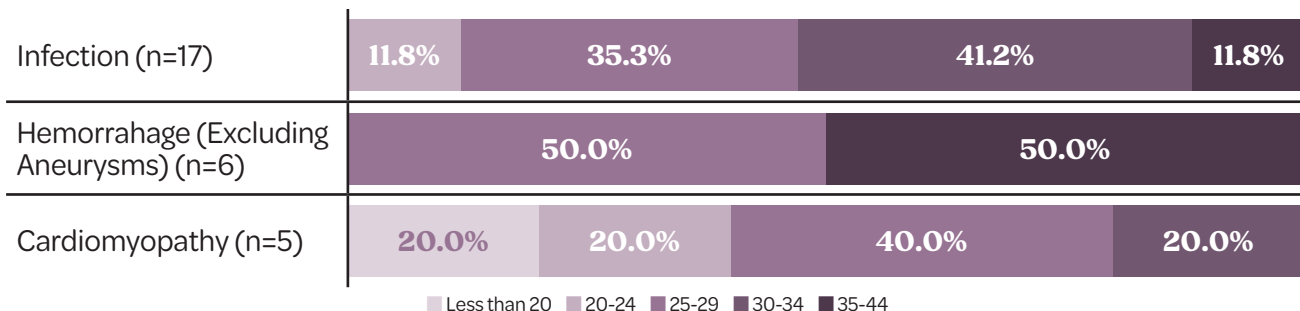
[†] Maternal mortality rates per 100,000 live births.

Note: Rural status combined both rural micropolitan and rural.

Leading Causes of Death

The top three leading causes of death for cases determined to be pregnancy-related included infection, hemorrhage (excluding aneurysms), and cardiomyopathy. Over **80 percent (n=14/17)** of deaths caused by infection were attributed to COVID-19. Other infections included sepsis and postpartum genital tract infections (e.g., of the uterus/pelvis/ perineum and necrotizing fasciitis). As shown in Figure 17, the three leading causes of death were broken down by age group. Looking at the first leading cause of death, **41.2 percent (n=7/17)** of infection-related deaths occurred among those between the ages of 30 and 34. Other causes of pregnancy-related death included hypertensive disorders of pregnancy, cerebrovascular accident, metabolic/endocrine pathologies, renal disease, mental health conditions (including substance use disorder and depression), embolism (excluding cerebrovascular accident), cancer, unintentional injury, other cardiovascular conditions (excluding cardiomyopathy, hypertensive disorders of pregnancy, and cerebrovascular accident), amniotic fluid embolism, hematologic conditions, and pulmonary conditions.

Figure 17. Top Three Leading Causes of Pregnancy-related Death by Age Group, 2020 - 2021



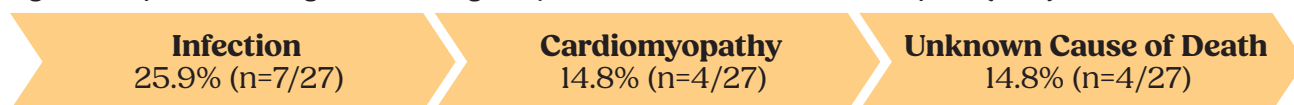
Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Note: Characteristic totals may not equal 100 percent due to rounding errors.

Leading Causes of Death by Race/Ethnicity

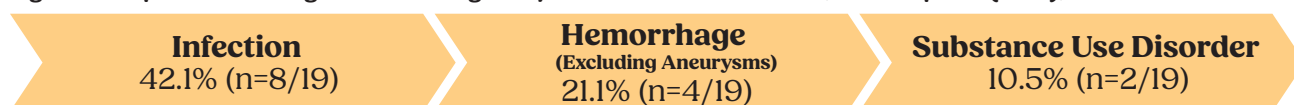
Infection remained the number one leading cause of pregnancy-related death when assessed by race/ethnicity. However, variation is seen in the second and third leading causes of death when comparing black, non-Hispanic women to white, non-Hispanic women. While cardiomyopathy and unknown cause of death both ranked second among black, non-Hispanic women, hemorrhage (excluding aneurysms) ranked second, and substance use disorder ranked third among white, non-Hispanic women (Figures 18 and 19). The AL-MMRC selected “unknown cause of death” if there was not enough information available to make a determination, such as a lack of toxicology screen or autopsy, or if there were missing records from healthcare providers, facilities, law enforcement, etc.

Figure 18. Top Three Leading Causes of Pregnancy-related Deaths for Black, non-Hispanic (n=27), 2020 - 2021



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Figure 19. Top Three Leading Causes of Pregnancy-related Deaths for White, non-Hispanic (n=19), 2020 - 2021

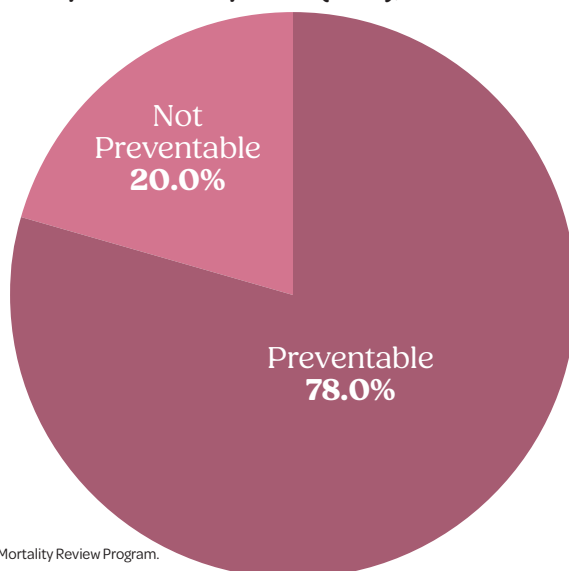


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Preventability

After reviewing all available information for each pregnancy-related death, the AL-MMRC determined whether each death was preventable. A death is considered preventable if the committee determines that there was at least some chance of the death being averted by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. As seen in Figure 20, the AL-MMRC determined that **78 percent (n=39/50)** of pregnancy-related deaths were preventable.

Figure 20. Pregnancy-related Deaths by Preventability Status (n=50), 2020 - 2021†

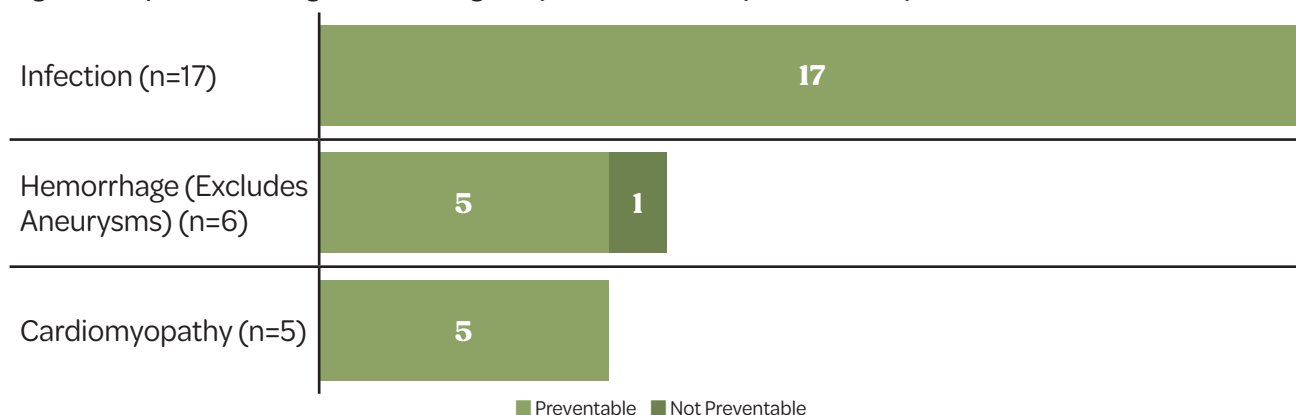


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† One case was marked unknown for preventability status.

Among the 3 leading causes of death, **69 percent (n=27/39)** were determined to be preventable. As shown in Figure 21, the AL-MMRC determined that all infection and cardiomyopathy deaths were preventable. Of those who died from hemorrhage (excluding aneurysms), one case was determined to be not preventable.

Figure 21. Top Three Leading Causes of Pregnancy-related Deaths by Preventability Status, 2020 - 2021

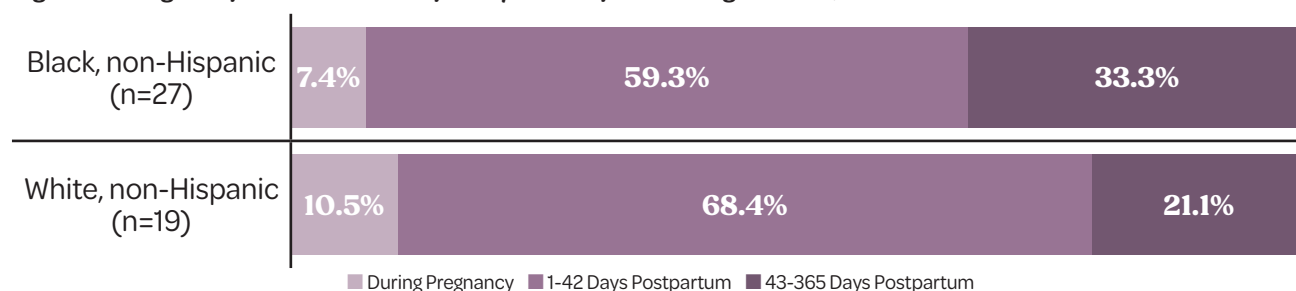


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

Timing of Death

As shown in the key findings, over half (62.0 percent) of the reviewed pregnancy-related deaths occurred within 42 days postpartum. Figure 22 shows the breakdown of the timing of death among black, non-Hispanic, and white, non-Hispanic groups. The greatest percent of deaths occurred within 1-42 days postpartum for both black, non-Hispanic, **59.3 percent (n=16/27)**, and white, non-Hispanic, **68.4 percent (n=13/19)**.

Figure 22. Pregnancy-related Deaths by Race/Ethnicity and Timing of Death, 2020 - 2021

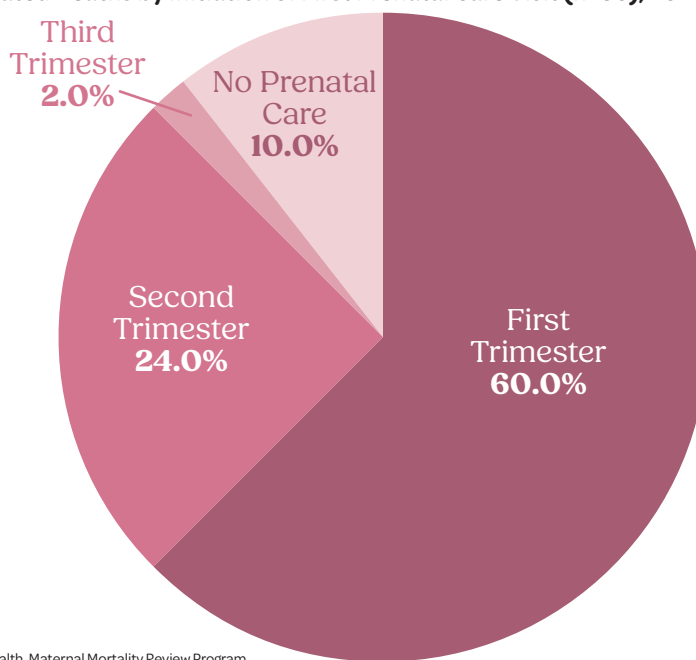


Sources: Alabama Department of Public Health, Maternal Mortality Review Program.

Timing of First Prenatal Visit

As shown in Figure 23, over half (**60 percent; n=30/50**) of the pregnancy-related deaths initiated prenatal care during the first trimester.

Figure 23. Pregnancy-related Deaths by Initiation of First Prenatal Care Visit (n=50), 2020 - 2021†

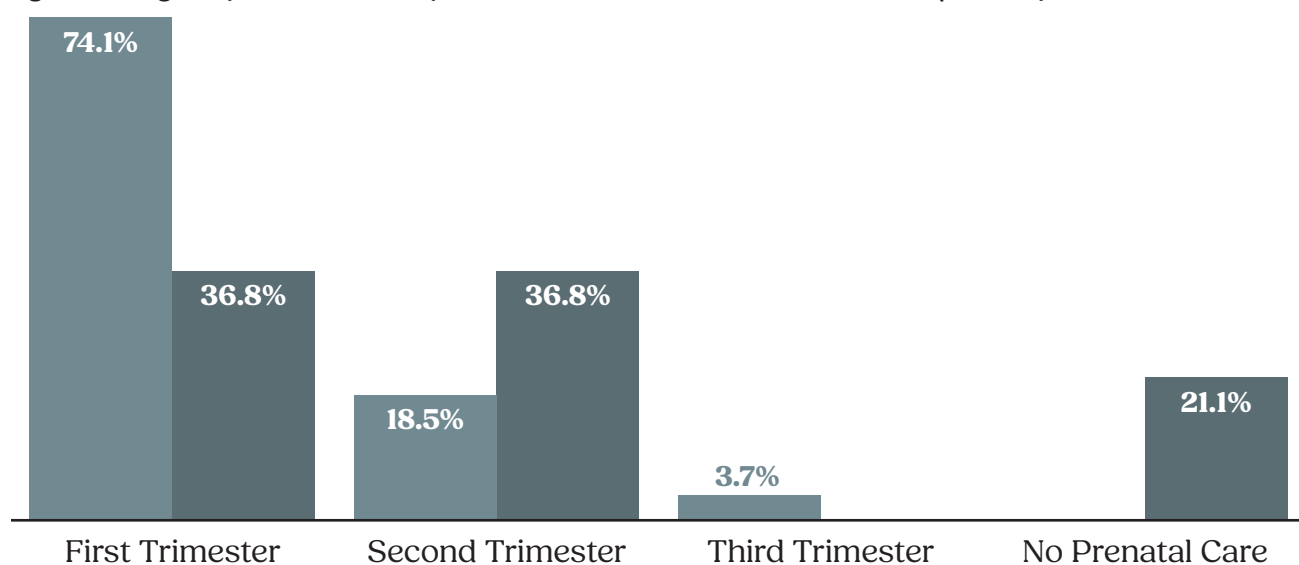


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Two cases were marked unknown for initiation of the first prenatal care visit among the selected groups.

There were some differences in initiation of prenatal care among black, non-Hispanic, and white, non-Hispanic pregnancy-related deaths. As shown in Figure 24, **74.1 percent (n=20/27)** of black, non-Hispanic women initiated prenatal care during their first trimester, while close to **58 percent (n=11/19)** of white, non-Hispanic women either experienced delayed prenatal care or did not initiate prenatal care.

Figure 24. Pregnancy-related Deaths by Initiation of First Prenatal Care Visit and Race/Ethnicity, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

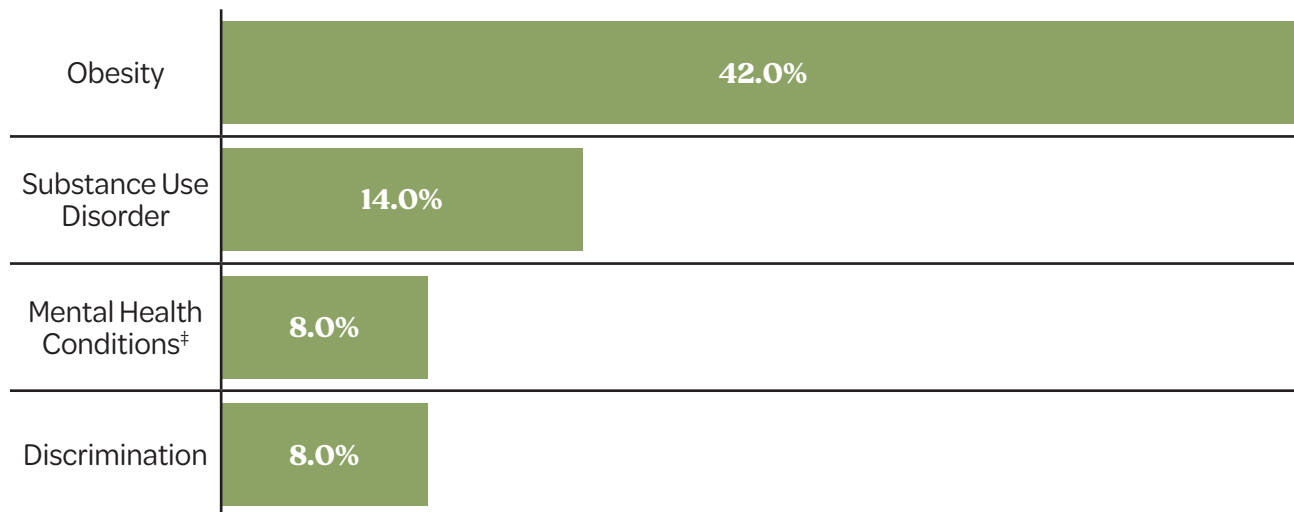
† Two cases were marked unknown for initiation of first prenatal care visit among the selected groups.

Circumstances Surrounding Death

Based on the records provided, the AL-MMRC identified whether specific factors contributed to a death. The contributing factors included obesity, mental health conditions other than substance use disorder, substance use disorder, or discrimination. For the purposes of maternal mortality reviews, the CDC defines discrimination as treating someone less or more favorably based on the group, class, or category they belong to, resulting from biases, prejudices, and stereotyping. Discrimination can manifest as differences in care, clinical communication, and shared decision-making. The discrimination checkbox encompasses discrimination, interpersonal racism, and structural racism.

Deaths in which a circumstance likely contributed were defined as those in which the committee answered “yes” or “probably” for whether each circumstance contributed to the death. As shown in Figure 25, the AL-MMRC determined that discrimination contributed to **8.9 percent (n=4/50)** of pregnancy-related deaths. Between 2020 and 2021, obesity contributed to almost half of the pregnancy-related deaths.

Figure 25. Circumstances Surrounding Pregnancy-related Deaths (n=50), 2020 - 2021[†]



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

[†] 14 cases did not have a circumstance surrounding their death.

[‡] Excludes substance use disorder.

Overview of Pregnancy-associated, but not Related and Unable to Determine Relatedness Deaths

Classifications of Pregnancy-associated Deaths

The AL-MMRC determined that 67 of the 137 deaths reviewed were pregnancy-associated, but not related. The AL-MMRC was unable to determine pregnancy-relatedness for 20 deaths. This often occurs when there is limited information available to review the death. The MMRP staff made every attempt to obtain records from healthcare providers, facilities, coroners/medical examiners, and law enforcement. However, toxicology screenings and autopsies were not always performed, and additional information from the healthcare system was not always available. For instance, a woman could have sought medical treatment from a provider in another location, or details such as the provider's name or facility were not documented in the records available. As shown in Table 7, there was an increase in pregnancy-associated deaths in 2021 when compared to 2020.

Table 7. Annual Trend for Pregnancy-associated Deaths[‡], 2020 - 2021

Alabama Maternal Mortality Rates			
Year of Death	Deaths ¹	Rate [†]	Births ²
2020	32	55.5	57,643
2021	55	94.8	58,040
Total	87	75.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

[†] Maternal mortality rates per 100,000 live births.

[‡] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Maternal Characteristics of Pregnancy-associated Deaths

Education Status

Overall, **69.0 percent (n=60/87)** of the pregnancy-associated deaths completed at least a high school education. As shown in Figures 26 and 27, this trend is consistent between black, non-Hispanic and white, non-Hispanic groups.

Figure 26. Education Status by Black, non-Hispanic (n=40), 2020 - 2021[†]

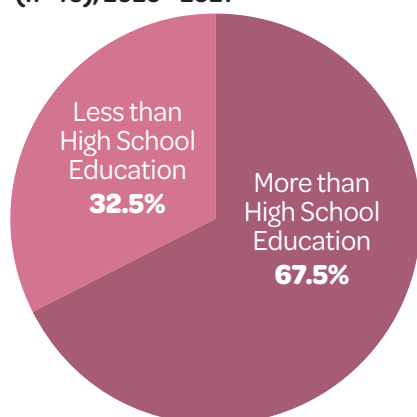
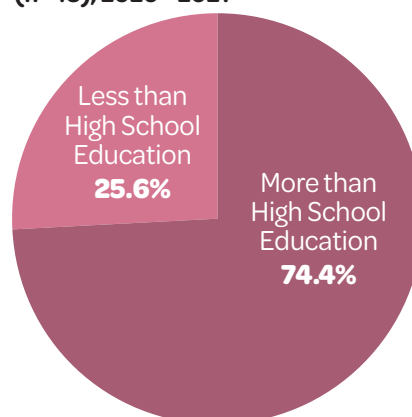


Figure 27. Education Status by White, non-Hispanic (n=43), 2020 - 2021[†]



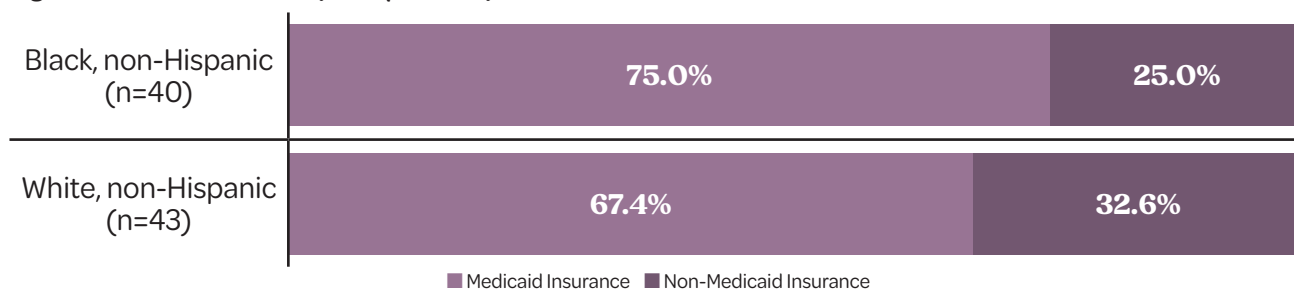
Source: Alabama Department of Public Health, Maternal Mortality Review Program.

[†] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Insurance Status at Delivery

Among pregnancy-associated deaths, data revealed a higher percentage of decedents had state Medicaid insurance at delivery, **71.3 percent (n=62/87)** when compared to pregnancy-related deaths, **60 percent (n=30/50)**. Non-Medicaid insurance included private, self-pay, Tricare, other, or unknown. As shown in Figure 28, the percentage of black, non-Hispanic women who received Medicaid coverage was **75.0 percent (n=30/40)**, while the percentage of white, non-Hispanic women was slightly lower at **67.4 percent (n=29/43)**.

Figure 28. Medicaid Status by Race/Ethnicity, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Note: Four cases were marked unknown for insurance status at delivery. These cases have been included in the non-Medicaid insurance category.

Race and Ethnicity

Table 8 highlights the 2020-2021 MMRs for pregnancy-associated deaths by race/ethnicity. Compared to white, non-Hispanics, the maternal mortality ratio was almost twice as high among black, non-Hispanics. Figure 29 shows a notable increase in the MMR among black, non-Hispanics during 2020-2021 when compared to the 2018-2019 rate. The 2020-2021 MMR for black, non-Hispanic women increased from 71.4 to 114.1 per 100,000 live births.

Table 8. Pregnancy-associated Deaths† by Race/Ethnicity, 2020 - 2021

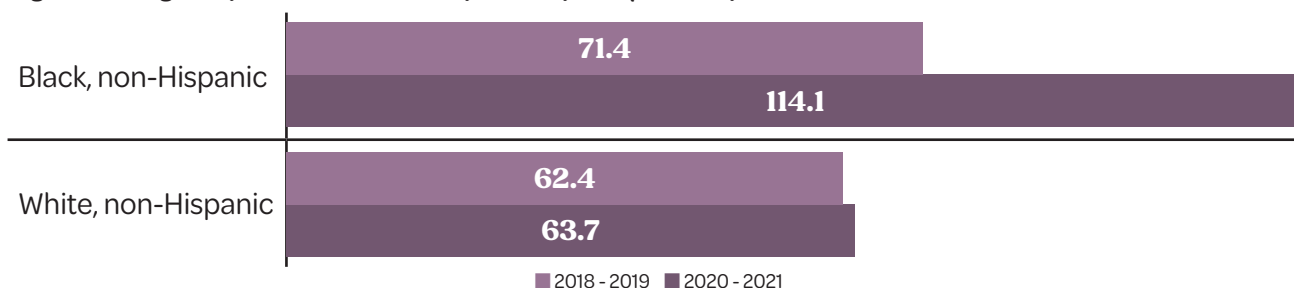
Alabama Maternal Mortality Rates			
Race and Ethnicity	Deaths ¹	Rate [†]	Births ²
Black, non-Hispanic	40	114.1	35,050
White, non-Hispanic	43	63.7	67,471
Hispanic	-	-	10,746
Other/Unknown	-	-	2,416
Total	87	43.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

† Maternal mortality rates per 100,000 live births. Rates with less than 10 deaths were excluded from analysis.

‡ Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Figure 29. Pregnancy-associated Mortality Rates by Race/Ethnicity, 2018 - 2021†



Sources: Alabama Department of Public Health, Maternal Mortality Review Program and Center for Health Statistics.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Maternal Age

As seen in Table 9, the MMR was the highest among the 35-44 age group.

Table 9. Pregnancy-associated Deaths[‡] by Age, 2020 - 2021

Alabama Maternal Mortality Rates			
Age (in Years)	Deaths ¹	Rate [†]	Births ^{2°}
Less than 20	-	-	7,537
20-24	19	65.6	28,963
25-29	24	66.0	36,387
30-34	19	67.1	28,323
35-44	22	153.4	14,339
45 or Older	-	-	129
Total	87	75.2	115,683

Sources: Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

[†] Maternal mortality rates per 100,000 live births. Rates with less than ten deaths were excluded from analysis.

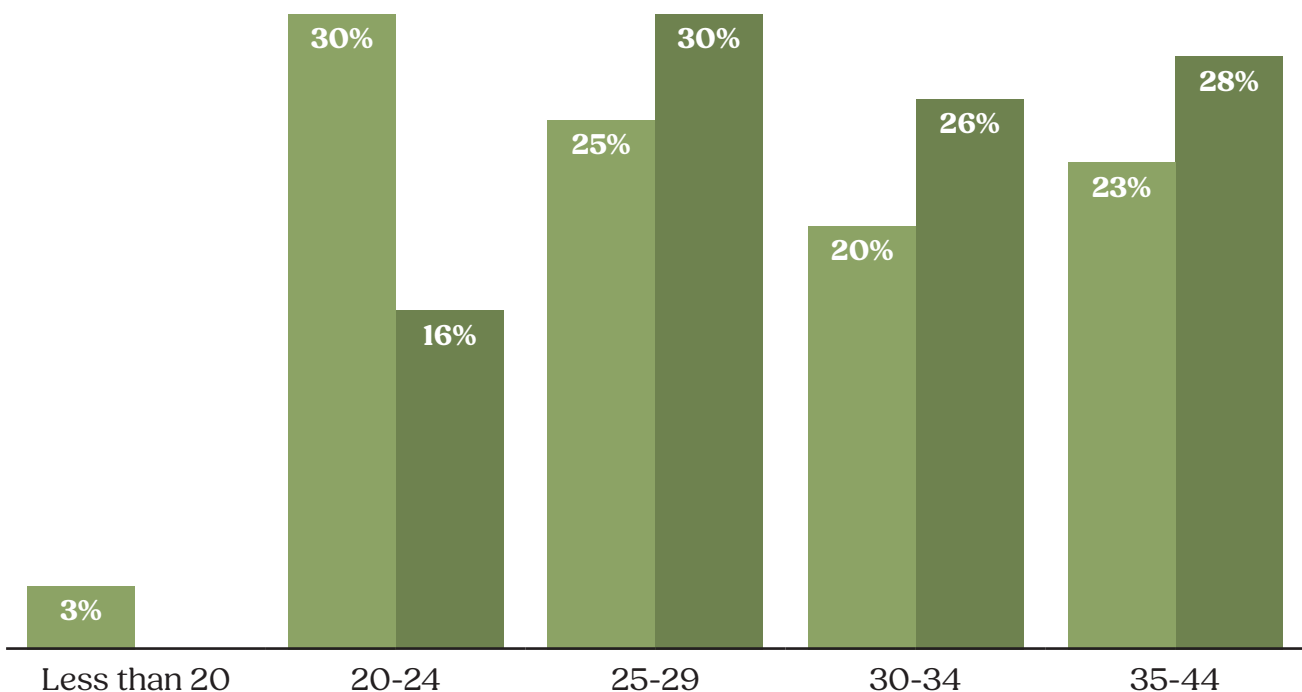
[‡] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

[°] The mother's date of birth was marked unknown for five birth certificates.

Maternal Age and Race/Ethnicity

As shown in Figure 30, the occurrence of pregnancy-associated deaths for white, non-Hispanic women was the highest among the 25-29 age group. For black, non-Hispanic women, the occurrence of pregnancy-associated deaths was the highest among the 20-24 age group.

Figure 30. Pregnancy-associated Deaths by Age and Race/Ethnicity, 2020 - 2021[†]



Sources: Alabama Department of Public Health, Maternal Mortality Review Program.

[†] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Residential Status

Similar to pregnancy-related deaths, Figure 31 shows that **79.3 percent (n=69/87)** of the pregnancy-associated deaths occurred among those who resided in urban counties ($\geq 50,000$ population).

Figure 31. Pregnancy-associated Deaths[‡] by Residential Status, 2020 - 2021[†]



Source: [2021 American Community Survey 5-Year Population Estimates](#), Table DP05.

Alabama Department of Public Health, Maternal Mortality Review Program.

[†] Urban includes urban metropolitan and rural status includes rural micropolitan and rural.

[‡] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Table 10 calculates the MMRs by residential status for pregnancy-associated deaths. Results are consistent with those presented overall and for the pregnancy-related deaths. The rural MMR is higher than both urban and total MMRs.

Table 10. Pregnancy-associated MMRs by Residential Status, 2020 - 2021[‡]

Alabama Maternal Mortality Rates			
Residential Classifications	Deaths ¹	Rate [†]	Births ²
Urban	69	72.3	95,606
Rural	18	89.7	20,077
Total	87	75.2	115,683

Sources: [2021 American Community Survey 5-Year Population Estimates](#), Table DP05.

Alabama Department of Public Health, Maternal Mortality Review Program¹ and Center for Health Statistics².

[†] Maternal mortality rates per 100,000 live births.

[‡] Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

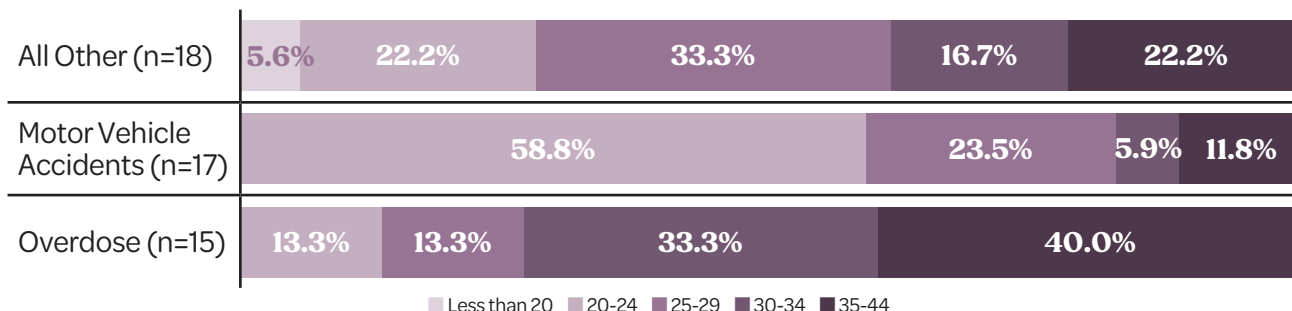
Note: Rural status combined both rural micropolitan and rural.



Leading Causes of Death

The top three leading causes of death for pregnancy-associated deaths included all other, motor vehicle accidents, and overdose. All other encompasses pulmonary embolism, traumatic brain hemorrhage, sepsis, anoxic brain injury, and complications of diabetic ketoacidosis. As shown in Figure 32, a third of deaths that were deemed as all other occurred among the 25-29 age group. Over half (**58.8 percent; n=10/17**) of motor vehicle accident-related deaths occurred in women between the ages of 20 and 24. **Forty percent (n=6/15)** of drug overdose deaths occurred between the ages of 35 and 44.

Figure 32. Alabama Top Three Leading Causes for Pregnancy-associated Deaths, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

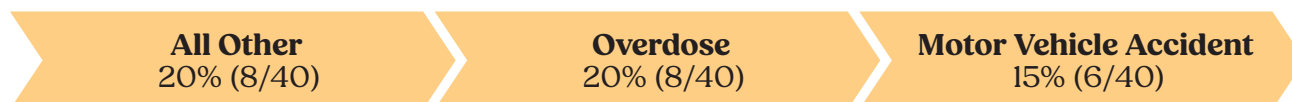
† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Note: Characteristic totals may not equal 100 percent due to rounding errors.

Leading Causes of Death by Race and Ethnicity

As shown in Figures 33 and 34, the leading causes of death for pregnancy-associated deaths were different between black, non-Hispanic and white, non-Hispanic women. The all other category and drug overdose were tied as the primary leading cause of death among black, non-Hispanics. Motor vehicle accidents was the leading cause of death, accounting for **25.6 percent (n=11/43)**, among white, non-Hispanics.

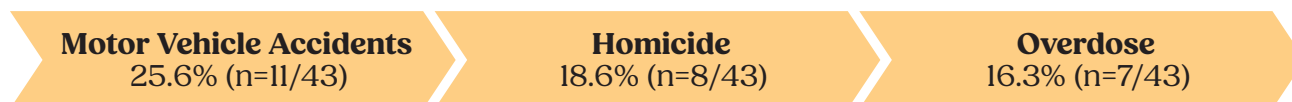
Figure 33. Top Three Leading Causes of Pregnancy-associated Deaths for Black, non-Hispanic (n=40), 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Figure 34. Top Three Leading Causes of Pregnancy-associated Deaths for White, non-Hispanic (n=43), 2020 - 2021†



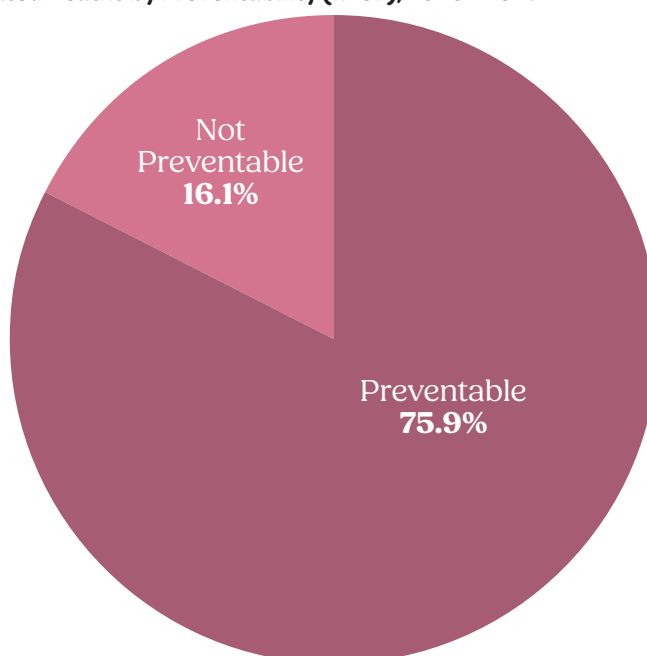
Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Preventability

The AL-MMRC used the same process and definition to determine preventability for pregnancy-associated deaths as done with pregnancy-related deaths. As shown in Figure 35, the AL-MMRC deemed **75.9 percent (n=66/87)** were preventable. There were seven cases in which the committee was unable to determine if the death was preventable. This often occurs when there is limited information available to review the death.

Figure 35. Pregnancy-associated Deaths by Preventability (n=87), 2020 - 2021†

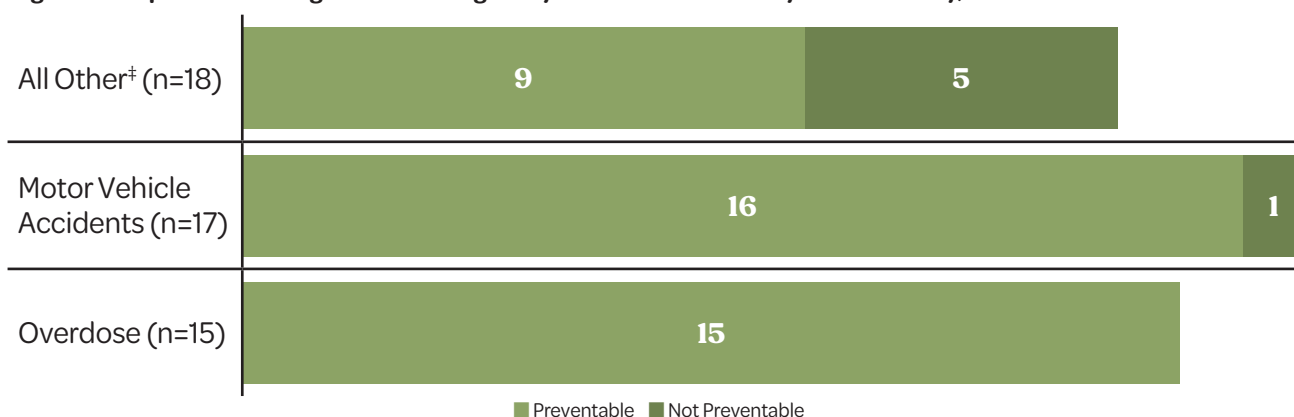


Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Among the three leading causes of pregnancy-associated death, **46.0 percent (n=40/87)** were deemed preventable. As shown in Figure 36, the AL-MMRC determined that all overdose deaths were preventable. Of those who died from a motor vehicle accident, one case was determined to be not preventable. There were five deaths the AL-MMRC deemed as not preventable within the all other classification.

Figure 36. Top Three Leading Causes of Pregnancy-associated Deaths by Preventability, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

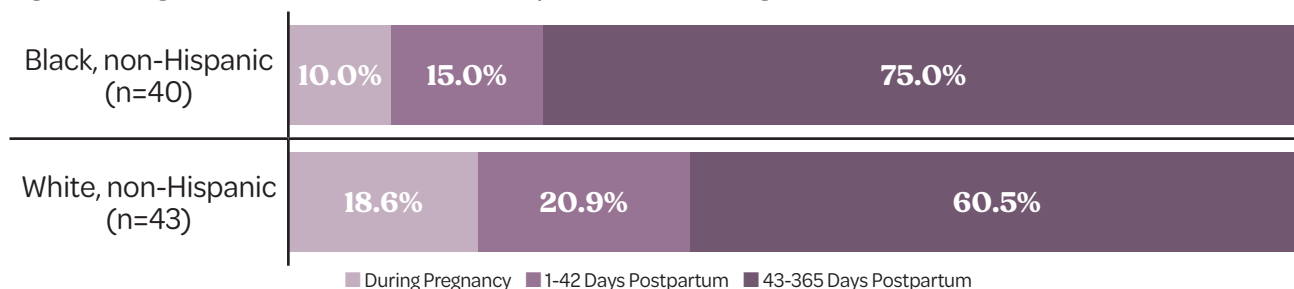
† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

‡ Four all other cases were marked unknown for preventability status.

Timing of Death

Over half (**69.0 percent; n=60/87**) of the pregnancy-associated deaths occurred 43-365 days postpartum. Figure 37 compares the timing of death among black, non-Hispanic, and white, non-Hispanic women. For both black, non-Hispanic and white, non-Hispanic, the majority of pregnancy-associated deaths occurred 46-365 days postpartum with, **75 percent (n=30/40)** occurring in this time frame for black, non-Hispanic women and **60.5 percent (n=26/43)** occurring in this time frame for white, non-Hispanic women.

Figure 37. Pregnancy-associated Deaths by Race/Ethnicity and Timing of Death, 2020 - 2021†



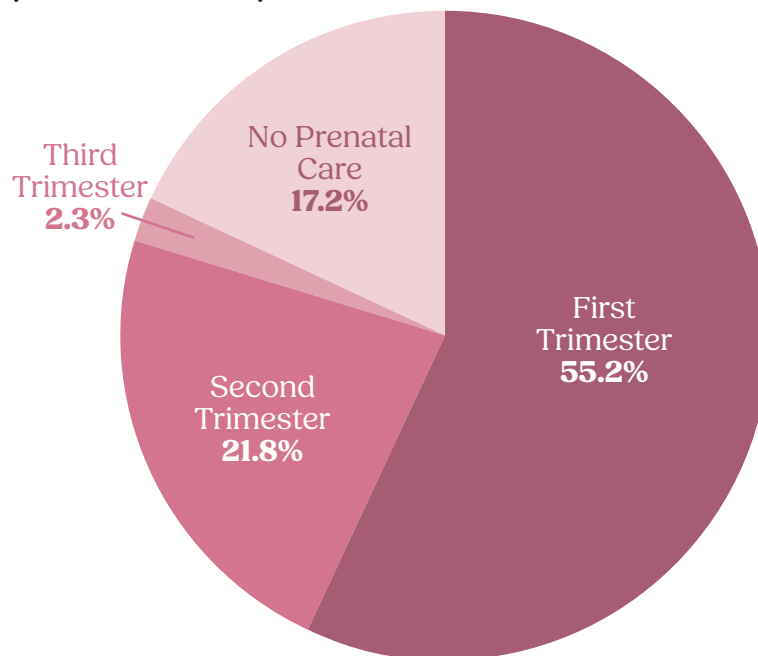
Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Timing of First Prenatal Visit

As shown in Figure 38, over half (**55.2 percent; n=48/87**) of the pregnancy-associated deaths initiated prenatal care during the first trimester. While **17.2 percent (n=15/87)** received no prenatal care.

Figure 38. Pregnancy-associated Deaths by Initiation of First Prenatal Care Visit, 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

Note: Three cases were marked unknown for initiation of first prenatal care visit among the selected groups.

Figures 39 and 40 examine the impact of race/ethnicity and residential status on pregnancy-associated deaths. As shown in Figure 39, initiation of prenatal care was largely similar, with **55.0 percent (n=22/40)** of black, non-Hispanic women initiating prenatal care during the first trimester and **53.5 percent (n=23/43)** of white, non-Hispanic women initiating prenatal care during the first trimester (less than a 2 percent difference). Similar results were seen within the second and third trimesters, with less than 1 percent difference when assessing by race/ethnicity. Among mothers who did not receive any prenatal care, there was less than a 4 percent difference when assessed by race/ethnicity.

Figure 39. Pregnancy-associated Deaths by Initiation of First Prenatal Care Visit and Race/Ethnicity, 2020 - 2021†

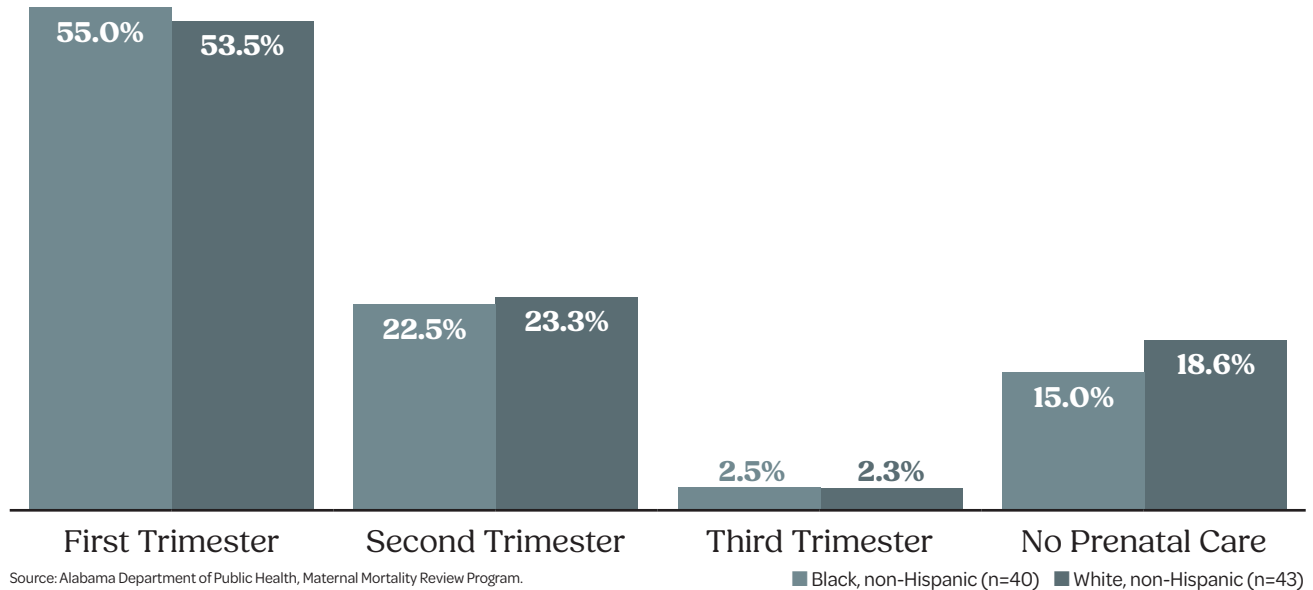
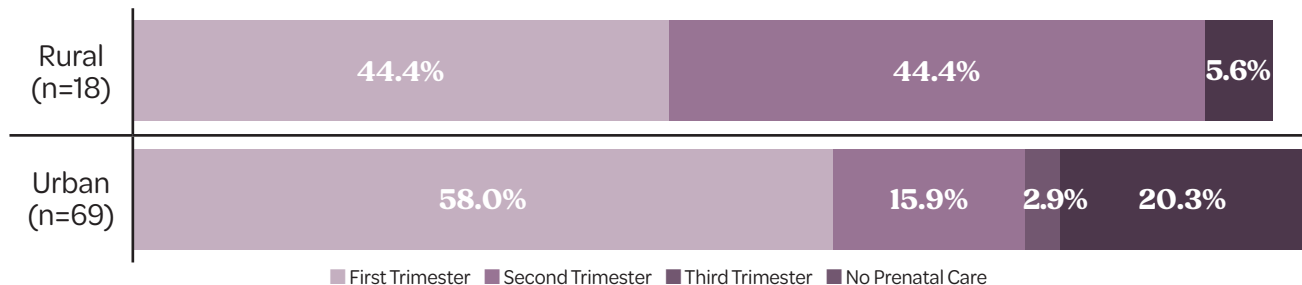


Figure 40 shows that half (n=9/18) of the pregnancy-associated deaths who lived in a rural county ($\leq 49,999$ population) either did not initiate prenatal care or had a delay in the initiation of their first prenatal care visit compared to **39.1 percent (n=27/69)** living in an urban county ($\geq 50,000$ population).

Figure 40. Pregnancy-associated Deaths by Initiation of First Prenatal Care Visit and Residential Status (n=87), 2020 - 2021†

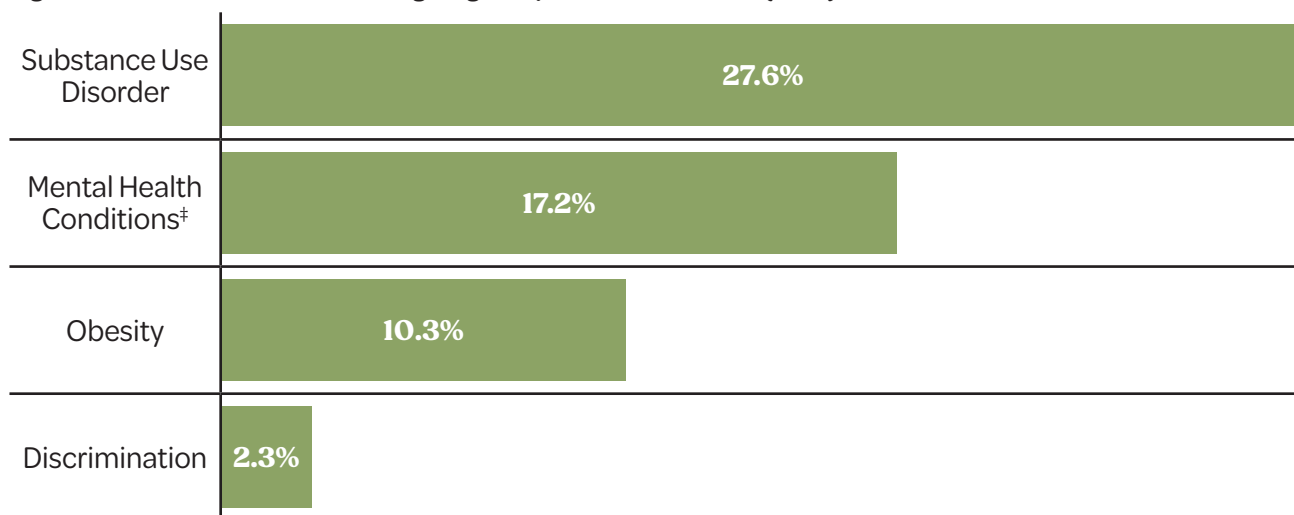


Circumstances Surrounding Death

Like pregnancy-related deaths, the AL-MMRC identified whether specific factors, including obesity, mental health conditions other than substance use disorder, substance use disorder, or discrimination, were contributors to a pregnancy-associated death.

Deaths in which a circumstance likely contributed were defined as those in which the committee answered “yes” or “probably” for whether each circumstance contributed to the death. As shown in Figure 41, substance use disorder contributed to **27.6 percent (n=24/87)** of the pregnancy-associated deaths, and mental health conditions contributed to **17.2 percent (n=15/87)**.

Figure 41. Circumstances Surrounding Pregnancy-associated Deaths (n=87), 2020 - 2021†



Source: Alabama Department of Public Health, Maternal Mortality Review Program.

† Pregnancy-associated deaths combined pregnancy-associated, but not related deaths and pregnancy-associated, but unable to determine relatedness deaths.

‡ Excludes substance use disorder.

Note: 37 cases did not have a circumstance surrounding their death.



Pregnancy Risk Assessment Monitoring System (PRAMS)

PRAMS is a joint surveillance project between the CDC Division of Reproductive Health and state health departments that was developed in 1987 to reduce infant morbidity and mortality. The purpose of PRAMS is to find out why some infants are born healthy, others are not, and to positively influence maternal behaviors before, during, and immediately after birth. Participating jurisdictions receive annual funding from the CDC to conduct PRAMS activities and collect information from mothers who have recently either given birth or had an infant death through a standardized PRAMS survey. Mothers are selected from the state's birth registry using selection eligibility criteria set by the jurisdiction. Alabama's PRAMS Program (AL-PRAMS) utilizes Medicaid and non-Medicaid insurance status as the primary stratification variable and limits participants based on Alabama residency. The PRAMS survey captures information on various maternal experiences and behaviors before, during, and after pregnancy by asking new mothers questions about their pregnancy and new infant. The CDC periodically updates its core survey questions to account for new or emerging health topics that could impact both mothers and infants.

Current core PRAMS survey questions include topics designed to monitor changes in maternal and child health indicators such as prenatal care, breastfeeding, smoking, and infant safe sleep. Supplemental questions may be included to better assess state specific health issues. Supplemental questions can include topics about social determinants of health, E-cigarette use (vaping), and other related health topics relevant to the state.

For more information on the AL-PRAMS Program, please visit www.alabamapublichealth.gov/prams.

How the MMRP can use PRAMS Data

Based on the framework developed by the CDC, states can select sample sizes ranging from approximately 1,000 to 3,000 women to represent all new mothers who either delivered a live-born infant or had an infant death during the time frame of interest. The AL-PRAMS samples approximately 1,600 new mothers to take the survey each year. Birth records are used to select a sample representation using the eligibility criteria set by the jurisdiction and state's priorities. Oversampling of a targeted population can occur to accurately reflect its representation within the state-level estimates.

The MMRP utilized PRAMS survey data captured for mothers delivering between 2020 and 2021 to strengthen its recommendations on addressing maternal mortality.

Additional Recommendations

The AL-MMRC identified contributing factors and provided recommendations for deaths deemed preventable. The AL-MMRC utilizes the committee decision form provided by the CDC to develop recommendations. Contributing factors, such as lack of access/financial resources, chronic disease, delay, and lack of knowledge, can occur at any of these five levels: patient/family, provider, facility, community, and system. The committee seeks to identify a range of recommendations to address multiple levels, types of prevention, and expected impacts. Throughout the 2020 and 2021 case reviews, more than 500 recommendations were made by the AL-MMRC. We have highlighted key recommendations below. The recommendations made were for deaths determined to be pregnancy-related, pregnancy-associated but not related, or pregnancy-associated but unable to determine relatedness. Those that were made specifically for pregnancy-related deaths are in green font.

Healthcare Coverage

The AL-MMRC record reviews continue to demonstrate that complications leading to pregnancy-associated deaths can occur several months following pregnancy. **Fifty-four percent (n=74/137)** of the reviewed deaths occurred within 43-365 days postpartum. Approximately **67.2 percent (n=92/137)** of the reviewed deaths were identified as women who receive coverage through the state's Medicaid program at delivery.

- The AL-MMRC continues to recommend that Medicaid coverage be extended to 1 year postpartum to reduce lapses in care and increase positive health outcomes.
- The AL-MMRC also recommends Medicaid coverage expansions, including dental care for pregnant and postpartum patients, supplemental funding for patients with substance use disorder, including medication assisted treatment, and expanding the number of medications that can be covered by Medicaid.
- Effective October 1, 2022, Alabama Medicaid extended postpartum coverage to 1 year after delivery. Dental coverage ends 60 days postpartum.
- The AL-MMRC recommends that the public and providers be educated on the availability of ALL Babies. It is low-cost, comprehensive healthcare coverage through the Alabama's Children's Health Insurance Program that is available for eligible pregnant women who reside in Alabama. ALL Babies uses Blue Cross Blue Shield of Alabama to provide medical services and mental health and substance use services through their preferred provider network from pregnancy through 60 days postpartum.

Access to Care

The AL-MMRC found that barriers to accessing care, including transportation, primary care, and community support, continue to impact maternal health in Alabama.

Recommendations made include:

- Enhanced state funded assistance for transportation to medical therapy should be arranged, funded, and implemented, especially to improve the availability of transportation services in rural areas.
- Increased access to primary care during the preconception, interconception, and postpartum periods is essential to decreasing the risk of death.

- Increased access and coverage of obesity-associated care, interventions, and treatment. This should include obesity prevention and prevention of worsening obesity.
- Women, especially those with chronic conditions, should be encouraged to seek prenatal care early and maintain follow-up visits during and after pregnancy as advised.
- Expansion of current maternal support systems in the community such as access to home-visiting postpartum care/support programs, would help improve optimal outcomes.
- Increased funding for rural emergency medical services is needed to improve access and response times.
- The closure of rural labor and delivery units can negatively impact the health of women and children. The committee recommends **rural labor and delivery units be kept open** so that women may access care at the closest facility.

The AL-PRAMS data reviews chronic health conditions at least 3 months before the pregnancy, including hypertension and diabetes. Results included the following: **7.5 percent (n=7,578/100,587)** of the estimated Alabama maternal population had hypertension, and **2.6 percent (n=2,622/100,365)** of the estimated Alabama deliveries had diabetes. The next set of questions reviews the projected percentage of pregnant mothers who have either diabetes or hypertension during pregnancy. During pregnancy, **18.3 percent (n=18,093/98,641)** were projected to have hypertension, followed by **9.4 percent (n=9,263/98,425)** for diabetes.

Smoking has negative impacts on both the mother and infant. The AL-PRAMS survey has specific questions for mothers who self-reported that they smoked within the past two years. Three months prior to pregnancy, **87.9 percent (n=15,564/17,707)** among the projected smoking maternal population used at least one cigarette. Within the last 3 months of pregnancy, **36.1 percent (n=6,382/17,692)** of the projected smoking population used at least 1 cigarette.

Discrimination

The AL-MMRC made some recommendations for cases where they determined that discrimination contributed to the death.

- Implicit bias training should be provided to all healthcare providers and staff so that diagnosis and treatment are not delayed.
- Providers should not inappropriately attribute signs or symptoms of disease to pregnancy, recent pregnancy, postpartum state, delivery, or any pregnancy-related procedures. Any signs or symptoms of the disease that are thought to be due to pregnancy-related conditions or procedures should be thoroughly discussed with an obstetrician prior to being attributed to these conditions, and in those cases, the obstetrician should weigh in as to whether the signs or symptoms are clinically concerning in these contexts.

COVID-19 Specific Recommendations

The greatest proportion of deaths from infection was attributed to COVID-19. Of the pregnancy-related deaths, **82.4 percent (n=14/17)** of infection-related deaths were determined to be COVID-19. The AL-MMRC made multiple recommendations regarding the care of patients with COVID-19. The recommendation for vaccination was considered based on the guidelines set by ACOG and SMFM in July 2020.

- Pregnant women should be educated on the risks of COVID-19 during pregnancy and should be encouraged to get vaccinated. Stronger recommendations for vaccination of pregnant women who have high risk factors (such as chronic hypertension and obesity).
- Patients are educated regarding the impact of untreated hypertension and diabetes and non-compliance with medications. Patients are encouraged to avoid smoking to decrease the impact of viral illnesses and other medical conditions.
- Pregnant patients should establish/obtain regular prenatal care and seek care early when COVID-19 symptoms arise.
- Pregnant women should be offered/prioritized for monoclonal antibodies.
- Continue to build systems across the state that address social determinants of health to support the health and wellbeing of pregnant women, including housing assistance, access to care, and social support.
- Policies/procedures to address the appropriate recommended care provided to pregnant patients for COVID-19 related complications (example: proning patients; prone position is lying face down). Providers should be made aware that proning of pregnant patients can be done safely, even during the third trimester.

Patient/Family Education

Ensuring that women and the community are educated regarding maternal health prior to pregnancy and following pregnancy is imperative to reducing maternal mortality in our state. Over **60 percent (64.2 percent; n=88/137)** of deaths reviewed had pre-existing conditions such as hypertension, diabetes, asthma, heart disease, and lupus. Forty-two percent of pregnancy-related deaths listed obesity as a contributing factor to the death. Motor vehicle accidents accounted for **19.5 percent (n=17/87)** of all pregnancy-associated deaths. The committee made numerous recommendations regarding the education of patients and families.

- Patients should be educated about chronic disease processes, the management of those diseases, and the potential consequences of non-adherence to medical recommendations at any point during care. Providers discuss with patients the importance of pre-pregnancy health and the importance of pre-pregnancy evaluation to determine the safety of pregnancy in women with chronic medical conditions, especially those with cardiac issues. Education regarding the importance of providing a complete medical history to medical providers when presenting for care at any time.
- Increased patient and community awareness that obesity, including and especially super-morbid obesity (BMI greater than or equal to 50), is associated with worsening of underlying medical co-morbidities and increased risks of pregnancy complications. Prioritization of weight management as a primary component of a treatment plan utilizing resources to enhance adherence.
- Patients should be educated regarding maternal warning signs during pregnancy and in the postpartum period, including signs/symptoms of hypertensive disorders of pregnancy, cardiomyopathy, infection, and hemorrhage, and when they need to seek evaluation/treatment.
- Pre-conception counseling should be provided for all women considering pregnancy who have underlying medical complications that may affect maternal/fetal health. Healthcare providers should educate patients with complex medical conditions regarding contraceptive options pre-pregnancy, antepartum, postpartum, and ensure patients have bridging contraception.

- Motor vehicle accidents were the second leading cause of death for all pregnancy-associated deaths. **Providers should educate pregnant women on the importance of wearing seat belts while pregnant and how to properly wear seat belts.** The public needs to be educated regarding not driving under the influence of alcohol, drugs, or mind-altering agents and to **avoid distractions such as using a cell phone while driving.**

PRAMS data could be further used by the MMRC to substantiate the recommendations made specific to pregnancy planning, medications, and lifestyle choices. Throughout any healthcare visit in the 12 months leading up to their pregnancy, the AL-PRAMS respondents were asked if medical staff discussed the following health topics with them: medication adherence, not wanting children, birth control methods, and smoking and alcohol use. During any medical visit that occurred 12 months before pregnancy, an estimated **47.8 percent (n=26,953/56,433)** discussed their desire to either have or not have children with a healthcare provider. Short birth intervals (less than 18-24 months between pregnancies) are associated with increased risks of adverse maternal and infant outcomes, including maternal mortality, neonatal mortality, and preterm birth. PRAMS data estimates **51.6 percent (n=29,183/56,506)** of pregnant women did not discuss birth control methods at any health care visit 12 months before pregnancy, and **10.3 percent (n=10,109/98,367)** of pregnant women were not asked by their healthcare provider about birth control preferences or needs after delivery. This represents both a gap and an opportunity for healthcare providers to make improvements in assisting expectant mothers with family planning after delivery. Ensuring all expectant mothers are asked about their birth control needs and counseled on available options can help reduce short birth intervals in subsequent pregnancies. Concerning lifestyle topics, **9.9 percent (n=9,744/98,378)** were projected to not have a discussion with their healthcare provider about their smoking history, followed by **10.3 percent (n=10,131/98,447)** failing to discuss alcohol use. Overall, **29.9 percent (n=29,397/98,354)** were projected to not have a discussion with their healthcare provider on how smoking during pregnancy negatively impacts the baby.

The AL-PRAMS included questions on whether health topics or resources were discussed at the postpartum visit. Health topics at that time included the following: **51.5 percent (n=45,321/88,035)** were projected to not discuss the importance of birth spacing, **44.8 percent (n=39,451/87,984)** of the projected Alabama population were not asked about their smoking history, and **12.1 percent (n=10,699/88,525)** of the projected Alabama population did not discuss birth control methods that can be used after delivery. For resources and procedures completed postpartum, **50.2 percent (n=44,245/88,167)** were prescribed contraceptives, and **16.1 percent (n=14,271/88,390)** received a contraceptive implant.

Provider and Facility Knowledge

All healthcare providers, including obstetricians/gynecologists, primary care providers, emergency physicians, and healthcare facilities, should be educated on vital issues that impact maternal health, including:

- **Include pregnancy history in intake questions/assessments on the patient's arrival. Healthcare providers need to be made aware of normal and disease states in pregnancy and postpartum, and how to recognize and manage complications in a timely fashion.**
- **Regardless of pregnancy outcome, patients are to be maintained under the care of an obstetrician up to 6 weeks postpartum. Providers should have patients with a complex pregnancy follow up sooner than 6 weeks postpartum.**
- **Cardiomyopathy was the second leading cause of pregnancy-related death among black, non-Hispanic women in 2020 and 2021. All healthcare providers need to be made aware of the risk**

factors for cardiovascular disease in the pregnancy and postpartum period, the maternal symptoms of cardiac disease, and the need for potential evaluation/treatment. Providers caring for pregnant and postpartum women should refer patients with cardiomyopathy to the appropriate level of care, and they should receive close outpatient follow-up.

- Provider education regarding the increased risk of wound complications in patients with co-morbidities, management of sepsis in complex medical postpartum patients, and the appropriate use of wound vacuum devices in cesarean section patients.
- All providers are educated on recognizing and appropriately treating obstetric hemorrhage. Facilities implement evidence-based maternal safety bundles in units to improve identification and timely treatment of hemorrhage. Patients with significant hemorrhage should follow up with the healthcare provider sooner (not the standard 6 weeks postpartum follow-up).
- Providers recognize and appropriately treat preeclampsia, severe preeclampsia, and eclampsia using ACOG guidelines; including prescribing low-dose aspirin for preeclampsia prevention in women with chronic hypertension, and delivery at 37 weeks gestation for patients diagnosed with gestational hypertension or preeclampsia. All facilities, including emergency departments and urgent care facilities, adopt the Alliance for Innovation on Maternal Health severe maternal hypertension bundle.

Mental Health Conditions and Substance Use Disorder

Overdose was the third leading cause of all pregnancy-associated deaths. The AL-MMRC determined that substance use disorder contributed to **14.0 percent (n=7/50)** of pregnancy-related deaths and **27.6 percent (n=24/87)** of pregnancy-associated deaths. Mental health conditions contributed to **8.0 percent (n=4/50)** of pregnancy-related deaths and **17.2 percent (n=15/87)** of pregnancy-associated deaths. Mental health conditions included depression and anxiety.

Recommendations made by the AL-MMRC include:

- Decriminalization of substance use disorder in pregnancy to promote voluntary treatment and so that patients do not avoid prenatal care for fear of prosecution.
- Increase funding and access to treatment/recovery support for substance use disorder and mental health conditions, especially for pregnant and postpartum women.
- Education of providers to avoid prescribing unindicated or unnecessary opioids following an uncomplicated vaginal delivery for patients with a positive urine drug screen and/or history of substance use disorder.
- Increase the availability of and education surrounding the use of Narcan for those with and without substance use disorder. Education of providers and creation of hospital/physician protocols to ensure that patients at high risk of opioid overdose are prescribed Narcan at discharge, especially for patients who are seen/admitted for a non-fatal opioid overdose.
- Patients with a positive drug screen should be offered substance use disorder treatment in a timely manner.
- State perinatal quality collaborative should educate providers on screening and best practices for the care of opioid dependent patients during pregnancy and the postpartum period. Patients with substance use disorder and psychiatric disorders should be followed closely for a year postpartum.
- Accessibility of care that is supportive of addressing substance use disorder in pregnancy and wrap around follow-up through expanding programs such as SafeCare and Comprehensive Addiction in

Pregnancy Program to additional counties. Expand the availability of community-based resources (such as nurse family partnerships and community health workers), including training to recognize and support mothers with perinatal mood and anxiety disorders.

- Providers who work directly with pregnant and postpartum patients, including those outside the obstetric specialty, should screen for mood at regular intervals before, during, and after pregnancy using validated tools. Patients should be referred to mental health and substance use disorder treatment facilities in a timely manner.

Using the AL-PRAMS data, an estimated **16.7 percent (n=16,827/100,678)** of the representative Alabama maternal population reported depression 3 months before being pregnant. During the most recent pregnancy, **17.8 percent (n=17,634/98,837)** of the projected Alabama maternal population self-reported depression symptoms.

The AL-PRAMS includes questions about whether medical staff discussed topics related to depression and substance abuse at any prenatal care visit. Based on the survey responses, **24.3 percent (n=24,012/98,447)** were projected to not be asked by medical staff if they were feeling down or depressed, followed by **28.5 percent (n=27,967/98,224)** projected to not be asked about using drugs such as marijuana, cocaine, crack, or methamphetamines. During the most recent pregnancy or after delivery, **16.2 percent (n=15,536/96,128)** were projected to not receive additional information on postpartum depression (baby blues). At their postpartum visit, **16.8 percent (n=14,817/88,384)** were projected to not be asked about feeling down or depressed.

The next set of questions asks about any reported signs of depression among the AL-PRAMS survey respondents after delivery. Based on the survey respondents, **14.9 percent (n=13,936/96,046)** of the Alabama maternal population has little interest or pleasure in activities they would enjoy doing since having the baby. Another **11.1 percent (n=10,735/96,315)** of the Alabama pregnant population was projected to always or very often feel let down, depressed, or hopeless.

Care Coordination

Care coordination can be instrumental in ensuring that patients are receiving all medical services needed, linking them to available resources, and providing education. To emphasize the importance of care coordination, the AL-PRAMS results have projected the following issues within Alabama:

43.1 percent (n=5,692/13,195) could not get an appointment when they wanted, **26.8 percent (n=3,515/13,139)** did not have enough money or insurance to pay for the medical visit, and **11.7 percent (n=1,539/13,121)** reported not having access to transportation.

- Providing social services/case management/care coordination to identify women at high risk and follow them for opportunities to intervene for care during pregnancy and postpartum. This includes ensuring patients can access care when needed, making sure patients can afford and pick up medications that are prescribed to them, and provide accurate resources and referrals for social support outside healthcare facilities.

Opportunities Moving Forward

The recommendations made by the AL-MMRC should be considered as a starting point for facilities/hospitals, providers, patients/families, and the state to address maternal mortality in Alabama.

- Only **44.5 percent (n=61/137)** of the reviewed deaths had an autopsy performed. Obtaining the most detailed and accurate information is critical in making determinations regarding maternal deaths and reducing maternal mortality in Alabama. During the reviews of 2020 and 2021 deaths, the AL-MMRC continued to recommend that autopsy and toxicology be performed on maternal deaths to gain more insight into the cause of death. Funding from the Alabama Legislature has been allocated to the ADPH MMRP to perform maternal autopsies at no charge to families. The funding also includes transportation to and from the facility where the autopsy is performed. The funding led to the implementation of the Maternal Autopsy Program in December 2023. The program was first piloted in Baldwin, Jefferson, Mobile, Shelby, and Walker Counties. In March 2024, the program was expanded to include Madison, Marshall, and Montgomery Counties. Effective October 2024, the program was expanded to the entire state. The autopsies will be performed at The University of Alabama at Birmingham and The University of South Alabama. Transportation will be provided by Mack Mortuary Transport Services. Additional information about the Maternal Autopsy Program and the MMRP can be found at <https://www.alabamapublichealth.gov/perinatal/maternal-mortality-review.html>.
- The CDC awarded \$2.975 million to the ADPH MMRP over 5 years through the Enhancing Reviews and Surveillance to Eliminate Maternal Mortality (ERASE MM) grant to expand support to the AL-MMRC beginning October 1, 2024. The CDC ERASE MM grant will provide additional support to the AL-MMRC by extending its data capabilities and decreasing time spent developing reports, increasing staffs ability to abstract records and interview family members, and increasing outreach to educate the public on the prevention of maternal deaths. Additional information about the CDC ERASE MM Program can be found at: <https://www.cdc.gov/maternal-mortality/php/erase-mm/index.html>.
- The Alabama Legislature has generously supported the MMRP since its inception for staffing, outreach activities, the AL-MMRC, and the Maternal Autopsy Program. We appreciate their continued support as we work to improve maternal health in Alabama.
- The BFHS hired a social worker to interview family members of decedents early this year. Including interviews in the case review process will provide more information on contributing factors not otherwise captured in medical records. This will provide the committee with a deeper understanding of the underlying causes of death and complete the story of women who have died.
- The ADPH launched the CDC Hear Her Campaign in November 2024. The Hear Her Campaign supports efforts to prevent pregnancy-related deaths by sharing potentially life-saving messages about urgent maternal warning signs. It includes resources for people who are pregnant or postpartum, their partners, family, friends, and the healthcare professionals who interact with them. The Hear Her Campaign aims to empower women and their support networks to know the urgent maternal warning signs and speak up when they have concerns. Recognizing the warning signs and getting the right diagnosis and treatment as soon as possible can save lives. Appendix A includes flyers for the Hear Her Campaign. The ADPH has included information about the campaign on its website: <https://www.alabamapublichealth.gov/perinatal/maternal-mortality-review.html>. Further information on the campaign can be found at <https://www.cdc.gov/hearher/index.html>.

- The Alabama Perinatal Quality Collaborative (ALPQC) launched the Obstetric Hemorrhage Initiative in January 2024 in collaboration with 36 hospitals throughout the state. The goal was to improve early recognition and intervention to improve patient outcomes. In October 2024, the ALPQC reported that there had been a significant decrease in severe maternal morbidity among patients with obstetric hemorrhage-related diagnoses, and hospitals reported updates to their education and protocols. Hospitals have now shifted into the Severe Maternal Hypertension sustainability phase and will soon cease reporting. Additional information can be found at <https://www.alpqc.org/initiatives/obh>.
- As part of the ALPQC's aim of reducing maternal morbidity and mortality, a statewide pilot of the Postpartum Bracelet Project began early in 2024 with eight hospitals participating. The pilot provided each postpartum patient with a bracelet to help doctors, nurses, and first responders recognize potential post-pregnancy health conditions in the event of a medical emergency. Patients are encouraged to wear the bracelet for at least 6 weeks. The goal is to prevent maternal deaths through education, recognition, and early intervention. The Postpartum Bracelet Project expanded statewide in April 2025. Additional information can be found at <https://www.alpqc.org/initiatives/pospartum-bracelet-project>.
- The ALPQC received a Health Resources and Services Administration State Maternal Health Innovation and Data Capacity Program award to establish the Alabama Maternal Health Task Force. The purpose of the task force is to develop a collective vision for maternal health improvement across the state and drive sustainable change. The task force is made up of a diverse group of partners, including representatives from government agencies, private and non-profit sectors, insurance providers, civic organizations, healthcare systems, universities, faith-based and community groups, families, patient advocates, and many more. It includes several members of the AL-MMRC. The task force began work in 2023 to create a strategic plan that addresses the following key priority areas: grow and strengthen the maternal health workforce; improve access to continuous, high-quality care; provide tools and a platform for community voice and patient advocacy; identify and grow the programs and policies that work to improve the health of Alabama women; and improving data collection and sharing. Additional information can be found at <https://www.almhtf.org>.
- In an effort to decrease missed opportunities in identifying pregnancy-related emergencies in non-obstetric settings, ACOG and CDC launched an initiative that provides tools and resources to help practitioners identify and manage pregnancy-related emergencies. Appendix B includes links to the tools available.

Data Limitations

- The CDC may have used a different data source than the AL-MMRP used to determine which counties would be classified as rural, rural micropolitan, or urban metropolitan.
- The MMRP staff had difficulty obtaining records from different facilities, providers, or other entities. This can have an impact on the AL-MMRC review process in determining pregnancy-relatedness, the cause of death, or preventability.
- The sample size was too small to calculate accurate annual MMRs among different racial groups.
- With access to only medical records and death certificates, discrimination may have been missed among the reviewed cases for this report.

Appendix A

The ADPH launched the Hear Her Campaign in November 2024. The following pages in Appendix A include flyers and posters with key information about maternal warning signs and tips for talking about concerns with pregnant and postpartum women and healthcare providers. Additional information can be found at the following website: <https://www.cdc.gov/hearher/index.html>.

Page 39- Conversation guide for pregnant or postpartum women

Page 40- Urgent maternal warning sign poster

Page 41- Poster for healthcare professionals

Page 42- Conversation guide for partners, friends, and families



You know your body best

If you experience something that seems unusual
or is worrying you, don't ignore it.

HEARTM
HEAR HER CONCERNS

Learn about urgent warning signs and how to talk to your healthcare provider.

During Pregnancy

If you are pregnant, it's important to pay attention to your body and talk to your healthcare provider about anything that doesn't feel right. If you experience any of the urgent maternal warning signs, get medical care immediately.

Tips:

- Bring this conversation starter and any additional questions you want to ask to your provider.
- Be sure to tell them that you are pregnant or have been pregnant within a year.
- Tell the doctor or nurse what medication you are currently taking or have recently taken.
- Take notes and ask more questions about anything you didn't understand.

Learn more about CDC's Hear Her Campaign at www.cdc.gov/HearHer

After Pregnancy

While your new baby needs a lot of attention and care, it's important to remain aware of your own body and take care of yourself, too. It's normal to feel tired and have some pain, particularly in the first few weeks after having a baby, but there are some symptoms that could be signs of more serious problems.



Tear this panel off and use this guide to help you start the conversation:

Urgent Maternal Warning Signs

If you experience any of these warning signs, get medical care immediately.

- Severe headache that won't go away or gets worse over time
- Dizziness or fainting
- Thoughts about harming yourself or your baby
- Changes in your vision
- Fever of 100.4° F or higher
- Extreme swelling of your hands or face
- Trouble breathing
- Chest pain or fast-beating heart
- Severe nausea and throwing up (not like morning sickness)
- Severe belly pain that doesn't go away
- Baby's movement stopping or slowing down during pregnancy
- Vaginal bleeding or fluid leaking during pregnancy
- Heavy vaginal bleeding or leaking fluid that smells bad after pregnancy
- Swelling, redness or pain of your leg
- Overwhelming tiredness

This list is not meant to cover every symptom you might have. If you feel like something just isn't right, talk to your healthcare provider

Use This Guide to Help Start the Conversation:

- Thank you for seeing me.
I am/was recently pregnant. The date of my last period/delivery was _____ and I'm having serious concerns about my health that I'd like to talk to you about.
- I have been having _____ (symptoms) that feel like _____ (describe in detail) and have been lasting _____ (number of hours/days)
- I know my body and this doesn't feel normal.

Sample questions to ask:

- What could these symptoms mean?
- Is there a test I can have to rule out a serious problem?
- At what point should I consider going to the emergency room or calling 911?

Notes:

HEARTM
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Learn more about CDC's Hear Her Campaign at www.cdc.gov/HearHer



Pregnant now or within the last year?

Get medical care right away if you experience any of the following symptoms:



Headache that won't go away or gets worse over time



Dizziness or fainting



Changes in your vision



Fever of 100.4°F or higher



Extreme swelling of your hands or face



Thoughts of harming yourself or your baby



Trouble breathing



Chest pain or fast beating heart



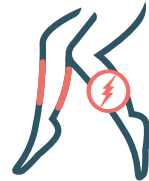
Severe nausea and throwing up



Severe belly pain that doesn't go away



Baby's movement stopping or slowing during pregnancy



Severe swelling, redness or pain of your leg or arm



Vaginal bleeding or fluid leaking during pregnancy



Heavy vaginal bleeding or discharge after pregnancy



Overwhelming tiredness

These could be signs of very serious complications. If you can't reach a healthcare provider, go to the emergency room. Be sure to tell them you are pregnant or were pregnant within the last year.



Learn more at
cdc.gov/HearHer



HEAR[®]
HEAR HER CONCERNS

This list of urgent maternal warning signs was developed by the Council on Patient Safety in Women's Health Care.



Asking whether my patient had been pregnant in the last year may have helped save her life.

Life-threatening complications can happen up to a year after pregnancy. Most pregnancy-related deaths are preventable.

Ask whether your patient is pregnant or was pregnant in the last year.

Connect her to the care she needs right away.



Learn more at cdc.gov/HearHer





Listening and Acting Quickly

could help save her life

HEARTM
HEAR HER CONCERNS

How Can You Help?

If a pregnant or recently pregnant woman expresses concerns about any symptoms she is having, take the time to Hear Her. Listening and acting quickly could help save her life.

- Learn the urgent maternal warning signs.
- Listen to her concerns.
- Encourage her to seek medical help. If something doesn't feel right, she should reach out to her provider. If she is experiencing an urgent maternal warning sign, she should get medical care right away. Be sure that she says she is pregnant or was pregnant within the last year.
- Offer to go with her to get medical care and help her ask questions. Visit <https://www.cdc.gov/hearher/pregnant-postpartum-women/index.html#talk>.
- Take notes and help her talk to a healthcare provider to get the support she needs.
- Support her through follow-up care.

Urgent Maternal Warning Signs

If someone who is pregnant or was pregnant within the last year has any of these symptoms, she should get medical care immediately.

- Severe headache that won't go away or gets worse over time
- Dizziness or fainting
- Thoughts about harming yourself or your baby
- Changes in your vision
- Fever of 100.4° F or higher
- Extreme swelling of your hands or face
- Trouble breathing
- Chest pain or fast-beating heart
- Severe nausea and throwing up (*not like morning sickness*)
- Severe belly pain that doesn't go away
- Baby's movement stopping or slowing down during pregnancy
- Vaginal bleeding or fluid leaking during pregnancy
- Heavy vaginal bleeding or fluid leaking that smells bad after pregnancy
- Swelling, redness or pain of your leg
- Overwhelming tiredness

This list is not meant to cover every symptom a woman might experience during or after pregnancy. Learn more about urgent maternal warning signs at [cdc.gov/HearHer](https://www.cdc.gov/HearHer).

Hear Her

Pregnancy complications can happen up to a year after birth. If your loved one shares that something doesn't feel right, support her to get the care and answers she may need. Learn the urgent warning signs that need immediate medical attention. Here are some talking points to help with the conversation:

During Pregnancy

- It's hard to tell what's normal with everything that's changing right now. It's better to check if there's anything you are worried about.
- It's important that we share this information with your doctor and make sure everything is okay.
- I am here for you. Let's talk to a healthcare provider to get you the care you need.

After Pregnancy

- It's normal to feel tired and have some pain after giving birth, but you know your body best. If something is worrying you, you should talk to your doctor.
- Although your new baby needs a lot of attention and care, it's important to take care of yourself, too.
- You are not alone. I hear you. Let's talk to a healthcare provider to get you the care you need.

HEARTM
HEAR HER CONCERNS

If you need additional support, don't be afraid to ask for help.
Learn more about CDC's Hear Her Campaign at www.cdc.gov/HearHer.



Appendix B

The CDC supports ACOG and other professional organizations in their commitment to help eliminate preventable maternal mortality. Specifically, this multidisciplinary effort addresses readiness in prehospital, emergency department, primary care, and urgent care settings to identify and manage obstetric emergencies during pregnancy and the postpartum period.

In January 2024, ACOG and partners in this effort released the following emergency department materials:

- Cardiovascular Disease in Pregnancy & Postpartum Algorithm
https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/programs/ob-emergencies/cardiovascular-disease-in-pregnancy-and-postpartum_algorithm.pdf
- Acute Hypertension in Pregnancy & Postpartum Algorithm
https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/programs/ob-emergencies/hypertension_algorithm.pdf
- Eclampsia Algorithm
https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/programs/ob-emergencies/eclampsia_algorithm.pdf
- Pregnancy status sign
https://www.acog.org/-/media/project/acog/acogorg/files/pdfs/brochures-flyers/ob-emergencies_pregnancy-status-sign.pdf

You can find more information at the following website: [acog.org/obemergencies](https://www.acog.org/obemergencies).

