

2018-2020

MATERNAL MORTALITY REPORT



2018 – 2020 Executive Summary

KEY PIECES OF INFORMATION

- There were **30.2 pregnancy-related deaths per 100,000 live births**.
- The leading causes of death were **hemorrhage, mental health conditions, cardiomyopathy, cardiovascular and coronary conditions, embolism, and preeclampsia and eclampsia**.
- Of the pregnancy-related deaths, **89% had at least some chance of being prevented**.
- Of the pregnancy-related deaths occurring after delivery, **60% were insured by Medicaid at the time of delivery**.

Of note, in keeping with evolving case review guidance from the CDC, there were changes made to MMRC processes since the reviews began in 2012. Therefore, data presented in this report **cannot be directly compared to previous years**.

CHANGES TO THE REVIEW PROCESS DURING CASE REVIEW (2018-2020)

- Led by the Georgia Department of Public Health, the MMRC staff was expanded to include three nurses and one licensed clinical social worker.
- A licensed clinical social worker was hired to conduct informant interviews with family members to learn about the circumstances surrounding the death that cannot be found in official records, how social determinants of health may have impacted the death, and what the informant believes could have been done to prevent the death.
- The committee composition was revised to include a wider variety of disciplines.
- Data quality improvements were made to improve completeness and accuracy of the Committee Decisions Form.

- Case review was timelier. All deaths are now reviewed within two years of the date of death.

OVERVIEW OF CASE REVIEW PROCESS

- Deaths are identified by the Georgia Department of Public Health by death certificate data, mandated reporting, and linking death certificates with birth certificates, fetal death certificates, and hospital discharge data.
- A case narrative is created based on medical records and information from informant interviews to summarize the events that occurred prior to death.
- A multidisciplinary committee reviews each case using the Committee Decisions Form developed by the Centers for Disease Control and Prevention (CDC).

<https://reviewtoaction.org/national-resource/mmria-committee-decisions-form-and-additional-guidance-updated-form-added>

- The MMRC is comprised of individuals representing 18 specialties and organizations.

INITIATIVES UNDERWAY IN GEORGIA TO IMPACT MATERNAL OUTCOMES

THE GEORGIA GENERAL ASSEMBLY LEGISLATION + APPROPRIATIONS

- The MMRC's recommendation to extend Medicaid coverage up to one year postpartum was passed during the 2021-2022 legislative session.

- \$1,180,000 was allocated in the FY23 budget to pilot two maternal quality improvement initiatives with Augusta University to increase resources for cardiac and hypertensive care and follow-up during pregnancy and postpartum.
- \$1,047,540 was allocated in FY 2019 to increase provider access to maternal mental health training and treatment resources.
- Perinatal Level of Care Designation legislation was enacted in FY 2018 and \$150,000 in funding was allocated for implementation in FY 2019.
- \$200,000 was allocated in FY 2019 to provide additional abstractors for maternal mortality review, needed resources to bring the case review current.
- \$2,000,000 was allocated in FY 2018 for maternal mortality prevention. The funding provides support for rural hospitals to implement maternal quality improvement initiatives.

GEORGIA PERINATAL QUALITY COLLABORATIVE (GAPQC)

- Between 2018 and 2022 GaPQC implemented the Alliance for Innovation on Maternal Health (AIM) Maternal Hemorrhage and Severe Hypertension Patient Safety Bundles in over 78% of the state's birthing facilities.
- GaPQC began implementing the AIM Cardiac Conditions in Obstetrical Care (CCOC) Patient Safety Bundle in June 2022. Georgia is the first state in the country to implement this bundle.

MATERNAL HEALTH EXTENSION FOR COMMUNITY HEALTH OUTCOMES (ECHO)

- DPH launched the Maternal Health ECHO in September 2021 to increase interprofessional collaboration, and dissemination of resources for providers to respond to Georgia-specific factors in maternal morbidity and mortality.

MATERNAL MENTAL HEALTH

- In partnership with Emory University, PEACE for Moms Perinatal Psychiatry Access Program provides phone consultations with a perinatal psychiatrist for providers treating pregnant and postpartum patients. Providers have access to training, and skills groups are available for patients to prevent perinatal depression.

MATERNAL LEVEL OF CARE VERIFICATION

- DPH formed a partnership with The Joint Commission to verify levels of maternal care in Georgia hospitals.
- In 2022, a rule change was approved to allow DPH to designate Level IV hospitals.

REGIONAL PERINATAL CENTERS

- Six Regional Perinatal Centers (RPC) supported by state and federal funding, coordinate access to optimal and appropriate maternal and infant care, assist with transport and transfers of high-risk patients, and provide medical consultations.
- RPC Outreach Educators provide education and training to hospital staff in each region.

FAMILY PLANNING

- During FY 2023 Public Health expanded training for nurses and increased available contraceptive inventory to provide access to long-term reversible contraceptive methods in local health departments.

HOME VISITING

- DPH is working to expand home visiting in various rural counties using a robust model of service delivery.

- Expanded services will ensure a streamlined continuum of care that includes:
 - Clinical care for mother and child
 - Health education
 - Patient navigation and linkage to resources
 - Support families at risk of entering the foster care system.
 - Behavioral health support

MATERNAL MORTALITY REVIEW COMMITTEE

- | | |
|--------------------------------|--------------------------------|
| • Academia | • Family Physician |
| • Advocacy | • Georgia Hospital Association |
| • Cardiology | • Maternal Outreach Educator |
| • Case Management | • Maternal Fetal Medicine |
| • Community-Based Organization | • Medicaid |
| • Department of Public Health | • Medical Examiner |
| • Domestic Violence | • Nursing |
| • Doula | • Obstetric Anesthesiology |
| | • Obstetrics |
| | • Perinatal Psychiatry |

MATERNAL MORTALITY REVIEW PROCESS

Potential pregnancy-associated deaths were identified by:

1. Notifiable condition reports
2. The pregnancy checkbox on death certificate
3. ICD-10 O codes (codes indicating pregnancy)
4. Death certificates linked to birth or fetal death certificates
5. Search of obituaries + news outlets



LIST OF DEFINITIONS

PREGNANCY-ASSOCIATED DEATH

A death during or within one year of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.

PREGNANCY-RELATED DEATH

A death during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by the pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.

PREGNANCY-ASSOCIATED DEATH, BUT NOT RELATED

A death during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy.

PREGNANCY-ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS

A pregnancy-associated death that the committee was unable to determine as pregnancy-related or pregnancy-associated, but not related.

YEARS IN REVIEW 2012 – 2020

The Maternal Mortality Review Committee (MMRC) reviewed **786 pregnancy-associated deaths** occurring in Georgia during 2012 to 2020. There were about **68 pregnancy-associated deaths** for **every 100,000 live births**.

Of the **786 pregnancy-associated deaths** reviewed, **312 were** determined to be **pregnancy-related deaths**. There were **27 pregnancy-related deaths** for **every 100,000 live births**.

Of note, in keeping with evolving case review guidance from the CDC, there were changes made to MMRC processes since the reviews began in 2012. Therefore, **years are not comparable**.

TABLE 1 Pregnancy-Associated Deaths, Number + Ratio by Year of Death
Georgia, 2018-2020

YEARS	FREQUENCY	LIVE BIRTHS	RATIO*
2012 - 2014	247	389399	63.4
2015 - 2017	269	390431	68.9
2018 - 2020	270	374680	72.1

*Deaths per 100,000 Live Births

TABLE 2 Pregnancy-Related Deaths, Number + Ratio by Year of Death
Georgia, 2018-2020

YEARS	FREQUENCY	LIVE BIRTHS	RATIO*
2012 - 2014	101	389399	25.9
2015 - 2017	98	390431	25.1
2018 - 2020	113	374680	30.2

*Deaths per 100,000 Live Births

2018 - 2020

270

pregnancy-associated deaths

113 (42%)

pregnancy-related deaths

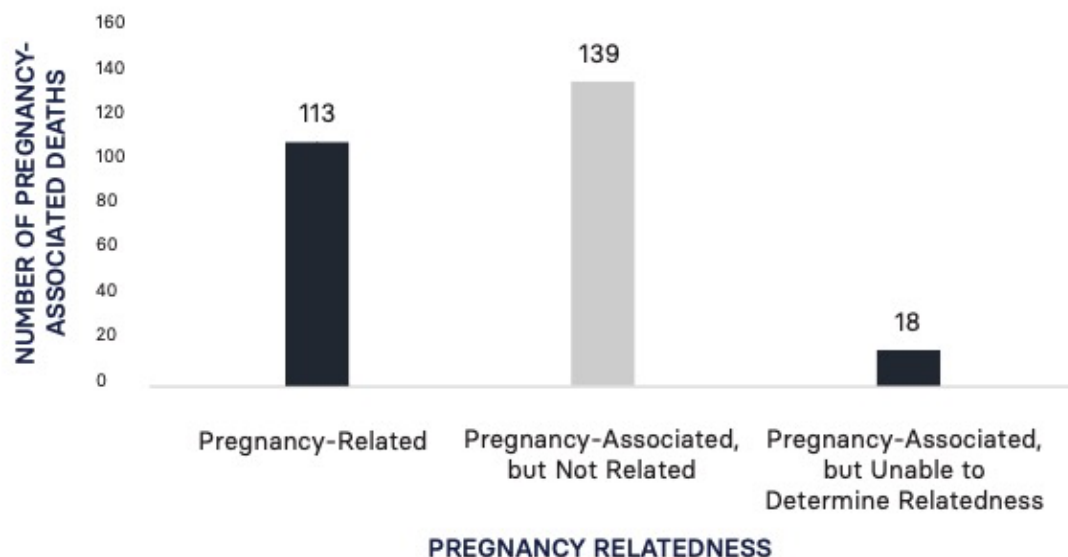
139 (52%)

pregnancy-associated,
but not related deaths

18 (7%)

pregnancy-associated,
but unable to determine relatedness

Figure 1 **Pregnancy-Associated Deaths by Pregnancy Relatedness**
Georgia, 2018-2020 (n=270)



PREGNANCY-RELATED DEATHS BY PUBLIC HEALTH DISTRICT

TABLE 3 Pregnancy-Related Deaths, Number + Ratio by Public Health District of Residence Georgia, 2018-2020

PUBLIC HEALTH DISTRICT	FREQUENCY	BIRTHS	RATIO
Clayton (<i>Jonesboro</i>)	*	12719	*
Coastal (<i>Savannah</i>)	6	24857	24.1
Cobb & Douglas	8	30927	25.9
DeKalb	10	31382	31.9
East Central (<i>Augusta</i>)	7	18570	37.7
East Metro (<i>Lawrenceville</i>)	8	40536	19.7
Fulton	10	34536	29.0
LaGrange	8	28657	27.9
North Central (<i>Macon</i>)	11	18494	59.5
North Georgia (<i>Dalton</i>)	7	15857	44.1
North (<i>Gainesville</i>)	*	23053	*
Northeast (<i>Athens</i>)	5	17066	29.3
Northwest (<i>Rome</i>)	5	23297	21.5
South (<i>Valdosta</i>)	*	10112	*
Southeast (<i>Waycross</i>)	*	13575	*
Southwest (<i>Albany</i>)	5	12609	39.7
West Central (<i>Columbus</i>)	9	13697	65.7
South Central (<i>Dublin</i>)	0	4736	0

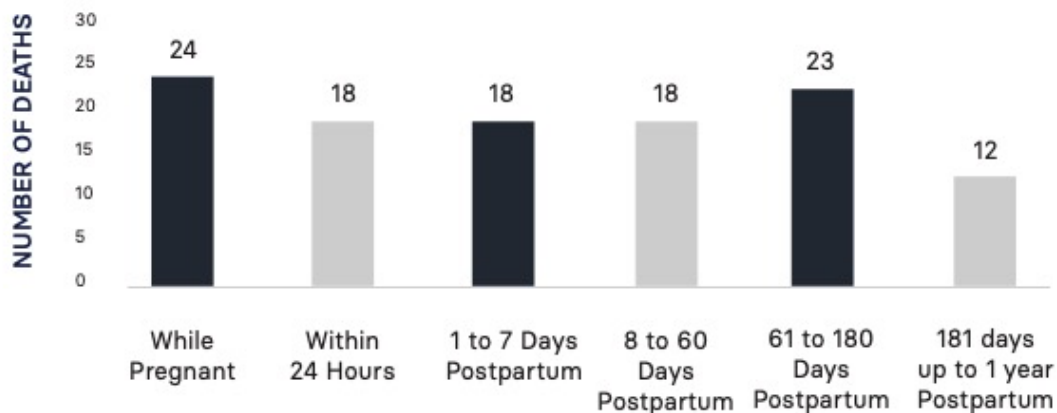
* Data for districts with fewer than 5 pregnancy-related deaths were suppressed to maintain confidentiality per standard epidemiologic data protocol.

** Counties included in each public health district can be found at:
<https://dph.georgia.gov/public-health-districts>.

PREGNANCY-RELATED DEATHS BY TIMING OF DEATH

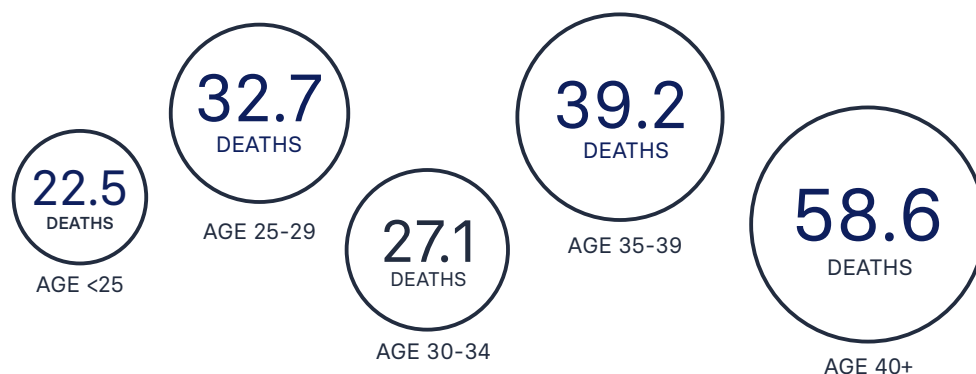
Between 2018 and 2020, 54 (48%) of the 113 pregnancy-related deaths occurred within 0 to 60 days after the end of pregnancy.

Figure 2 Pregnancy-Related Deaths by Timing of Death in Relation to Pregnancy, Georgia, 2018-2020 (n=113)



PREGNANCY-RELATED DEATHS BY AGE

Figure 3 Pregnancy-Related Mortality Ratio by Age, Georgia, 2018-2020 (per 100,000 live births)



PREGNANCY-RELATED DEATHS BY RACE / ETHNICITY

Of the 113 pregnancy-related deaths:

56% (63) Non-Hispanic, Black

34% (38) Non-Hispanic, White

7% (8) Hispanic / Latino

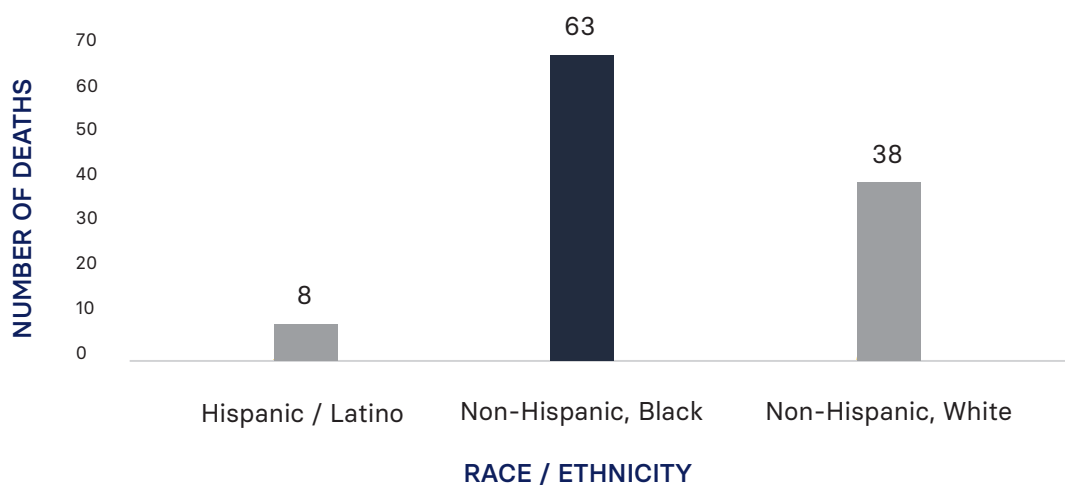
Pregnancy-Related Mortality Ratio by Race / Ethnicity

Georgia, 2018-2020 (n=113)

23.3 deaths per 100,000 live births / Non-Hispanic, White

48.6 deaths per 100,000 live births / Non-Hispanic, Black

Figure 4 Pregnancy-Related Deaths by Race / Ethnicity
Georgia, 2018-2020 (n=113)



* Other races/ethnicities (Bi-Racial, Multi-Racial, Asian Indian, and Vietnamese) were included in the analysis, however data for districts with fewer than 5 pregnancy-related deaths were suppressed to maintain confidentiality per standard epidemiologic data protocol.

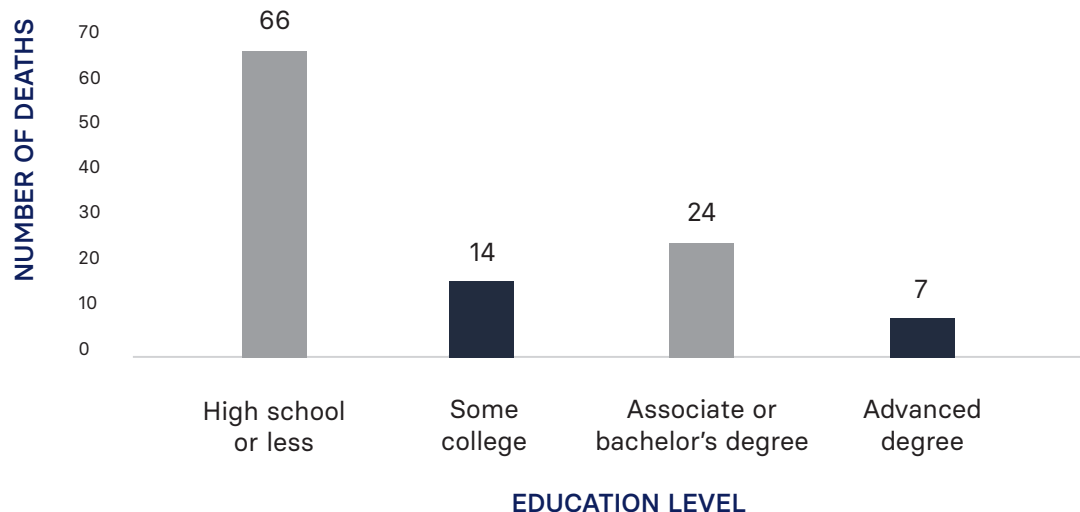
DISPARITY BY RACE / ETHNICITY (2018-2020)

Among pregnancy-related deaths in Georgia, non-Hispanic, Black women were two times more likely to die from pregnancy-related causes than non-Hispanic, White women.

PREGNANCY-RELATED DEATHS BY EDUCATION LEVEL

Between 2018-2020, a majority (66; 60%) of pregnancy-related deaths were to decedents with a high school degree or less. There were 14 (13%) pregnancy-related deaths that occurred among individuals with some college and 24 (22%) individuals had associate or bachelor's degrees. The fewest (7; 6%) pregnancy-related deaths were among individuals with advanced degrees.

Figure 5 **Pregnancy-Related Deaths by Education Level**
Georgia, 2018-2020 (n=113)



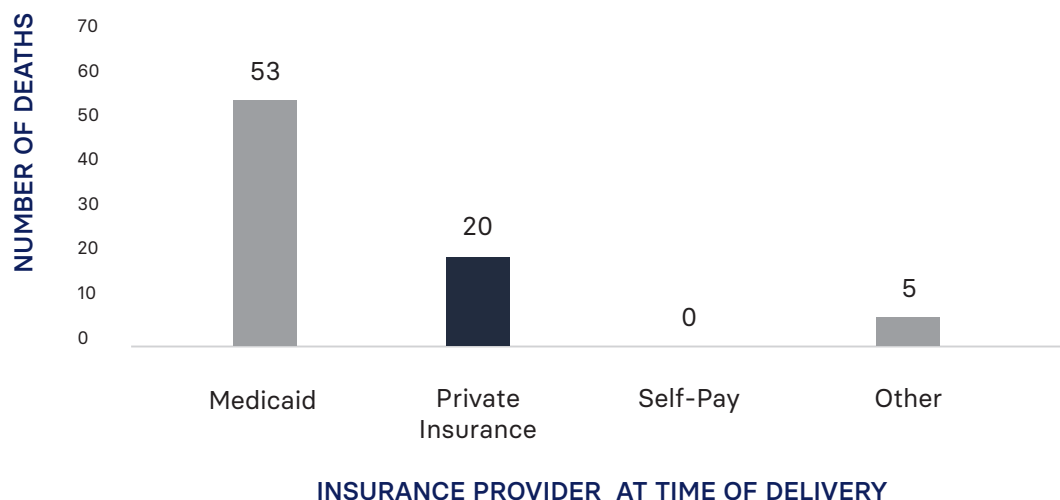
* Education information was unknown for 2 pregnancy-related deaths.

PREGNANCY-RELATED DEATHS BY INSURANCE PROVIDER

Between 2018-2020, a majority (53; 60%) of pregnancy-related deaths occurring after delivery were insured by Medicaid at the time of delivery. Second most frequent insurance source for pregnancy-related deaths at the time of delivery was a private provider (20; 22%).

Of the 89 pregnancy-related deaths that occurred after delivery, 11 (12%) are missing payor information; it is advisable to interpret the data with caution.

Figure 6 Pregnancy-Related Deaths by Insurance Provider at Time of Delivery, Georgia, 2018-2020 (n=78)



FACTORS CONTRIBUTING TO PREGNANCY-RELATED DEATHS

The committee determined whether obesity, bias and discrimination*, mental health conditions other than substance use disorder, and substance use disorder contributed to each death. Deaths where a circumstance probably contributed were defined as those where the committee selected “yes” or “probably” for whether each of these circumstances contributed to the death.

Obesity

Between 2018-2020, obesity at least probably contributed to 47 (42%) pregnancy-related deaths.

Bias and Discrimination*

Between 2018-2020, discrimination at least probably contributed to 17 (15%) pregnancy-related deaths.

Mental Health Conditions

Between 2018-2020, mental health conditions, other than substance use disorder, at least probably contributed to 20 (18%) pregnancy-related deaths.

Substance Use Disorder

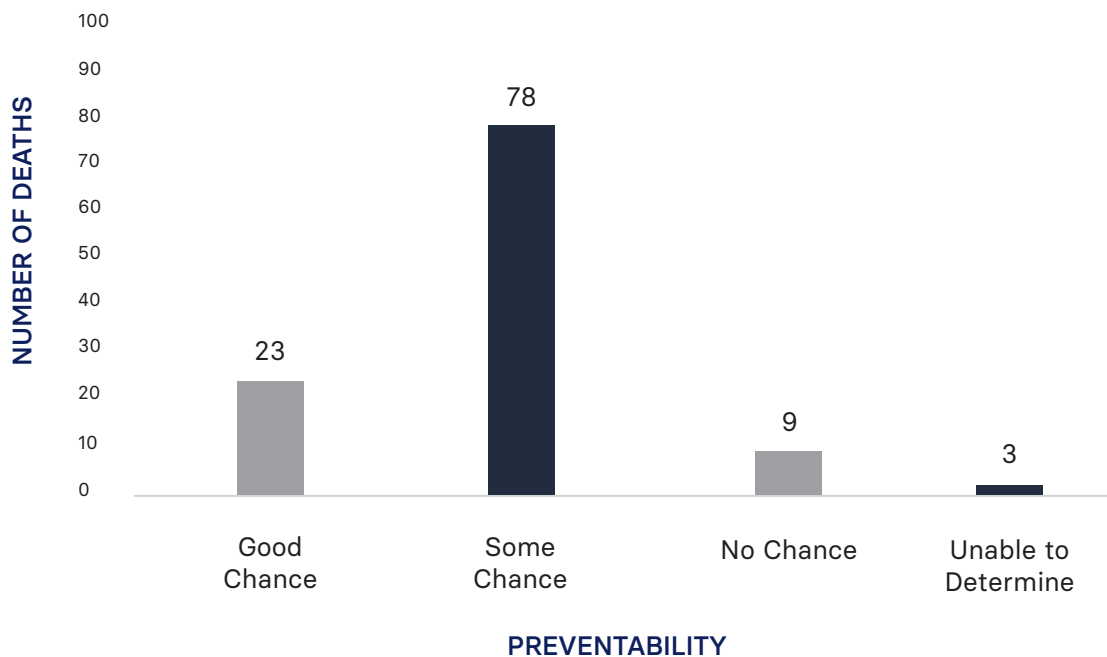
Between 2018-2020, substance use disorder at least probably contributed to 14 (13%) pregnancy-related deaths.

* CDC: Bias and Discrimination - treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Smedley et al, 2003 and Dr. Rachel Hardeman).

PREVENTABILITY

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. Between 2018-2020, 101 (89%) of the 113 pregnancy-related deaths had at least some chance of being prevented.

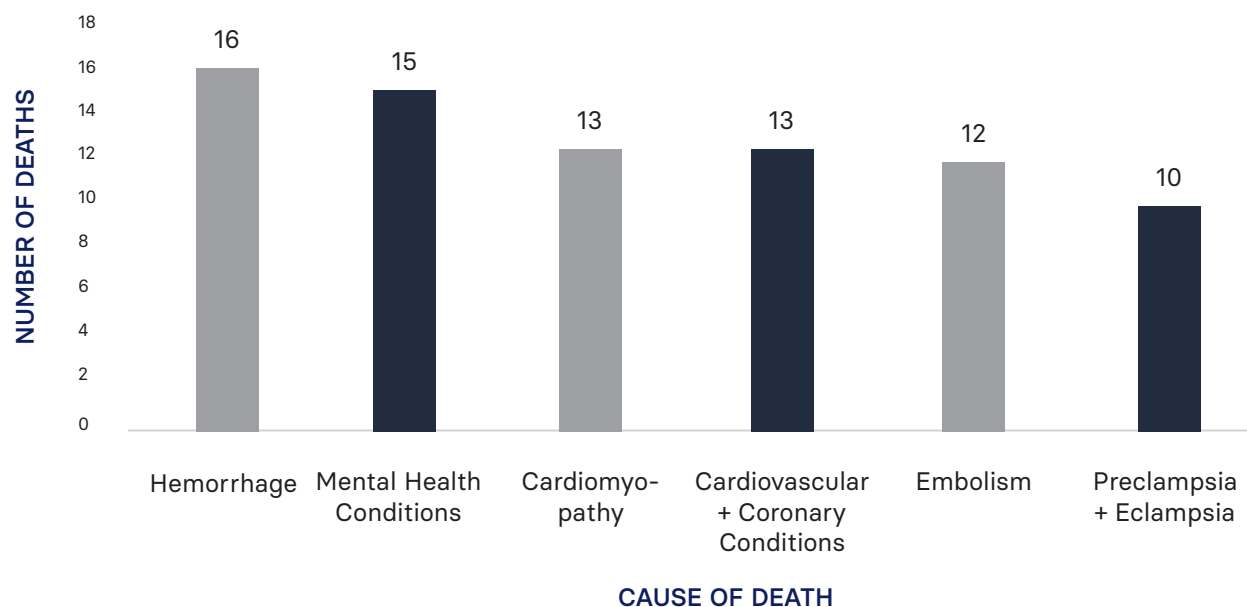
Figure 7 **Chance to Alter Outcome of Pregnancy-Related Deaths**
Georgia, 2018-2020 (n=113)



LEADING CAUSES OF DEATHS PREGNANCY-RELATED 2018-2020

Between 2018-2020, 79 (70%) of the 113 pregnancy-related deaths were due to one of the six leading causes of death: hemorrhage, mental health conditions, cardiomyopathy, cardiovascular and coronary conditions, embolism, preeclampsia and eclampsia. The remaining 34 (30%) pregnancy-related deaths were due to seizure disorders, metabolic/endocrine conditions, anesthesia complications, blood disorders, cerebrovascular accident, homicide, infection, malignancies, renal disease, unintentional injury, and unknown cause of death.

Figure 8 Leading Causes of Pregnancy-Related Deaths
Georgia, 2018-2020 (n=79)



The leading causes of pregnancy-related death were hemorrhage (16; 14%), mental health conditions (15; 13%), cardiomyopathy (13; 12%), cardiovascular and coronary conditions (13; 12%), embolism (12; 11%), and eclampsia and preeclampsia (10; 9%).

CAUSE OF DEATH VARIATIONS WITHIN RACE / ETHNICITY SUBGROUPS

Between 2018 and 2020, cardiomyopathy (10; 16%) and embolism (9; 14%) were the leading causes of death among non-Hispanic, Black women. Mental health conditions (10; 27%) and hemorrhage (8; 22%) were the leading causes of death for non-Hispanic, White women.

TABLE 4 Leading Causes of Pregnancy-Related Deaths Among Non-Hispanic, White Women Georgia, 2018-2020

CAUSE OF DEATH	NUMBER	PERCENTAGE
Mental Health Conditions	10	27%
Hemorrhage	8	22%
Cardiovascular + Coronary Conditions	4	11%
Cardiomyopathy	3	8%
Embolism	3	8%

*Table 4 includes the 5 leading causes of underlying death among non-Hispanic, White women. This table does not represent all underlying causes of death among non-Hispanic, White women.

TABLE 5 Leading Causes of Pregnancy-Related Deaths Among Non-Hispanic, Black Women Georgia, 2018-2020

CAUSE OF DEATH	NUMBER	PERCENTAGE
Cardiomyopathy	10	16%
Embolism	9	14%
Cardiovascular + Coronary Conditions	8	13%
Preclampsia + Eclampsia	8	13%
Hemorrhage	7	11%

* Table 5 includes the 5 leading causes of underlying death among non-Hispanic, Black women. This table does not represent all underlying causes of death among non-Hispanic, Black women.

CAUSES OF DEATH: HEMORRHAGE

A majority (11; 69%) of pregnancy-related deaths due to hemorrhage occur within the first 7 days of the postpartum period. Specifically, 7 (44%) of hemorrhage deaths occurred within 24 hours postpartum. All (16; 100%) hemorrhage deaths were determined to be preventable.

Description of Contributing Factors

- Providers did not adequately assess risk factors for hemorrhage.
- Providers did not respond to hemorrhage in a timely manner, including delay in initiating a massive transfusion protocol and delay in escalating to surgical management.
- Hospitals did not follow the Alliance for Innovation on Maternal Health (AIM) Obstetric Hemorrhage Patient Safety Bundle and properly initiate massive transfusion protocol.
- Hospitals did not use sufficient number of staff or appropriate hospital unit to manage the hemorrhage.

- Patients had a lack of knowledge about the importance of adhering to medical care and when to seek medical care.
- Providers and hospitals did not transfer patients to the appropriate level of care for delivery.
- Emergency Departments did not adequately assess for pregnancy and providers were delayed in recognizing a ruptured ectopic pregnancy.

Recommendations

- Hospitals should implement the AIM Obstetric Hemorrhage Patient Safety Bundle on an ongoing basis.
- Communities, hospitals, and providers should educate patients and support persons on identifying urgent maternal warning signs and accessing medical care throughout pregnancy and at delivery, including implementing the HEAR HER campaign developed by the Centers for Disease Control and Prevention.
- Hospitals and providers should transfer patients to the closest, most appropriate level of care during pregnancy and at delivery.
- Emergency Departments should develop and implement a standardized policy for assessing pregnancy in women of reproductive age on an ongoing basis.

CAUSES OF DEATH: MENTAL HEALTH CONDITIONS

A majority (13; 87%) of deaths due to mental health conditions occurred in the postpartum period.

Suicide was the manner of death for a majority (11; 73%) of deaths due to mental health conditions.

All (15; 100%) pregnancy-related deaths due to mental health conditions were determined to be preventable. Substance use disorder contributed to 7 (47%) pregnancy-related deaths due to mental health conditions.

Description of Contributing Factors

- The obstetric care system did not adequately provide case management services.
- Patients lacked social support during the prenatal period and postpartum.
- Patients lacked knowledge of the safety of psychotropic medications during pregnancy.
- Care was offered in multiple care settings and was not coordinated.
- The care system did not provide community coordinated care or outreach to community resources.
- Patients declined referrals to mental health care.
- Providers did not use standardized assessment tools for postpartum depression and suicide.
- Patients had histories of trauma and abuse and experienced stressors during the perinatal period, including housing instability, perinatal loss, and intimate partner violence.
- Families did not know how to recognize signs of depression or understand the severity of suicide risk.

Recommendations

- The obstetric care system, including providers, insurers, and hospitals, should offer case management during pregnancy and up to one year postpartum, particularly for individuals experiencing mental health conditions, substance use disorders, and those negatively impacted by social determinants of health (economic stability, education access

and quality, healthcare access and quality, neighborhood, social and community interactions).

- Community-based organizations and care settings should offer peer support groups for individuals with mental health conditions during the perinatal period and coordinate with providers to ensure patients are referred to peer support groups.
- Obstetric providers and mental health providers should connect patients and families with community resources, including Postpartum Support International, Healthy Mothers, Healthy Babies Coalition of Georgia, and PEACE for Moms Perinatal Psychiatry Access Program, when treating a patient with mental health conditions in the perinatal period.
- Communities should offer resources and support for individuals with mental health conditions in the perinatal period and their families and support systems on an ongoing basis.
- Georgia should increase access to mental health care throughout the lifespan.
- Providers should conduct close follow-up after a pregnancy loss, including using validated screening tools to detect mental health conditions, and provide referrals to grief therapy and bereavement support services.
- Hospitals should provide patients who experience pregnancy loss with bereavement resources and referrals to grief therapy and counseling prior to discharge.
- Patients should access grief support and counseling services after pregnancy loss.
- Obstetric providers should consult with a perinatal psychiatrist or access the PEACE for Moms Perinatal Psychiatry Access Program to help manage mental health conditions during pregnancy and up to one year postpartum.

- Providers should refer patients with mental health conditions to mental health and behavioral health services, including psychiatry and psychotherapy.
- Obstetric providers, mental health providers, and emergency department staff should conduct a suicide risk assessment when individuals have mental health conditions and admit patients who meet criteria for involuntary hospitalization to a psychiatric facility.
- Obstetric providers, mental health providers, and primary care providers should collaboratively develop a safety plan with individuals experiencing suicidal ideation and their families or support system on an ongoing basis.
- Communities should offer community education on awareness of perinatal mental health conditions, including suicide awareness and prevention education, on an ongoing basis.
- Providers should closely follow patients who have high risk conditions, mental health conditions, and substance use disorder during pregnancy and up to one year postpartum.
- Providers should include family and support systems in care plans and educate them on the patient's needs and how to respond in an emergency during pregnancy and up to one year postpartum.

CAUSES OF DEATH: CARDIOMYOPATHY

A majority (7; 54%) of pregnancy-related deaths due to cardiomyopathy occurred 43 to 180 days postpartum.

All (13; 100%) pregnancy-related deaths due to cardiomyopathy were determined to be preventable. Bias and discrimination (4; 31%) and obesity (10; 77%) contributed to pregnancy-related deaths due to cardiomyopathy.

Description of Contributing Factors

- Patients had chronic conditions prior to pregnancy.
- Providers did not provide the standard of care when evaluating and treating cardiac conditions and hypertensive disorders during pregnancy and postpartum.
- Providers did not have policies and procedures in place to follow up with patients with hypertension earlier than 6 weeks postpartum.
- Patients lacked access to case management services.
- Patients experienced financial barriers to primary care and services during pregnancy in a timely manner.
- Patients and families lacked an understanding of warning signs, serious symptoms, diagnoses, medications, and the importance of adherence to the plan of care.

Recommendations

- Providers should counsel patients of reproductive age on contraception options and counsel patients with chronic conditions on risks associated with pregnancy prior to conception.
- All care environments should implement the Alliance for Innovation on Maternal Health (AIM) **Cardiac Conditions** in Obstetrical Care patient safety bundle on an ongoing basis.
- Every care setting should implement the Alliance for Innovation on Maternal Health (AIM) **Severe Hypertension** in Pregnancy patient safety bundle on an ongoing basis.
- The obstetric care system, including providers, insurers, and hospitals, should offer case management during pregnancy and up to one year postpartum, particularly for individuals experiencing chronic health conditions, mental health conditions, substance use disorders, and those negatively impacted by social determinants of health.

- Providers should educate patients on implementing lifestyle modifications, including proper nutrition and exercise, to manage weight before, during, and after pregnancy.

CAUSES OF DEATH: CARDIOVASCULAR + CORONARY CONDITIONS

All (13; 100%) pregnancy-related deaths due to cardiovascular and coronary conditions occurred while pregnant or within 180 days postpartum, with a majority (9; 69%) occurring in the postpartum period.

All (13; 100%) pregnancy-related deaths due to cardiovascular and coronary conditions deaths were determined to be preventable. Obesity was identified as a contributor to 9 (69%) pregnancy-related deaths due to cardiovascular and coronary conditions.

Description of Contributing Factors

- Providers did not follow the standard of care.
- Providers did not check blood pressure at 72 hours after discharge.
- The care system had a lack of community-oriented care coordination and outreach to community resources.
- The obstetric care system did not adequately provide case management services.
- Patients had chronic conditions prior to pregnancy.

Recommendations

- All care environments should implement the Alliance for Innovation on Maternal Health (AIM) **Cardiac Conditions** in Obstetrical Care patient safety bundle on an ongoing basis.

- Every care setting should implement the Alliance for Innovation on Maternal Health (AIM) **Severe Hypertension** in Pregnancy patient safety bundle on an ongoing basis.
- The obstetric care system, including providers, insurers, and hospitals, should offer case management during pregnancy and up to one year postpartum, particularly for individuals experiencing chronic health conditions, mental health conditions, substance use disorders, and those negatively impacted by social determinants of health.
- Providers should educate patients on implementing lifestyle modifications, including proper nutrition and exercise, to manage weight before, during, and after pregnancy.

CAUSES OF DEATH: EMBOLISM

All (12; 100%) pregnancy-related deaths due to embolism occurred while pregnant or within 180 days postpartum, with a majority (7; 58%) occurring in the postpartum period.

A majority (10; 83%) of pregnancy-related deaths due to embolism were determined to be preventable. Obesity was identified as a contributor to 9 (75%) pregnancy-related deaths due to embolism.

Description of Contributing Factors

- Patients had chronic conditions prior to pregnancy.
- Patients had issues accessing medications and primary care to manage chronic conditions due to lack of insurance.
- Providers did not discuss risk of pregnancy with patients with chronic conditions prior to pregnancy.
- Patients and families lacked knowledge of warning signs of an embolism.

- Providers did not thoroughly assess for signs and symptoms and did not provide the standard of care for embolism.

Recommendations

- Communities should provide nurse home visiting programs to coordinate care with obstetric providers and offer case management, education, and facilitate remote patient monitoring during pregnancy and up to one year postpartum.
- Providers and hospitals should educate all patients and support persons on maternal early warning signs during pregnancy prior to discharge from the delivery hospital.
- Providers should follow guidelines from the American College of Obstetricians and Gynecologists for prevention and management of embolism on an ongoing basis.
- The obstetric care system, including providers, insurers, and hospitals, should offer case management during pregnancy and up to one year postpartum, particularly for individuals experiencing chronic health conditions, mental health conditions, substance use disorders, and those negatively impacted by social determinants of health (economic stability, education access and quality, healthcare access and quality, neighborhood, social and community interactions).
- Providers should educate patients on implementing lifestyle modifications, including proper nutrition and exercise, to manage weight before, during, and after pregnancy.
- Providers should initiate prepregnancy counseling on all women of reproductive age according to ACOG's recommendations to optimize health, address modifiable risk factors, provide education about healthy pregnancy, and family planning counseling.

CAUSES OF DEATH: PREECLAMPSIA + ECLAMPSIA

All (10; 100%) pregnancy-related deaths due to preeclampsia and eclampsia occurred while pregnant or within 60 days postpartum, with a majority (8; 80%) occurring in the postpartum period.

All (10; 100%) of the pregnancy-related deaths due to preeclampsia and eclampsia deaths were determined to be preventable. Obesity was identified as a contributor to 4 (40%) pregnancy-related deaths due to preeclampsia and eclampsia.

Description of Contributing Factors

- Providers did not adequately assess for or treat signs and symptoms of preeclampsia.
- Hospitals and providers did not follow the Alliance for Innovation on Maternal Health (AIM) Severe Hypertension in Pregnancy patient safety bundle, including having procedures in place to do a blood pressure check at 72 hours after discharge and follow up prior to six weeks postpartum.
- The care system had a lack of community-oriented care coordination and did no outreach to community resources.
- Patients had a lack of knowledge of the importance of adhering to medication recommendations, including medication, follow-up appointments, and when to seek care.
- Hospitals did not have policies and procedures in place to use Quantitative Blood Loss during delivery.
- Hospitals did not transfer to a higher level of care, or did not transfer to the closest, most appropriate hospital.

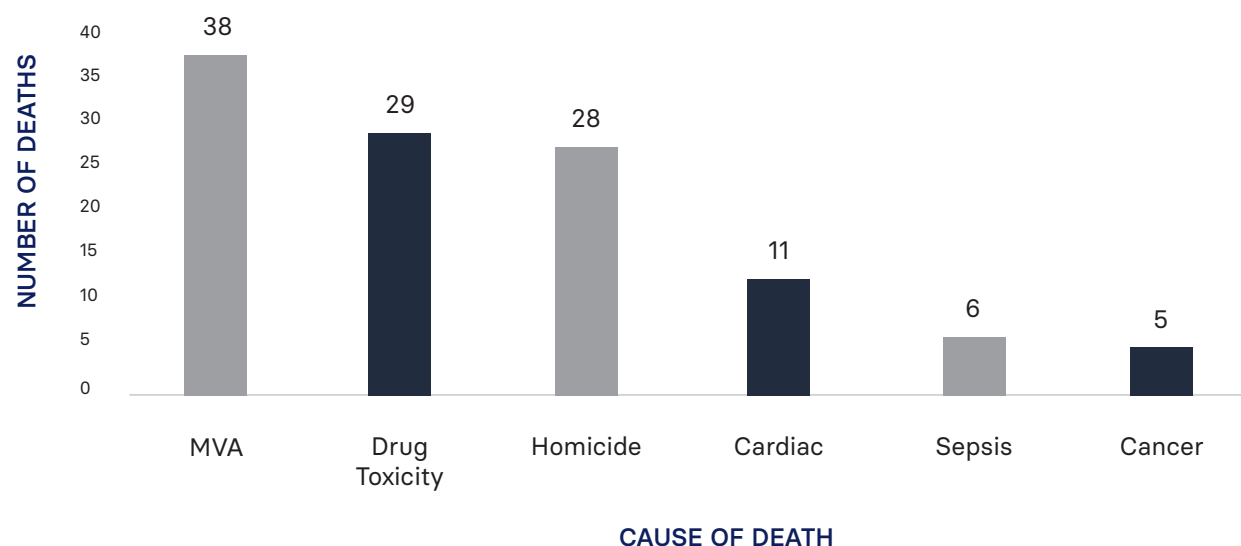
Recommendations

- Every care setting should implement the Alliance for Innovation on Maternal Health (AIM) Severe Hypertension in Pregnancy patient safety bundle on an ongoing basis.
- Communities should provide nurse home visiting programs to coordinate care with obstetric providers and offer case management, education, and facilitate remote patient monitoring during pregnancy and up to one year postpartum.
- Communities, hospitals, and providers should educate patients and support persons on identifying urgent maternal warning signs and accessing medical care throughout pregnancy and at delivery, including implementing the HEAR HER campaign developed by the Centers for Disease Control and Prevention.
- Hospitals should implement the Alliance for Innovation for Maternal Health (AIM) Obstetric Hemorrhage Patient Safety Bundle on an ongoing basis.
- The obstetric care system should incorporate doula services during pregnancy and up to one year postpartum to support adherence and access to medical care and recognition of urgent warning signs.
- Hospitals and providers should transfer patients to the closest, most appropriate level of care during pregnancy or at delivery.

CAUSES OF DEATH: OTHER PREGNANCY-ASSOCIATED DEATHS

This section describes pregnancy-associated deaths that were determined to be pregnancy-associated, but not related or pregnancy-associated, but unable to determine pregnancy relatedness. For ease of description writing these deaths will be referred to as other pregnancy-associated deaths

Figure 9 Leading Causes of Pregnancy-Associated, but Not Related Deaths, Georgia, 2018-2020 (n=117)



The overall leading cause of other pregnancy-associated deaths for the years 2018-2020 was motor vehicle accidents (MVA) (38; 24%). Other leading causes included: drug toxicity (29; 18%), homicides (29; 18%), cardiac-related deaths (11; 7%), sepsis (6; 4%), and cancer (5; 3%).

MOTOR VEHICLE ACCIDENT (MVA)

Other pregnancy-associated deaths due to MVA were more frequent (27; 71%) between 60 days and one year postpartum.

A majority (37; 97%) of other pregnancy-associated deaths due to MVA were determined to be preventable. Substance use disorder was identified as a contributor to (8; 21%) other pregnancy-associated deaths due to MVA. The leading contributing factors identified were violence and substance use disorder. The most prevalent levels of change for contributing factors are patient/family and community. Most

recommendations focused on the patient/family and community levels such as seat belt use.

DRUG TOXICITY

Other pregnancy-associated deaths due to drug toxicity are more frequent (22; 76%) between 60 days and one year postpartum.

All (29; 100%) of the other pregnancy-associated deaths due to drug toxicity were determined to be preventable. Substance use disorder and mental health conditions other than substance use disorder contributed to 28 (97%) and 24 (83%) of other pregnancy-associated deaths due to drug toxicity, respectively. The leading contributing factors identified were substance use disorder, mental health conditions, and access/financial. The most prevalent levels of change for contributing factors are patient/family and provider. Most recommendations focused on the system and provider levels.

HOMICIDE

A plurality 10 (36%) of other pregnancy-associated deaths due to homicide occurred while pregnant.

A majority (26; 93%) of other pregnancy-associated deaths due to homicide were determined to be preventable. The leading contributing factors identified were violence and law enforcement. The most prevalent levels of change for contributing factors are patient/family and community. Most recommendations focused on the community and system levels.

CARDIAC

A majority (9; 82%) of other pregnancy-associated deaths due to cardiac related occurred between 61 days and one year postpartum.

A majority (9; 82%) of other pregnancy-associated deaths due to cardiac related causes were determined to be preventable. The leading contributing factors identified were chronic disease, access/ financial, and delay. The most prevalent levels of change for contributing factors are patient/family and provider. Most recommendations focused on the provider and system levels.

SEPSIS

* There were too few cases to stratify by time within the sepsis cause of death category.

All (6; 100%) other pregnancy-associated deaths due to sepsis were determined to be preventable. The leading contributing factors identified were chronic disease, clinical skill/quality of care, and assessment. The most prevalent levels of change for contributing factors are patient/family and provider. Most recommendations focused on the provider and system levels.

CANCER

All (5; 100%) other pregnancy-associated deaths due to cancer occurred between 61 days and one year postpartum.

A majority of other pregnancy-associated deaths due to cancer were determined to be not preventable. The leading contributing factors identified were access/financial and tobacco use. The only identified level of change for contributing factors was at the patient/family level. Recommendations focused on the provider and system levels.*

* There were too few cases to publish the number and percentage determined to be not preventable.

Appendix

APPENDIX 1 Public Health District of Residence by Pregnancy Relatedness Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
Clayton County Health District (JONESBORO)	*	*	*
Coastal Health District (SAVANNAH)	7 (5%)	6 (5%)	*
Cobb & Douglas Health District	6 (4%)	8 (7%)	*
DeKalb Health District	12 (9%)	10 (9%)	*
East Central Health District (AUGUSTA)	6 (4%)	7 (6%)	0
East Metro Health District (LAWRENCEVILLE)	8 (6%)	8 (7%)	*
Fulton Health District	14 (10%)	10 (9%)	*
LaGrange Health District	10 (7%)	8 (7%)	*
North Central Health District (MACON)	6 (4%)	11 (10%)	0
North Georgia Health District (DALTON)	7 (5%)	7 (6%)	0
North Health District (GAINESVILLE)	7 (5%)	*	0
Northeast Health District (ATHENS)	*	5 (4%)	0
Northwest Health District (ROME)	12 (9%)	5 (4%)	*

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
South Central Health District (DUBLIN)	*	0	0
South Health District (VALDOSTA)	*	*	*
Southeast Health District (WAYCROSS)	6 (4%)	*	*
Southwest Health District (ALBANY)	11 (8%)	5 (4%)	*
West Central Health District (COLUMBUS)	11 (8%)	9 (8%)	0
Unknown / Missing	5 (4%)	0	0

* Data for districts with fewer than 5 pregnancy-related deaths were suppressed to maintain confidentiality per standard epidemiologic data protocol.

APPENDIX 2 Timing of Death in Relation to Pregnancy by Relatedness
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
While Pregnant	26 (19%)	24 (21%)	7 (39%)
Within 24 Hours	2 (1%)	18 (16%)	1 (6%)
1 to 7 Days Postpartum	3 (2%)	18 (16%)	1 (6%)
8 to 60 Days Postpartum	13 (9%)	18 (16%)	1 (6%)
61 to 180 Days Postpartum	42 (30%)	23 (21%)	6 (33%)
181 Days to 1 Year Postpartum	53 (38%)	12 (11%)	2 (11%)

APPENDIX 3 Race and Ethnicity by Pregnancy Relatedness
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
Hispanic / Latino	12 (9%)	8 (7%)	3 (17%)
Non-Hispanic, Black	67 (48%)	63 (56%)	11 (61%)
Non-Hispanic, White	55 (40%)	38 (34%)	4 (22%)
Other (Bi-Racial, Multi-Racial, Asian Indian + Vietnamese)	4 (3%)	4 (4%)	0
Unknown/Missing	1 (1%)	4 (4%)	0

APPENDIX 4 Age at Time of Death by Pregnancy Relatedness
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
< 25 Years	38 (27%)	23 (21%)	6 (33%)
25 to 29 years	37 (27%)	36 (32%)	2 (11%)
30 to 34 years	31 (22%)	27 (24%)	6 (33%)
35 to 39 years	23 (17%)	20 (18%)	2 (11%)
40 + years	10 (7%)	7 (6%)	2 (11%)

APPENDIX 5 Education Level by Pregnancy Relatedness
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
High school or less	95 (68%)	66 (59%)	14 (78%)
Some college	16 (12%)	14 (13%)	1 (6%)
Associate or Bachelor degree	22 (16%)	24 (21%)	3 (17%)
Advanced degree	4 (3%)	7 (6%)	0
Unknown/Missing	2 (1%)	2 (2%)	0

APPENDIX 6 Insurance Provider at Time of Delivery by Pregnancy Relatedness Georgia, 2018-2020

	PREGNANCY-ASSOCIATED, BUT NOT RELATED (n=113)	PREGNANCY-RELATED (n=89)	PREGNANCY-ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS (n=11)
Medicaid	80 (71%)	53 (60%)	7 (64%)
Private Insurance	15 (13%)	20 (22%)	2 (18%)
Self-Pay	5 (4%)	0	1 (9%)
Other	2 (2%)	5 (6%)	0
Unknown / Missing	(10%)	11 (12%)	1 (9%)

APPENDIX 7 Preventability by Pregnancy Relatedness Georgia, 2018-2020

	PREGNANCY-ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY-RELATED (n=113)	PREGNANCY-ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY-RELATEDNESS (n=18)
Not Preventable	10 (7%)	9 (8%)	1 (6%)
Preventable	126 (91%)	101 (89%)	15 (83%)
Unable to Determine	3 (2%)	3 (3%)	2 (11%)

**APPENDIX 8 Circumstances Surrounding the Death by Pregnancy
Relatedness: “Did Obesity Contribute to the Death?”**
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
No	126 (91%)	65 (58%)	15 (83%)
Yes	9 (6%)	37 (33%)	2 (11%)
Probably	4 (3%)	10 (9%)	1 (6%)
Unknown / Missing	0	1 (1%)	0

**APPENDIX 9 Circumstances Surrounding the Death by Pregnancy
Relatedness: “Did Mental Health Conditions Other than
Substance Use Disorder Contribute to the Death?”**
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
No	94 (68%)	93 (82%)	15 (83%)
Yes	25 (18%)	16 (14%)	1 (6%)
Probably	13 (9%)	4 (4%)	1 (6%)
Unknown / Missing	7 (5%)	0	1 (6%)

APPENDIX 10 Circumstances Surrounding the Death by Pregnancy
Relatedness: "Did Substance Use Disorder Contribute to
the Death?" Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
No	87 (63%)	96 (85%)	17 (94%)
Yes	39 (28%)	12 (11%)	1 (6%)
Probably	6 (4%)	2 (2%)	0
Unknown / Missing	7 (5%)	3 (3%)	0

APPENDIX 11 Circumstances Surrounding the Death by Pregnancy
Relatedness: "Did Discrimination Contribute to the Death?"
Georgia, 2018-2020

	PREGNANCY- ASSOCIATED, BUT NOT RELATED (n=139)	PREGNANCY- RELATED (n=113)	PREGNANCY- ASSOCIATED, BUT UNABLE TO DETERMINE PREGNANCY- RELATEDNESS (n=18)
No	127(91%)	83 (73%)	15 (83%)
Yes	2 (1%)	2 (2%)	0
Probably	6 (4%)	15 (13%)	0
Unknown / Missing	4 (3%)	13 (12%)	3 (17%)



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