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Investigating Maternal Mortality in Texas, 2012-2015: DATA-DRIVEN PUBLIC HEALTH

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Investigation Purpose

- To examine which demographic characteristics, health factors, and birth outcomes place women at higher risk for maternal death



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Investigation Method

1. Death records were obtained for all Texas female residents who died within 4-year period, 2012-2015
2. These death records were then matched to birth or fetal death records
3. If woman's death record could be matched to either birth or fetal death, and death occurred within 365 days following end of pregnancy, then death was categorized as confirmed maternal death, and included in investigation



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Confirmed Maternal Deaths by Timing and Cause of Death, Texas, Over Four-Year Period, 2012-2015

Table 1

<i>Cause of Death</i>	<i>While Pregnant</i>	<i>0-7 Days Post-partum</i>	<i>8-42 Days Post-partum</i>	<i>43-60 Days Post-partum</i>	<i>61+ Days Post-partum</i>	<i>Total</i>
<i>Amniotic Embolism</i>	1	9	0	0	0	10
<i>Cardiac Event</i>	2	12	9	5	27	55
<i>Cerebrovascular Event</i>	0	8	9	1	9	27
<i>Drug Overdose</i>	0	3	7	5	50	65
<i>Hemorrhage</i>	3	12	2	0	3	20
<i>Homicide</i>	2	1	5	2	32	42
<i>Hypertension/Eclampsia</i>	0	7	4	0	7	18
<i>Infection/Sepsis</i>	1	3	14	3	11	32
<i>Pulmonary Embolism</i>	2	3	4	2	2	13
<i>Substance Use Sequelae (e.g., liver cirrhosis)</i>	0	0	2	0	3	5
<i>Suicide</i>	0	1	2	2	28	33
<i>Other</i>	5	5	6	3	43	62
Total	16	64	64	23	215	382



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Pregnancy-Related vs. Pregnancy-Associated Death

- ***Pregnancy-related death*** — death while pregnant or within 1 year of end of pregnancy from a cause related to or aggravated by pregnancy (e.g., obstetric hemorrhage within 7 days of giving birth)

OR

- ***Pregnancy-associated death*** — death while pregnant or within 1 year of end of pregnancy, regardless of cause (e.g., drug overdose 4 months after delivery)



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Categorization Method

- **Pregnancy-related death:**

- Death occurred during pregnancy or within 7 days postpartum

OR

- Death occurred both within and after 7 days postpartum, but from a cause known to be directly related to pregnancy (e.g., hemorrhage)

- **Pregnancy-associated death:**

- Death occurred after 7 days postpartum from a cause not solely related to pregnancy (e.g., drug overdose)



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Categorization of Pregnancy-Related vs. Pregnancy-Associated Maternal Death, Texas, Over Four-Year Period, 2012-2015

Table 2

<i>Category and Cause of Death</i>	<i>While Pregnant</i>	<i>0-7 Days Postpartum</i>	<i>8-42 Days Postpartum</i>	<i>43-60 Days Postpartum</i>	<i>61+ Days Postpartum</i>	<i>Total</i>
PREGNANCY-RELATED DEATH	11	58	42	12	59	182
<i>Amniotic Embolism</i>	1	9	0	0	0	10
<i>Cardiac Event</i>	2	12	9	5	27	55
<i>Cerebrovascular Event</i>	0	8	9	1	9	27
<i>Hemorrhage</i>	3	12	2	0	3	20
<i>Hypertension/Eclampsia</i>	0	7	4	0	7	18
<i>Infection/Sepsis</i>	1	3	14	3	11	32
<i>Pulmonary Embolism</i>	2	3	4	2	2	13
<i>Other Obstetric Causes</i>	2	4	0	1	0	7
PREGNANCY-ASSOCIATED DEATH	5	6	22	11	156	200
<i>Drug Overdose</i>	0	3	7	5	50	65
<i>Homicide</i>	2	1	5	2	32	42
<i>Substance Use Sequelae (e.g. liver cirrhosis)</i>	0	0	2	0	3	5
<i>Suicide</i>	0	1	2	2	28	33
<i>Other Non-Obstetric Causes</i>	3	5	6	3	43	59
Total of Both Categories	16	64	64	23	215	382



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Risk Profile Method

- Calculated overall, pregnancy-related, and pregnancy-associated rates of maternal death (per 100,000 live births) according to:
 - Demographic characteristics
 - Health factors
 - Birth outcomes



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Pregnancy-Related Death Risk Profile

DEMOGRAPHICS

- Black women
- Aged 40+
- Not married
- High School diploma or less
- Self-pay/no insurance OR Medicaid at delivery
- Regional variations

HEALTH FACTORS

- Obese before pregnancy
- Diabetes
- Hypertension
- Smoked while pregnant
- Late prenatal care
- No MD OR midwife at delivery
- Cesarean delivery

BIRTH OUTCOMES

- Pre-term birth
- Very low birth weight birth



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Pregnancy-Associated Death Risk Profile

DEMOGRAPHICS

- Black women
- Aged 40+
- Not married
- High School diploma or less
- Medicaid at delivery
- Regional variations

HEALTH FACTORS

- **Underweight** before pregnancy
- Diabetes
- Hypertension
- Smoked while pregnant
- Late prenatal care
- No MD OR midwife for delivery
- Cesarean delivery

BIRTH OUTCOMES

- Pre-term birth
- Very low birth weight birth



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Data-Driven Prevention Opportunities

- Implementation by state perinatal quality collaborative of evidence-based maternal safety bundles
- Behavioral health services for postpartum depression and opioid use in pregnant women
- Addressing chronic disease risk factors that complicate pregnancy, including obesity, diabetes, hypertension, and smoking while pregnant



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Next Steps for Data Analysis

- **Health Insurance Status** — for those enrolled in Medicaid at time of death, examine rate of maternal death by timing of death
- **Geographic Region** — for most common causes of death, investigate rate of maternal death by timing of death and region
- **Race/Ethnicity** — for Black women, examine factors that place them at higher risk for maternal death, especially pregnancy-related death



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Conclusion

- Findings improve understanding of maternal mortality in Texas
- Results identify key prevention opportunities
- Investigation also helps with new legislation, and informs recommendations for prevention in 2018 Joint Biennial Report



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