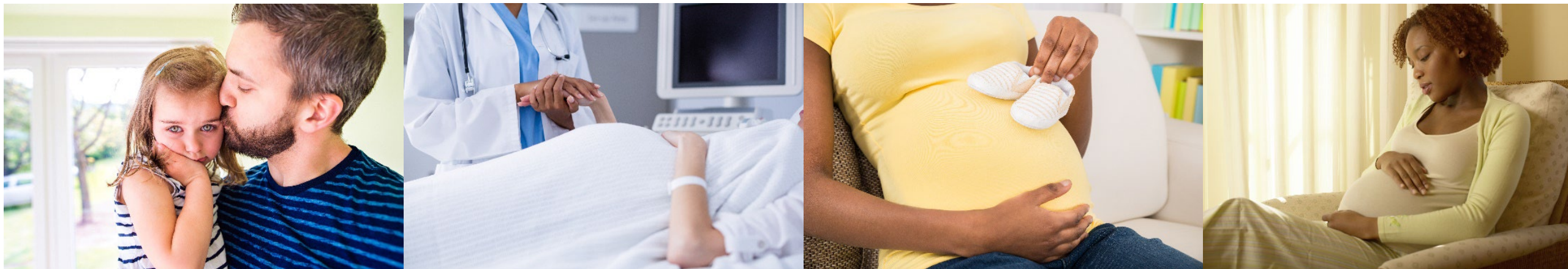


Enhancing Reviews and Surveillance to Eliminate Maternal Mortality

Maternal Mortality Prevention Team
CDC Division of Reproductive Health



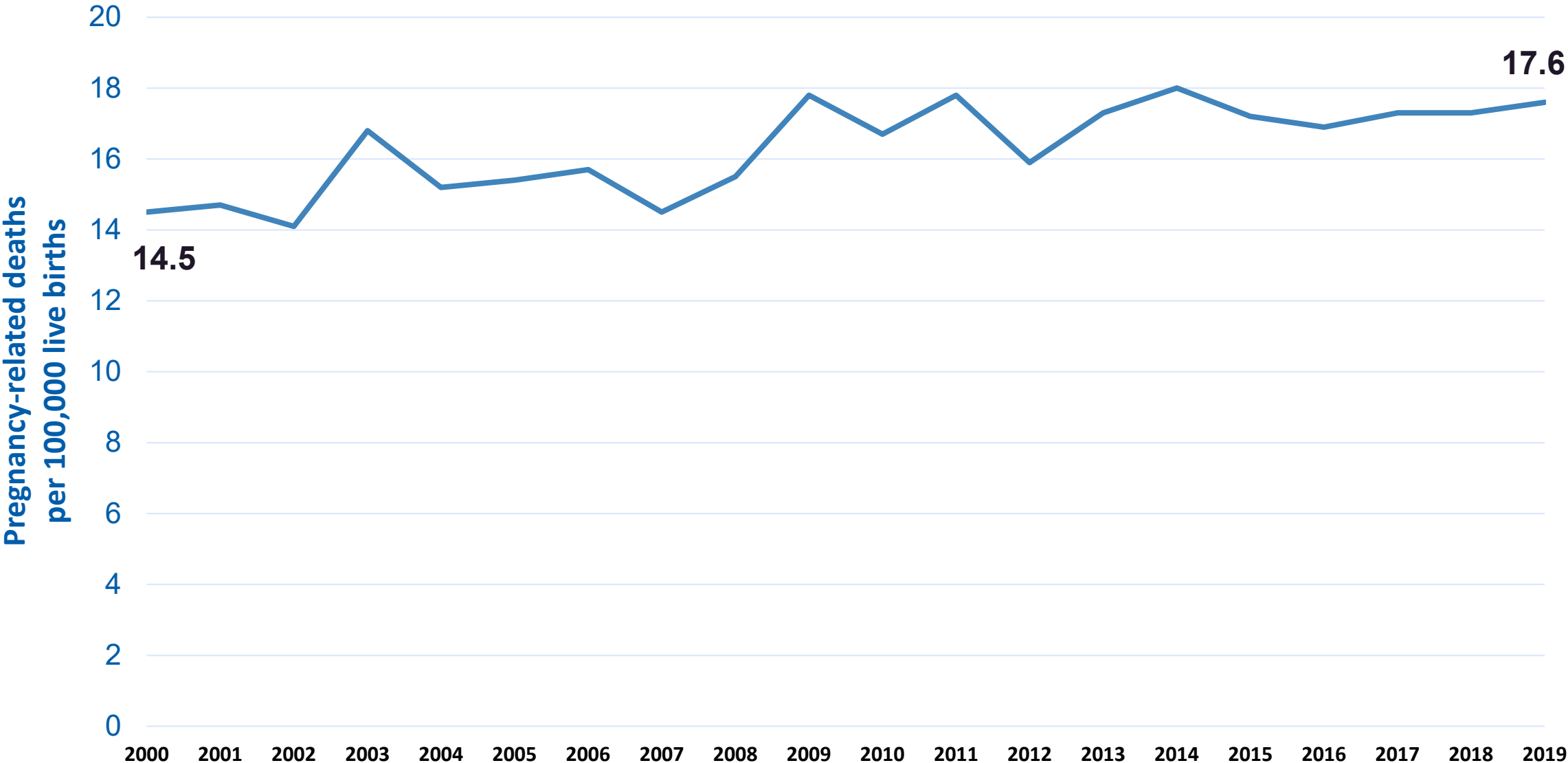
Disclosure

- I have no potential conflicts of interest to disclose
- The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention (CDC).

CDC Division of Reproductive Health Pregnancy-related Mortality Surveillance Programs: PMSS and MMRCs

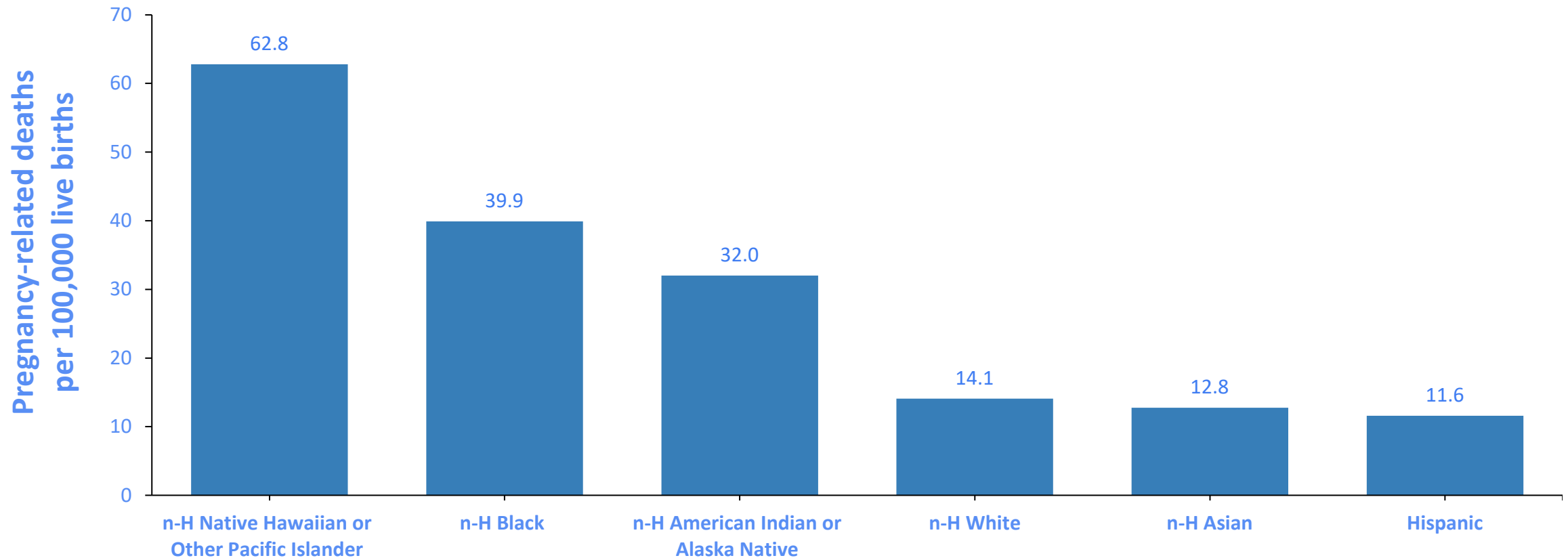
	Pregnancy Mortality Surveillance System (PMSS)	State and Local Maternal Mortality Review Committees (MMRCs)
Data Source	Death records, and death records linked birth or fetal death records, additional information as available	Death records, and death records linked birth or fetal death records, medical records, social service records, autopsy, informant interviews, etc.
Time Frame	During pregnancy – 1 year	During pregnancy – 1 year
Source of Classification	Medical epidemiologists	Multidisciplinary committees
Terms	Pregnancy-associated, (Associated and) Pregnancy-related, (Associated but) Not pregnancy-related	Pregnancy associated, (Associated and) Pregnancy-related, (Associated but) Not pregnancy-related
Measure	Pregnancy-Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births	Pregnancy Related Mortality Ratio - # of Pregnancy Related Deaths per 100,000 live births
Purpose	Analyze clinical factors associated with deaths, publish national information that supports interpretation and uptake of information among clinical & public health practitioners.	Understand medical and non-medical contributors to deaths, inform prioritization of interventions that effectively reduce pregnancy-related deaths

Pregnancy-Related Mortality Ratio by Year: PMSS* 2000-2019



*CDC Pregnancy Mortality Surveillance System. <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>

Pregnancy-related Mortality Ratio by Race-ethnicity: 2017-2019, PMSS*



Multiracial PRMR for 2018-2019 = 7.1 pregnancy-related deaths per 100,000 live births.

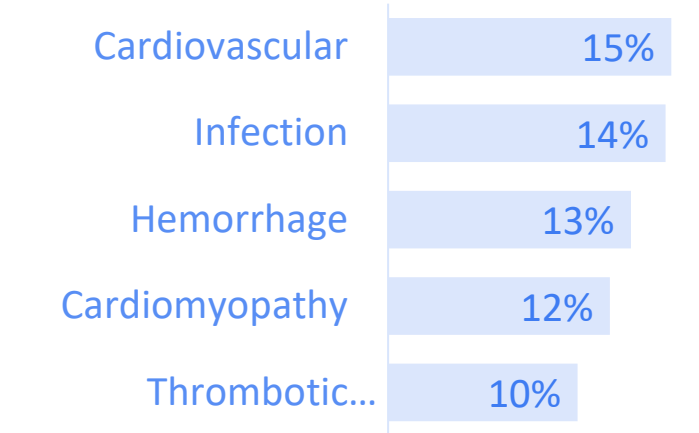
Race or ethnicity was missing for 1.4% of pregnancy-related deaths in 2017-2019; PRMRs for non-Hispanic Other Race were not calculated due to small numbers.

*CDC Pregnancy Mortality Surveillance System. <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm>

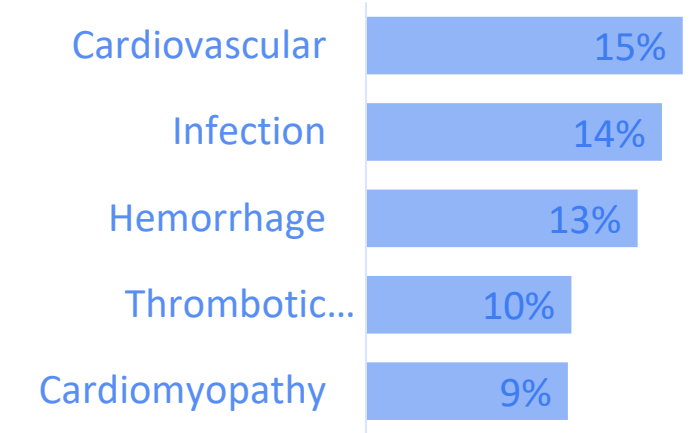
**Study Question: How does PMSS-identified
underlying cause of pregnancy-related death
vary by urbanicity?**

Most Common Causes of Pregnancy Related Deaths by Urbanicity: 2015 – 2019, PMSS

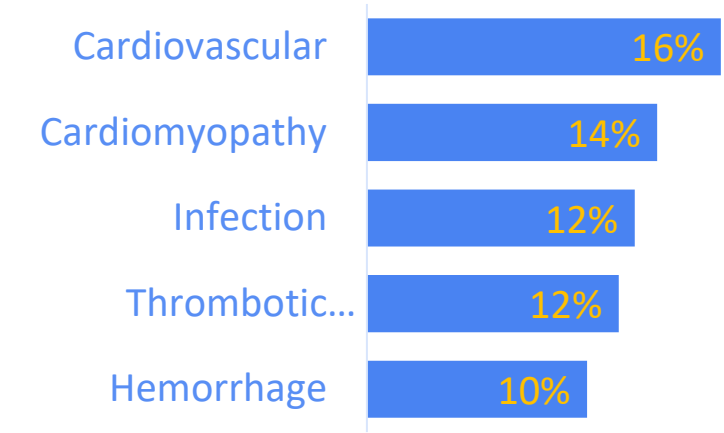
Large Central Metro



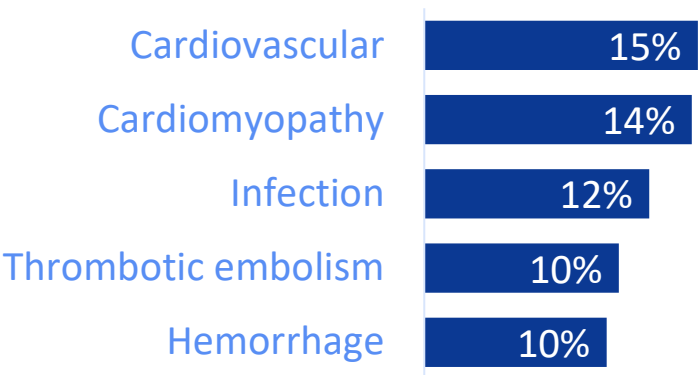
Large Fringe Metro



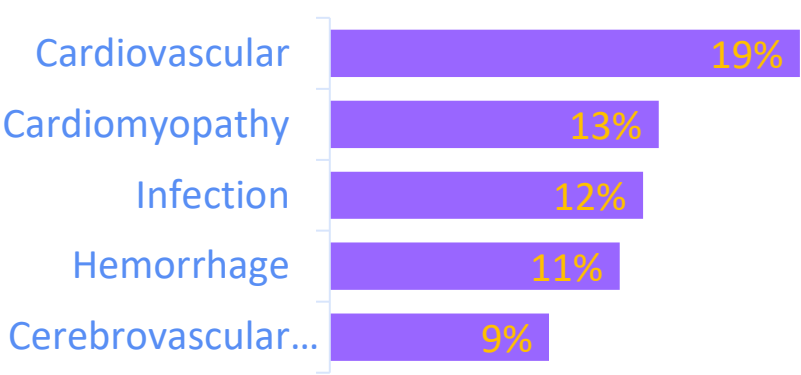
Medium Metro



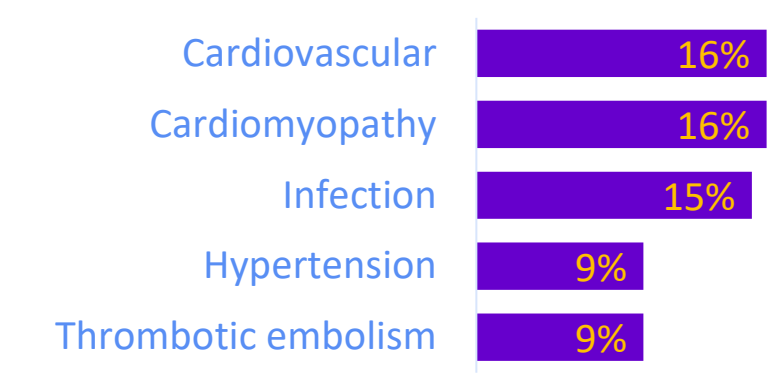
Small Metro



Micropolitan



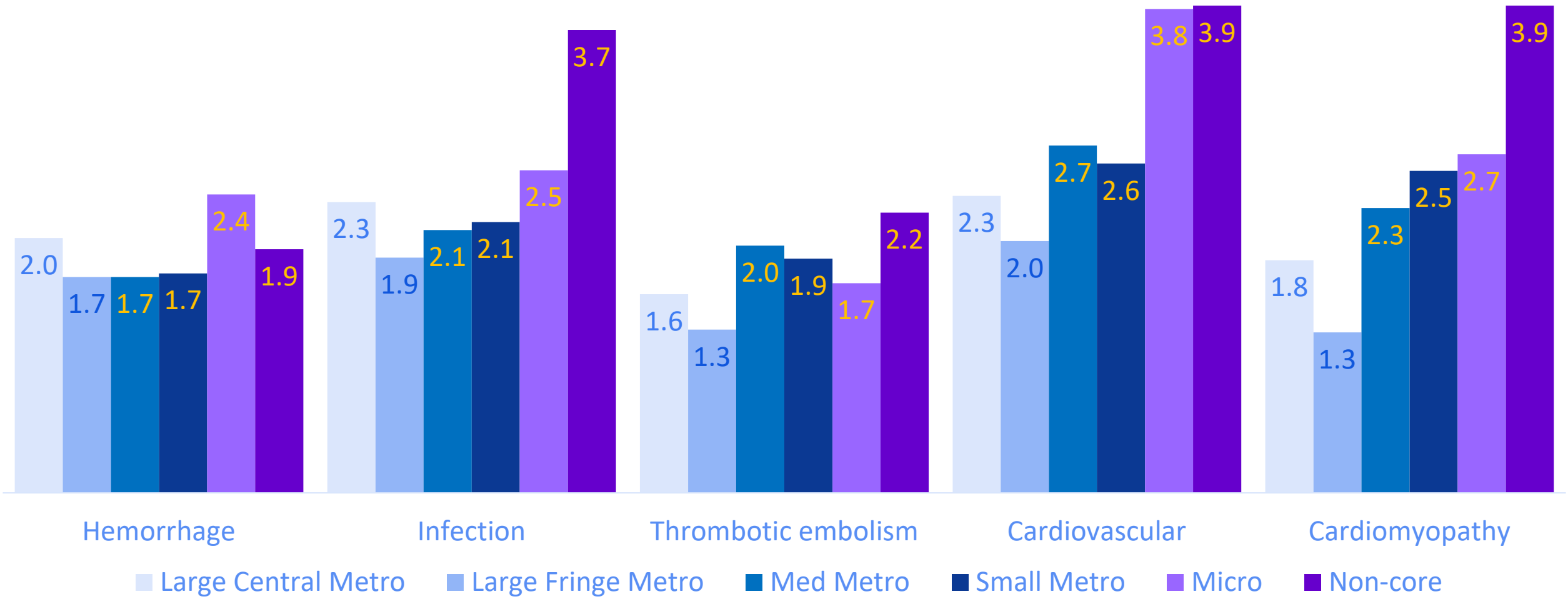
Non-core



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Cause-specific PRMR by Urbanicity Level: 2015 – 2019, PMSS



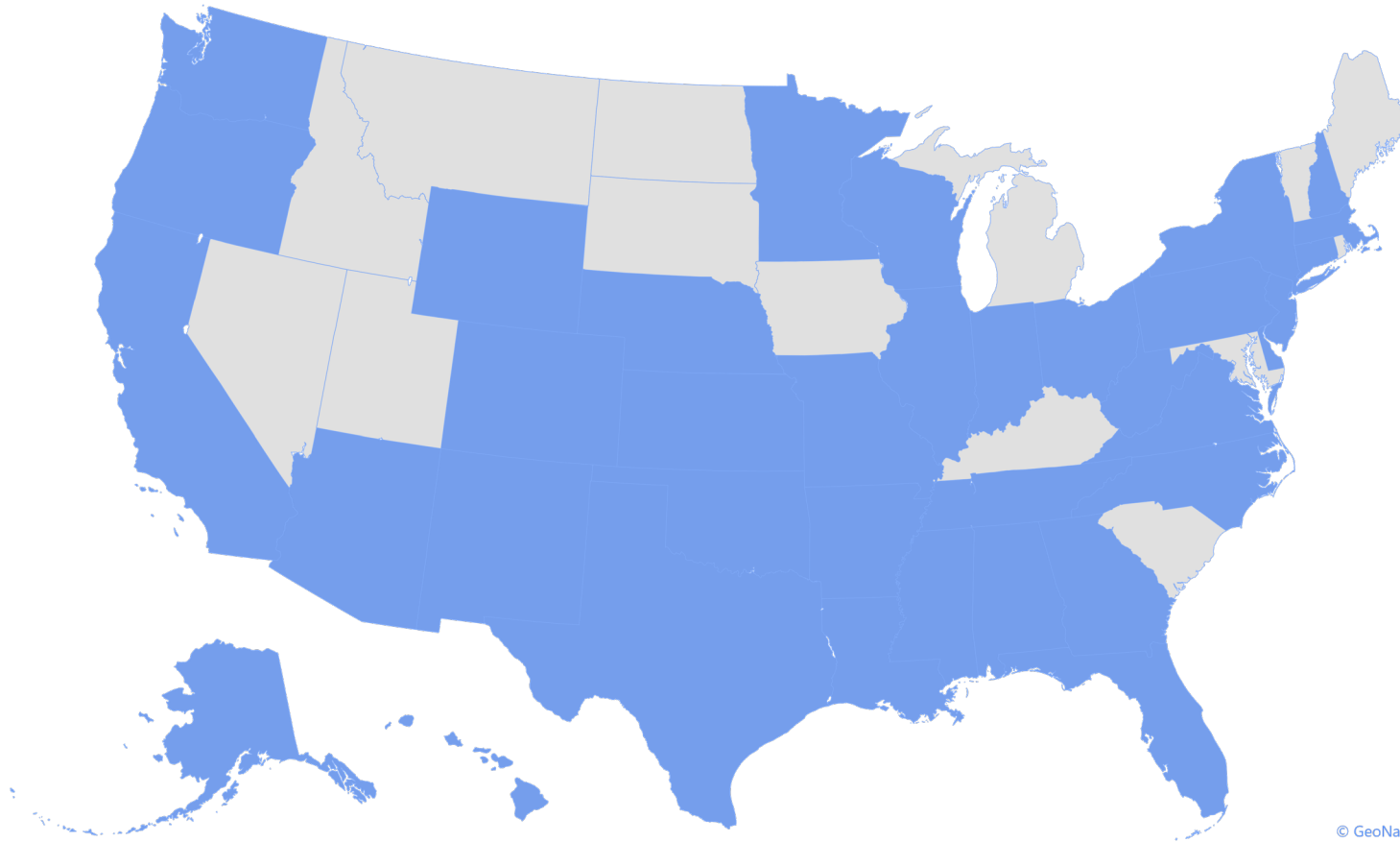
PROVISIONAL RESULTS

Conclusions

- Cardiovascular conditions were the most frequent underlying cause of pregnancy-related death nationally and across all urbanicity levels
- The PRMR for pregnancy-related cardiovascular conditions and for cardiomyopathy was highest among residents of the most rural areas

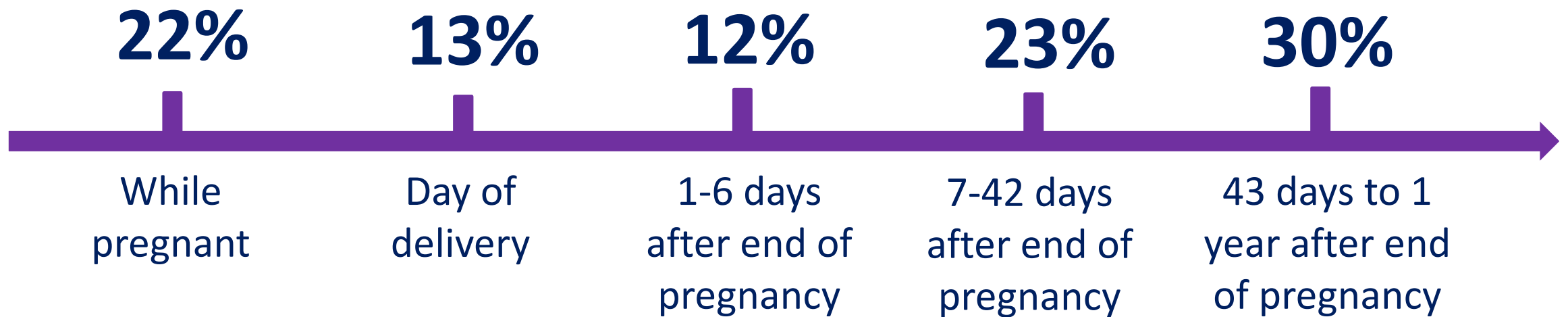
Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019

MMRCs in 36 states contributed data on 1,018 pregnancy-related deaths among their residents



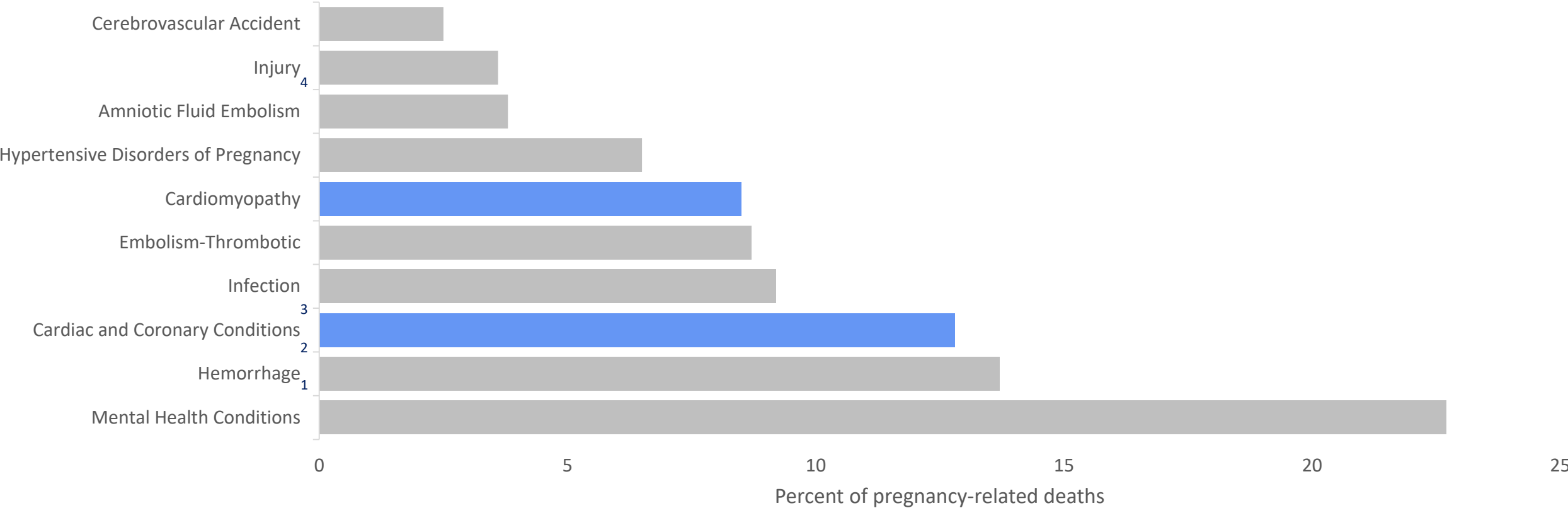
© GeoNames, Microsoft, TomTom

Timing of Pregnancy-related Deaths



Timing was missing (n=2) or unknown (n=14) for 16 (1.6%) pregnancy-related deaths.

Most Frequent Underlying Causes of Pregnancy-related Deaths*



¹ Mental health conditions include deaths to suicide, unintentional or unknown intent overdose/poisoning related to substance use disorder, and other deaths determined by the MMRC to be related to a mental health condition, including substance use disorder

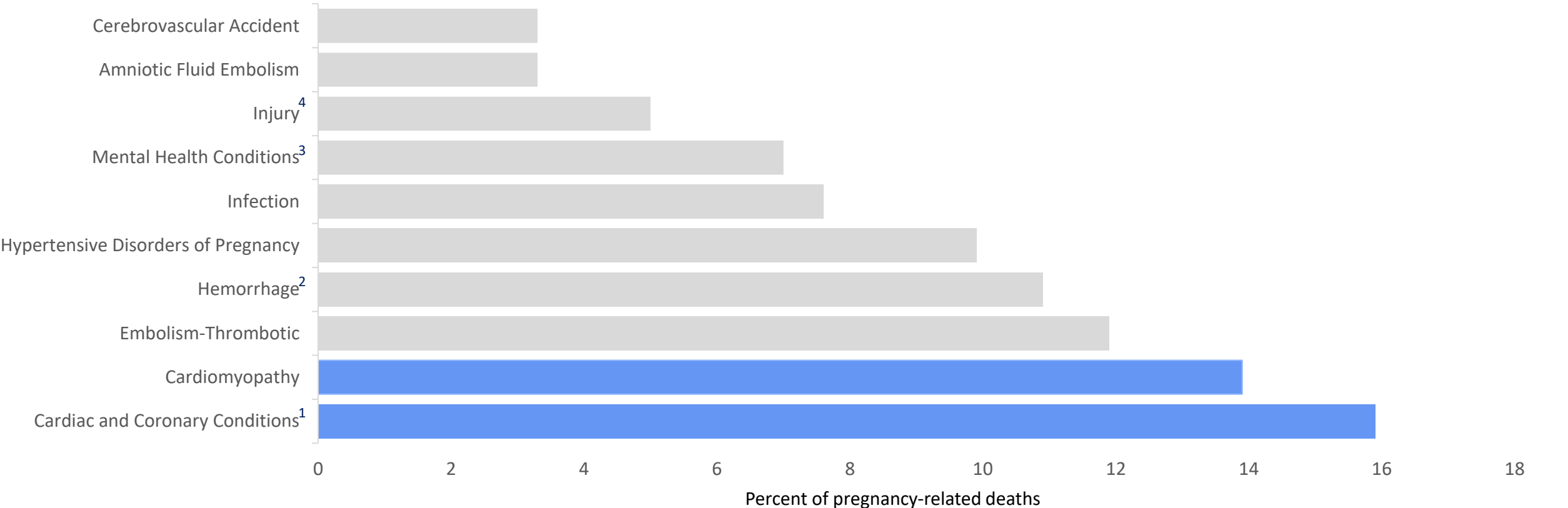
² Excludes aneurysms or cerebrovascular accident (CVA)

³ Cardiac and coronary conditions include deaths to coronary artery disease, pulmonary hypertension, acquired and congenital valvular heart disease, vascular aneurysm, hypertensive cardiovascular disease, Marfan Syndrome, conduction defects, vascular malformations, and other cardiovascular disease; and excludes cardiomyopathy and hypertensive disorders of pregnancy.

⁴ Injury includes intentional injury (homicide), unintentional injury, including overdose/poisoning deaths not related to substance use disorder, and injury of unknown intent or not otherwise specified.

*Only 10 most frequent underlying causes of death are shown; underlying cause of death was missing (n=10) or unknown (n=21) for 31 (3.0%) pregnancy-related deaths

Most Frequent Underlying Causes of Pregnancy-related Deaths Among non-Hispanic Black Persons*



¹ Cardiac and coronary conditions include deaths to coronary artery disease, pulmonary hypertension, acquired and congenital valvular heart disease, vascular aneurysm, hypertensive cardiovascular disease, Marfan Syndrome, conduction defects, vascular malformations, and other cardiovascular disease; and excludes cardiomyopathy and hypertensive disorders of pregnancy.

² Excludes aneurysms or cerebrovascular accident (CVA)

³ Mental health conditions include deaths to suicide, unintentional or unknown intent overdose/poisoning related to substance use disorder, and other deaths determined by the MMRC to be related to a mental health condition, including substance use disorder

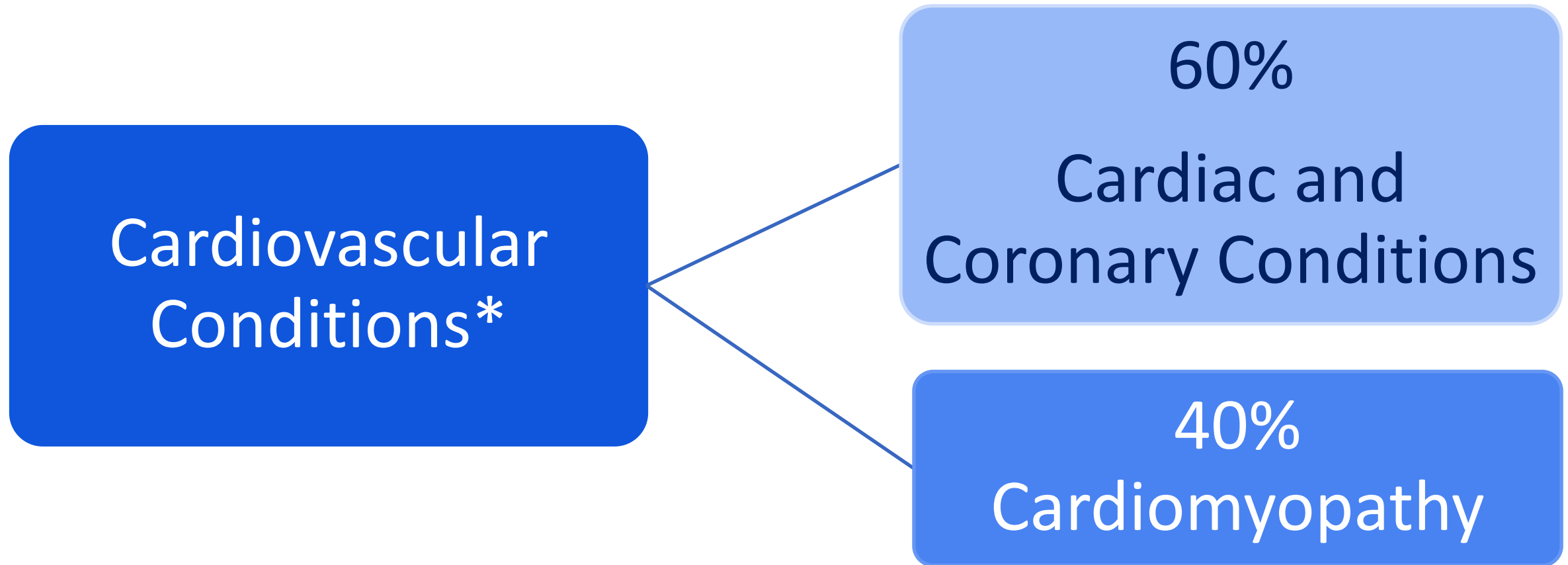
⁴ Injury includes intentional injury (homicide), unintentional injury, including overdose/poisoning deaths not related to substance use disorder, and injury of unknown intent or not otherwise specified.

*Only 10 most frequent underlying causes of death are shown; underlying cause of death was missing (n=6) or unknown (n=7) for 13 (4.1%) pregnancy-related deaths

Detailed Analyses

MMRCs in 36 US States: Cardiovascular Conditions

Pregnancy-related Cardiovascular Conditions* Deaths



PROVISIONAL RESULTS

*Excludes hypertensive disorders of pregnancy and cerebrovascular accident

Cardiovascular Conditions*

PMSS-MM 80 Series (cardiomyopathy)

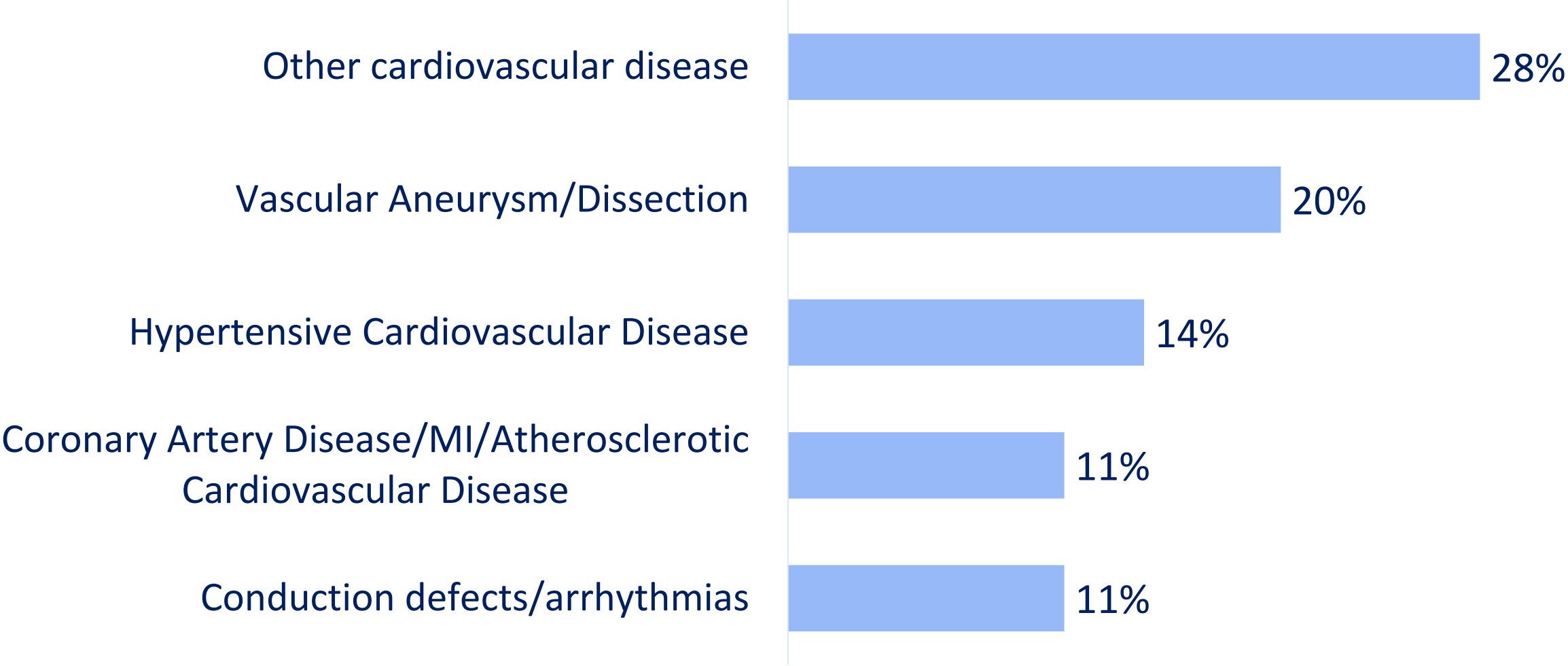
- 80.1 - Postpartum/Peripartum Cardiomyopathy
- 80.2 - Hypertrophic Cardiomyopathy
- 80.9 - Other Cardiomyopathy/NOS

PMSS-MM 90 Series (cardiac and coronary conditions)

- 90.1 - Coronary Artery Disease/Myocardial Infarction (MI)/Atherosclerotic Cardiovascular Disease
- 90.2 - Pulmonary Hypertension
- 90.3 - Valvular Heart Disease Congenital and Acquired
- 90.4 - Vascular Aneurysm/Dissection (Non-Cerebral)
- 90.5 - Hypertensive Cardiovascular Disease
- 90.6 - Marfan Syndrome
- 90.7 - Conduction Defects/Arrhythmias
- 90.8 - Vascular Malformations Outside Head and Coronary Arteries
- 90.9 - Other Cardiovascular Disease, including CHF, Cardiomegaly, Cardiac Hypertrophy, Cardiac Fibrosis, Non-Acute Myocarditis/NOS

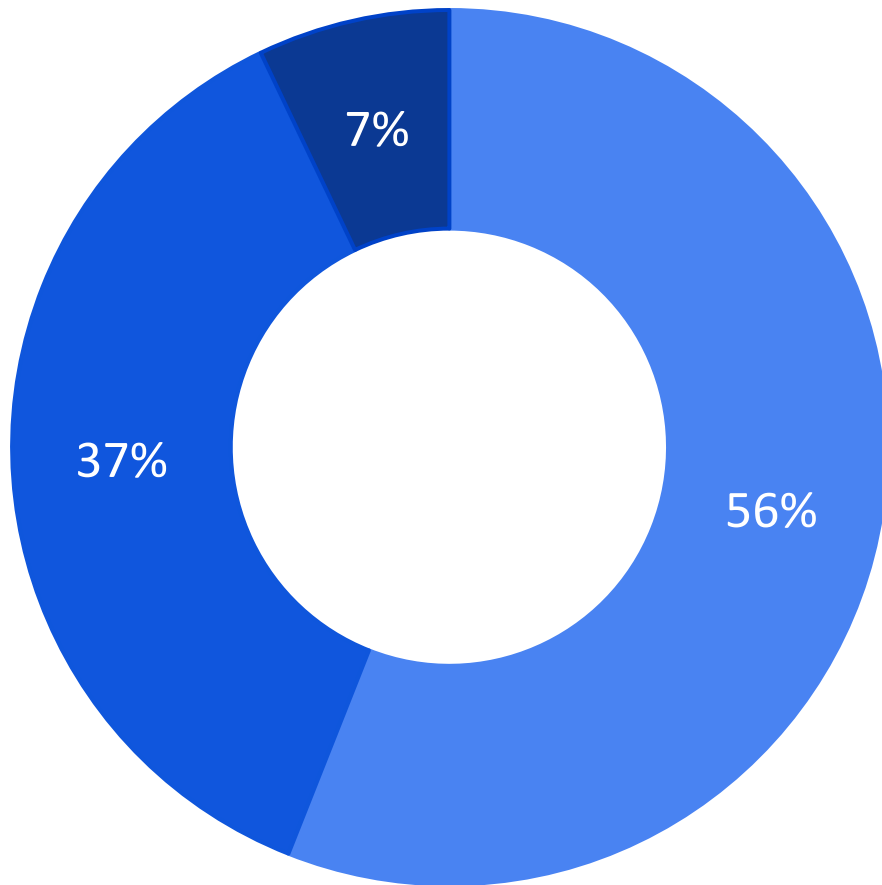
*Excludes hypertensive disorders of pregnancy and cerebrovascular accident

Cardiac and Coronary Conditions



Provisional results

Cardiomyopathy



- Postpartum/peripartum cardiomyopathy
- Other cardiomyopathy/NOS
- Hypertrophic cardiomyopathy

Provisional results

Among All Pregnancy-related Cardiac and Coronary Conditions



Among All Pregnancy-related Cardiac and Coronary Conditions



Among All Pregnancy-related Cardiomyopathy



Provisional results

Timing of death was missing or unknown for 1 pregnancy-related cardiomyopathy death

75% of pregnancy-related **Cardiac and Coronary Conditions** deaths with a preventability determination were determined to be **preventable**

77% of pregnancy-related **Cardiomyopathy** deaths with a preventability determination were determined to be **preventable**

A preventability determination was missing or unable to be determined for 4 pregnancy-related cardiac and coronary conditions and 1 cardiomyopathy deaths.

PREVENTABLE PREGNANCY-RELATED DEATHS
WITH MMRC IDENTIFIED CAUSES OF
CARDIOVASCULAR CONDITIONS IN THE
NORTHEAST AND MID-ATLANTIC, 2017-2019

*How is **care coordination** characterized in the lives of those who had a preventable pregnancy-related death from MMRC-Identified Causes of Death from Cardiovascular Conditions, in 6 New England and Mid-Atlantic States?*

Summary and Conclusions

- Findings from our thematic analysis suggest that the **23 individuals with preventable cardiovascular deaths lacked care coordination across multiple points of their care during and after pregnancy.**
- Among those with a known diagnosis of cardiac conditions, initial cardiac diagnosis during prepregnancy, prenatal or postpartum, **providers and health systems did not ensure these individuals received appropriate referrals or follow up care.**
- Despite many transitions across the health care continuum, including obstetric care, postpartum care, specialty care, emergency care, and in-patient hospitalizations, **individuals were not provided adequate case management** and were frequently only recommended or instructed to follow up with health care providers on their own.

Thank you!

For more information, visit
www.cdc.gov/erasemm or
contact: erasemm@cdc.gov



The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

