



Infant and Maternal Health Mortality

Susan Castellano, Maternal and Child Health Section Manager

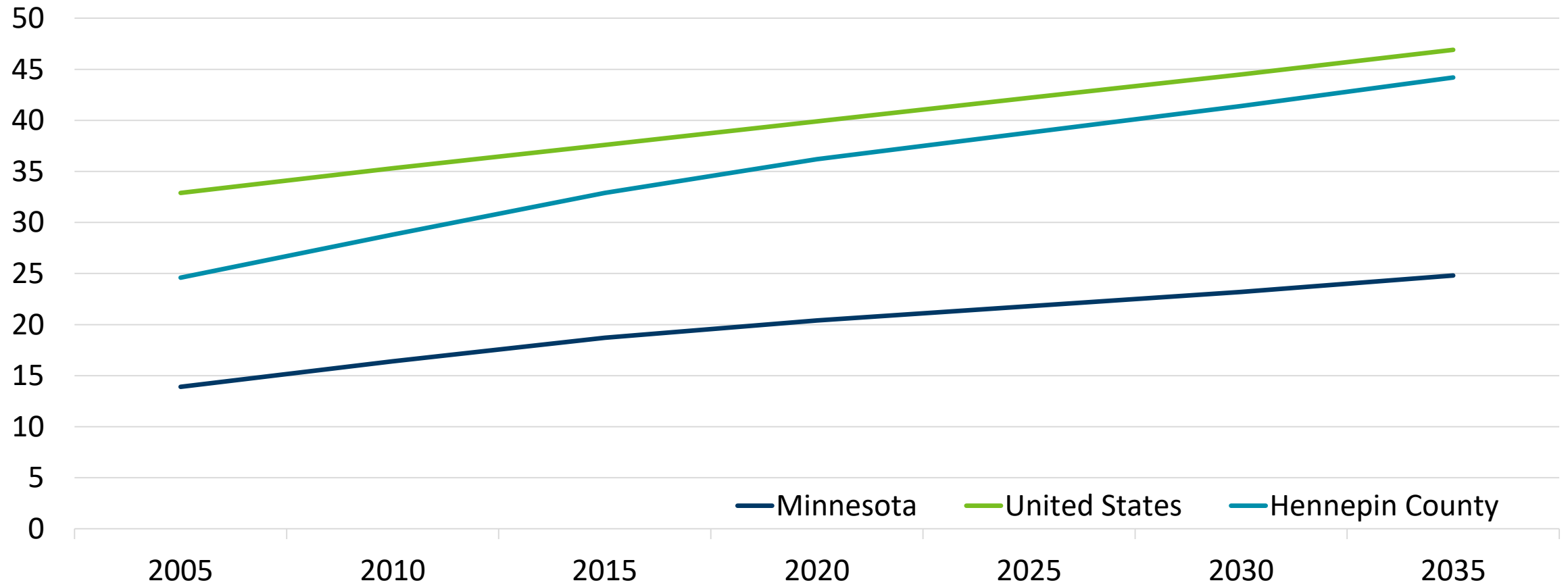
Child and Family Health Division



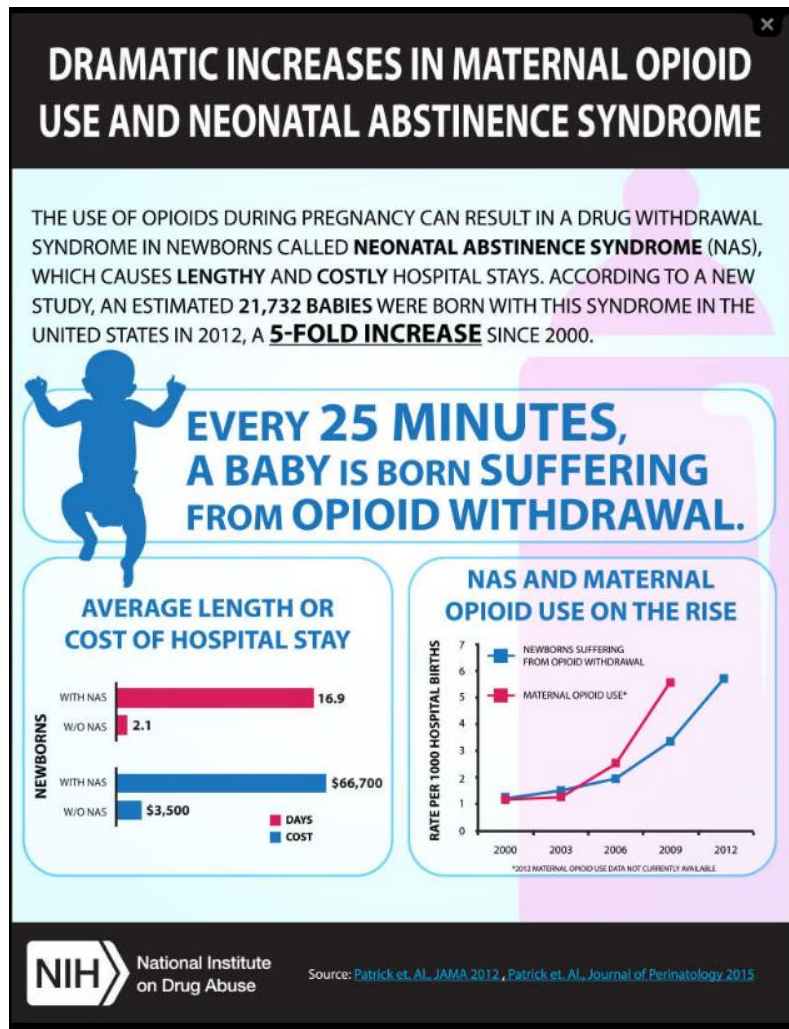
Trends Impacting Perinatal Health

The Increasing diversity of Minnesota

Percent of Total Population Projected to Be Nonwhite or Latino, by Year



Neonatal Abstinence Nationally

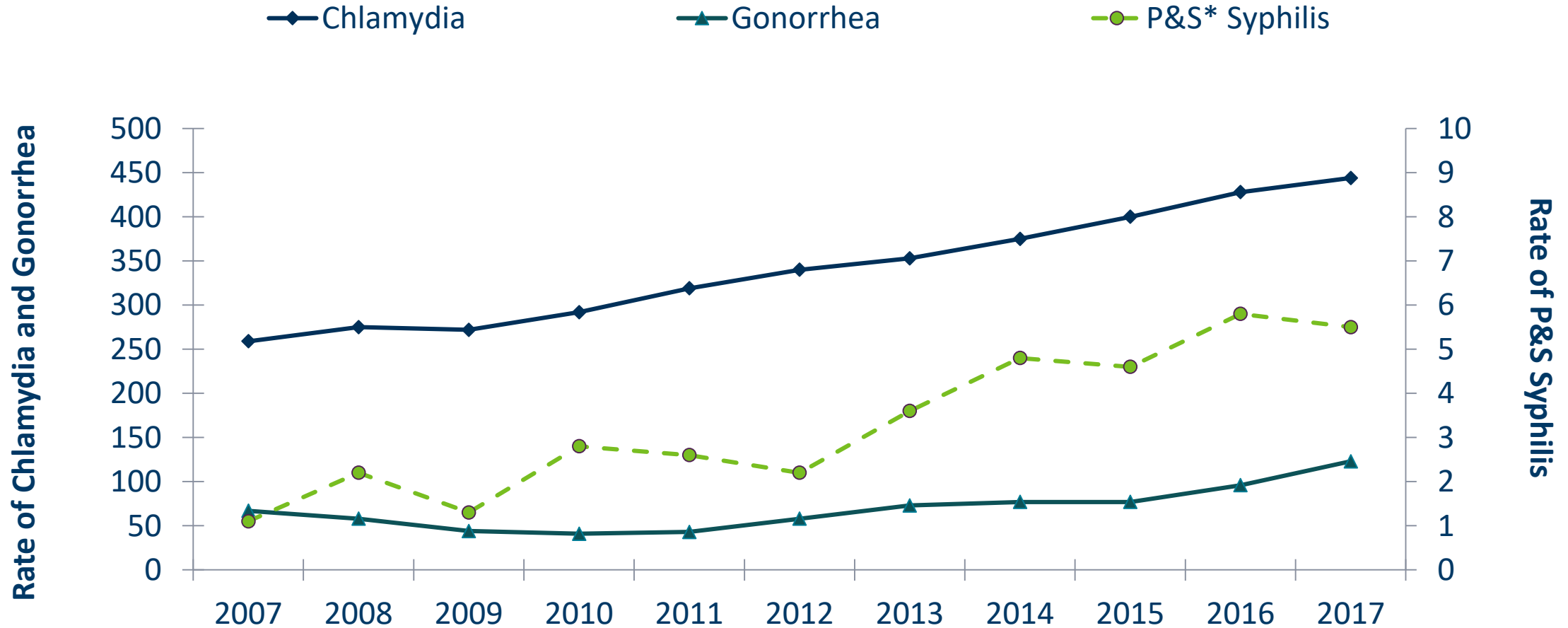


Nationally, the rate of babies born with NAS per 1,000 hospital births was 1.2 in 2000, 1.5 in 2003, 1.96 in 2006, 3.39 in 2009 and 5.8 in 2012. The rate of maternal opiate use per 1,000 hospital births was 1.19 in 2000, 1.26 in 2003, 2.52 in 2006, and 5.63 in 2009.

[Patrick et. Al., JAMA 2012, Patrick et. Al., Journal of Perinatology.](#)

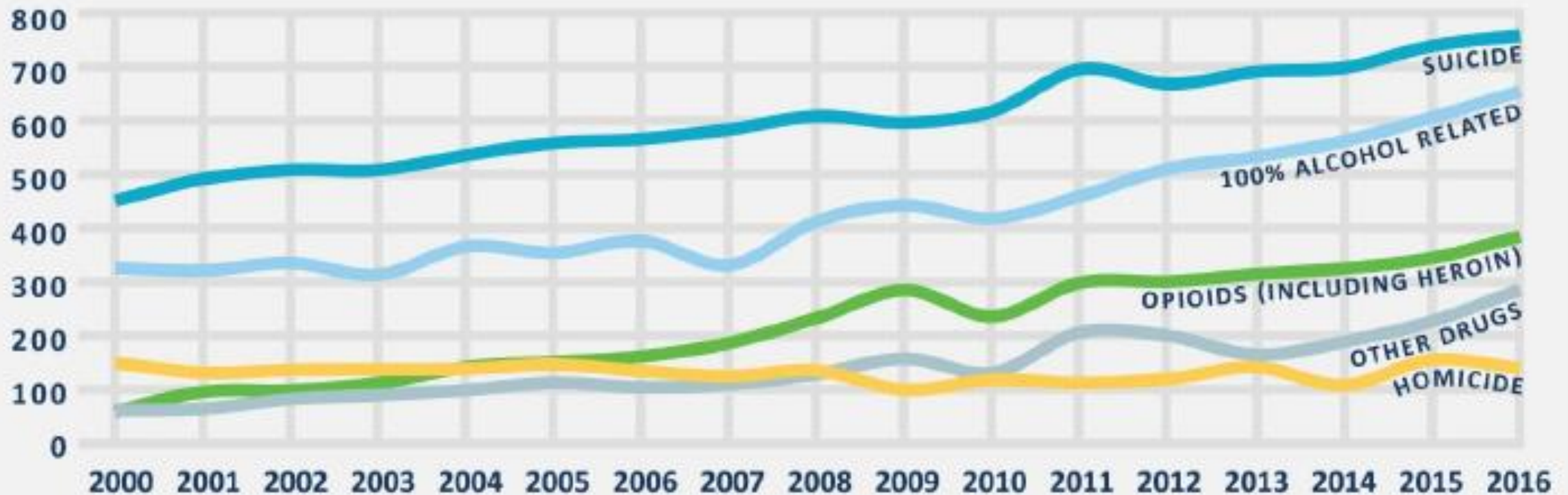
STDs in Minnesota

Rate per 100,000 by Year of Diagnosis, 2007-2017



* P&S = Primary and Secondary

Deaths in MN from Suicide, Homicide, Alcohol and Drug Overdose, 2000-2016



SOURCE: MINNESOTA DEPARTMENT OF HEALTH, INJURY AND VIOLENCE PREVENTION UNIT

DEATHS FROM SUICIDE, ALCOHOL, AND DRUG OVERDOSES HAVE BEEN STEADILY INCREASING OVER THE LAST 16 YEARS.



Infant Mortality

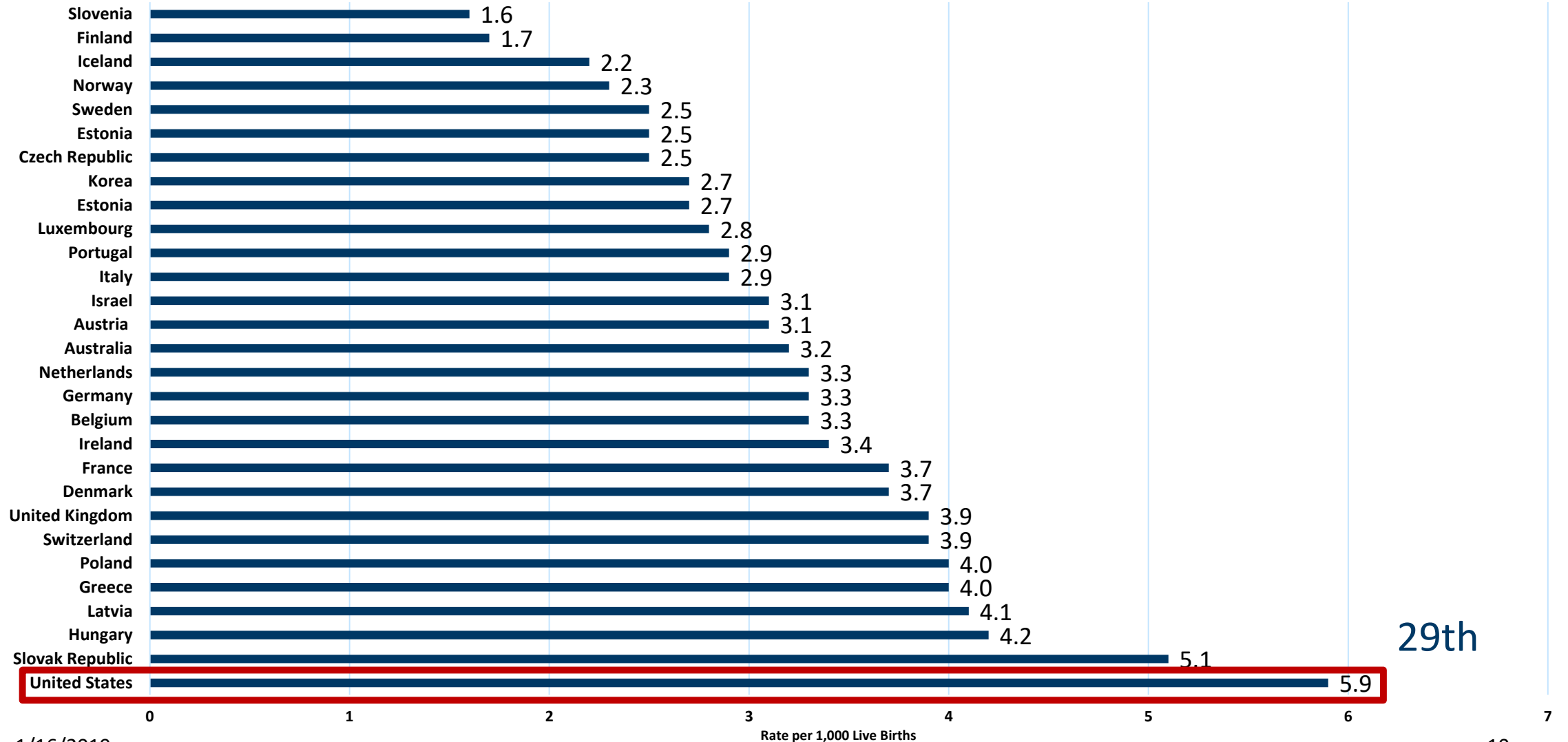
Key Fetal/Infant MN Statistics: 2016

- Live Births: 69,835
- Number of infant deaths (Infants aged < 1 year): 357
 - Number of neonatal deaths (Infants aged < 28 days): 242
 - Number of post neonatal deaths (Infants aged 28 days to < 1 year): 115
- Fetal (Stillbirth) deaths (20+ weeks gestation): 420
- Infant mortality rate per 1,000 live births: 5.1
- Fetal mortality rate per 1,000 live births + fetal deaths: 5.3

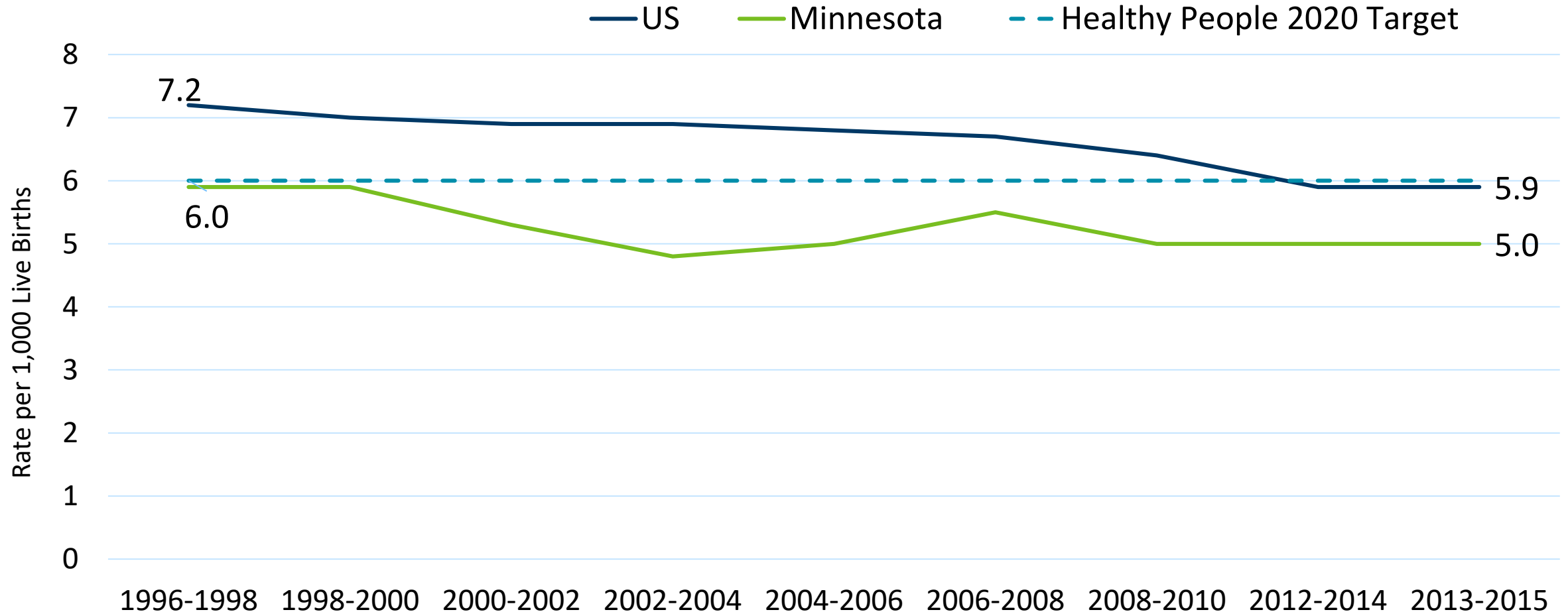
What Is the Infant Mortality Rate?

1. The infant mortality rate (IMR) is expressed as the number of infant deaths per 1,000 live births.
2. **IMR Calculation Example**: In 2014, there were 346 infant deaths and 69,916 live births in Minnesota. What was the infant mortality rate?
 - ✓ **$346/69,916 \times 1,000 = 4.9$ infant deaths per 1,000 live births**
 - ✓ *Interpretation: In 2014, the IMR in Minnesota was 4.9 infant deaths per 1,000 live births.*

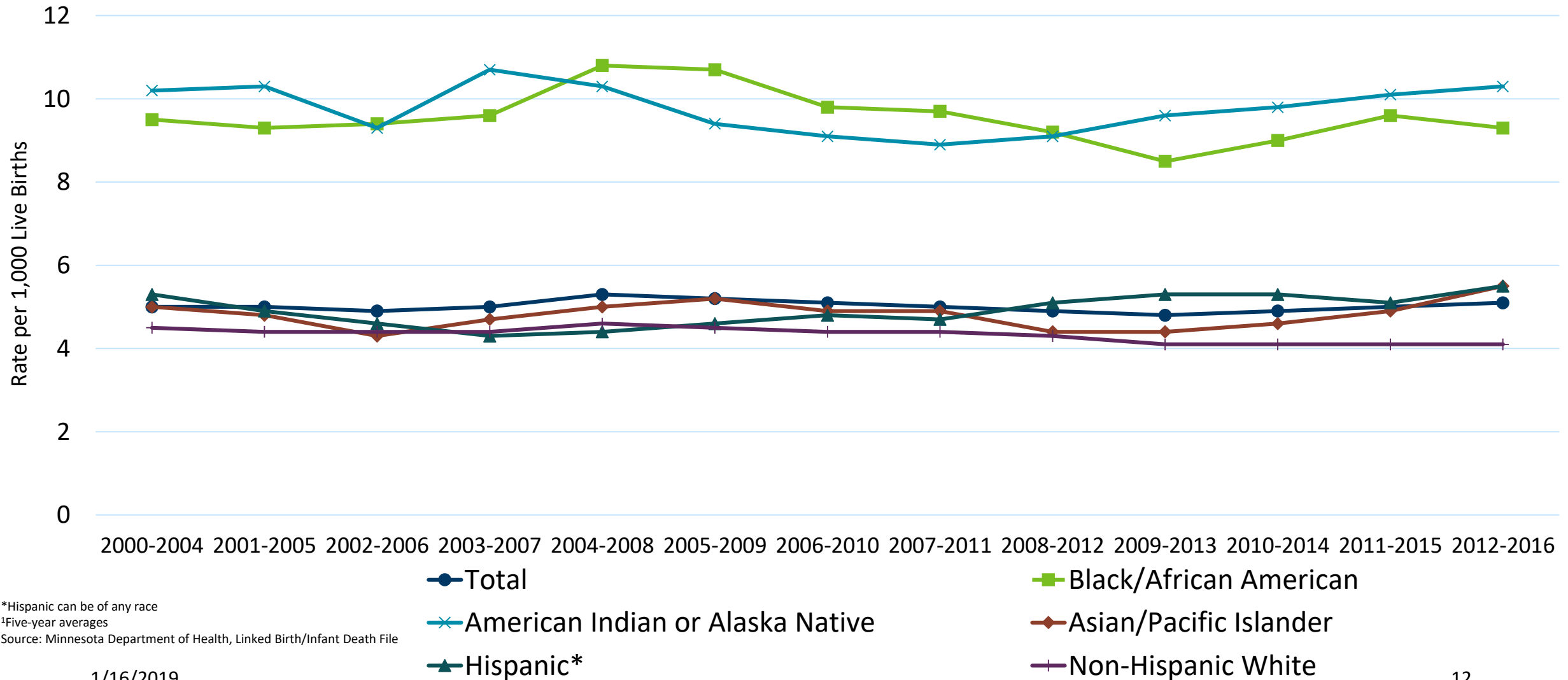
Infant Mortality Rates for Selected OECD Countries



Infant Mortality Rates 1996-2015: Minnesota and U.S.



Infant Mortality Rates by Race/Ethnicity of Mother, Minnesota 2000-2016¹



*Hispanic can be of any race

¹Five-year averages

Source: Minnesota Department of Health, Linked Birth/Infant Death File

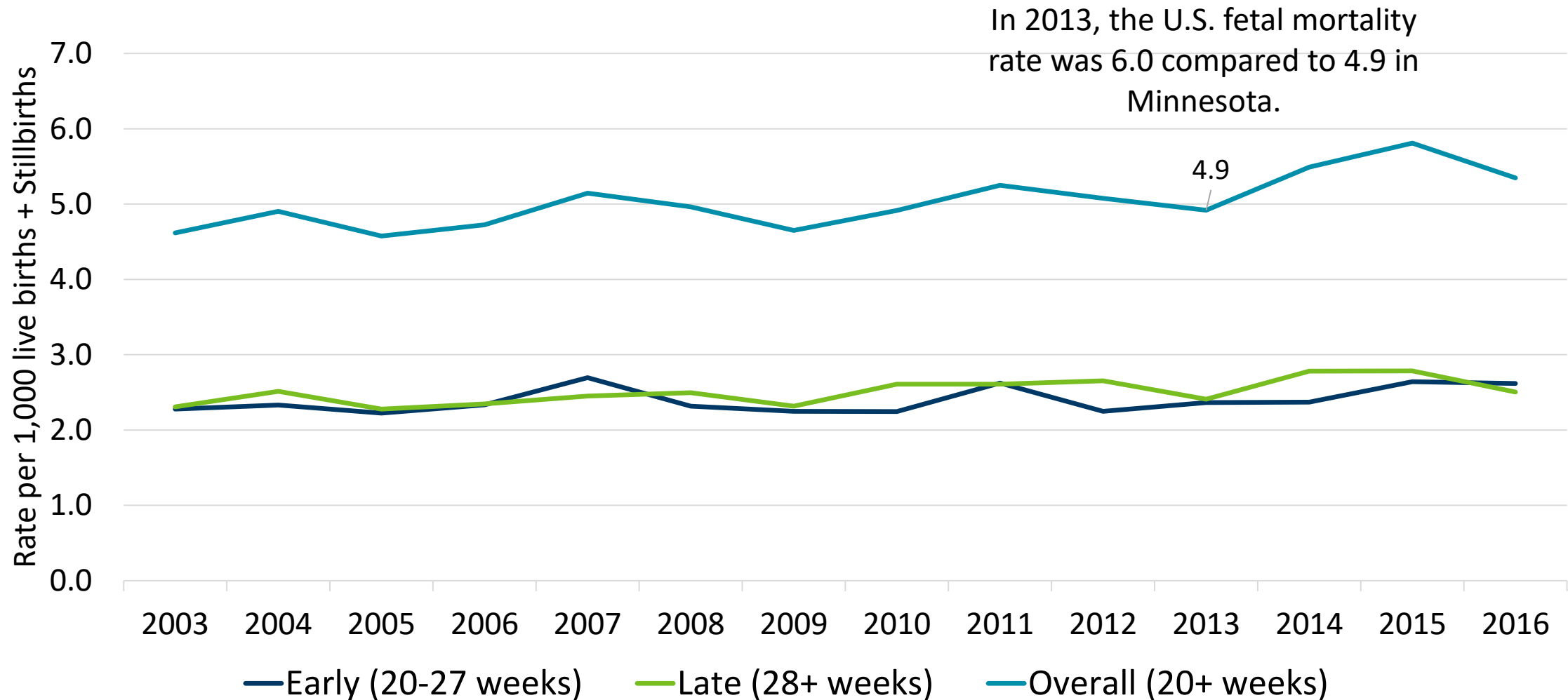
Leading Causes of Infant Mortality in Minnesota, 2012-2016



DEPARTMENT
OF HEALTH

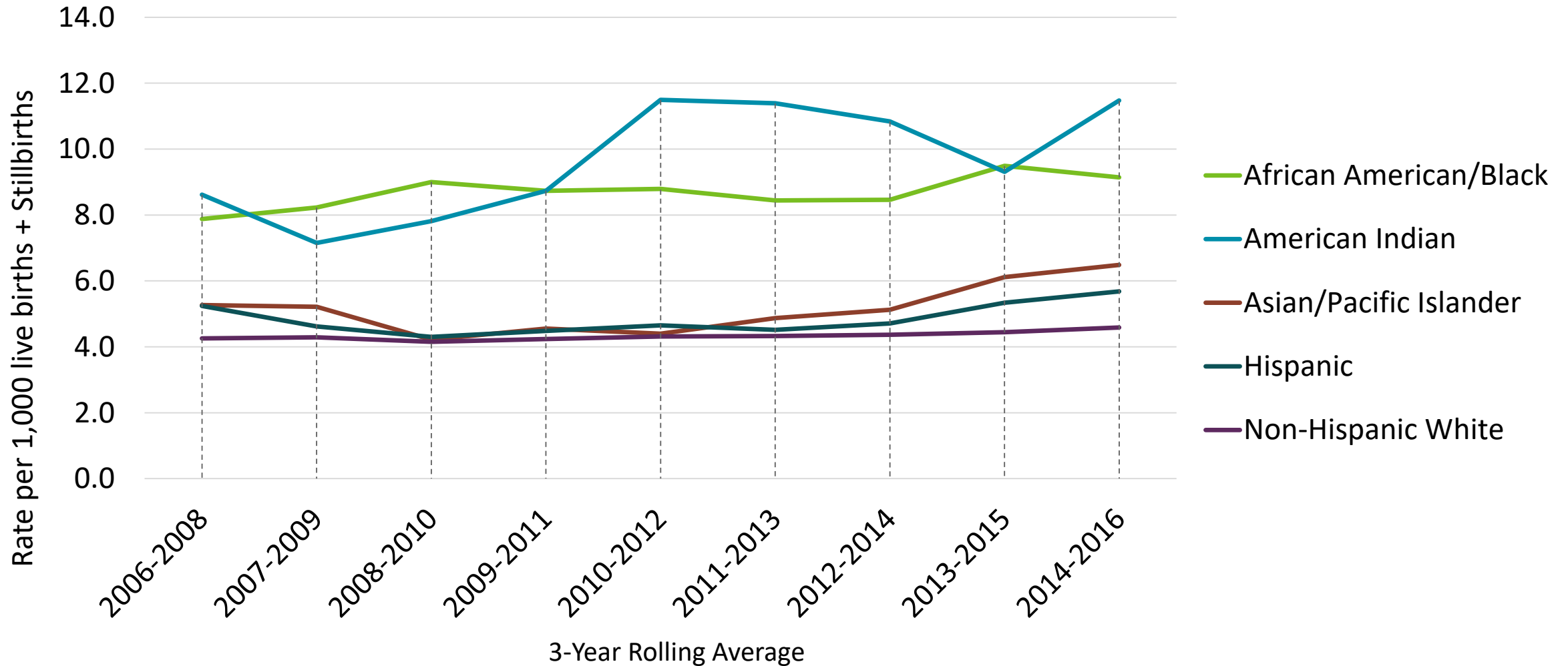
Race/Ethnicity	First	Second	Third	Fourth
Total	Congenital Anomalies(26.0%)	Prematurity (24.7%)	Obstetric Conditions (12.6%)	SUID (12.5%)
Black/African American	Prematurity (26.4%)	Congenital Anomalies (23.0%)	SUID (16.3%)	Obstetric Conditions (12.4%)
American Indian	Obstetric Conditions (31.3%)	#	#	#
Asian/Pacific Islander	Prematurity (34.0%)	Congenital Anomalies (26.7%)	Obstetric Conditions (15.3%)	#
Hispanic*	Congenital Anomalies (25.4%)	Prematurity (23.8%)	#	#
Non-Hispanic White	Congenital Anomalies (27.9%)	Prematurity (23.0%)	SUID/SIDS (12.6%)	Obstetric Conditions (11.0%)

Minnesota Stillbirth rates 2003-2016



Data Source: Minnesota Department of Health, Minnesota Resident Final Fetal Death File

Stillbirth rates by race/ethnicity Minnesota 2006-2016



Data Source: Minnesota Department of Health, Minnesota Resident Final Fetal Death File

Once a day =
Many are preventable





Fetal and Infant Mortality Review

History of FIMR in Minnesota



- Statutory authority and resources no longer exists
- Previous statewide American Indian Infant Mortality Review conducted

What is a Fetal and Infant Mortality Review?

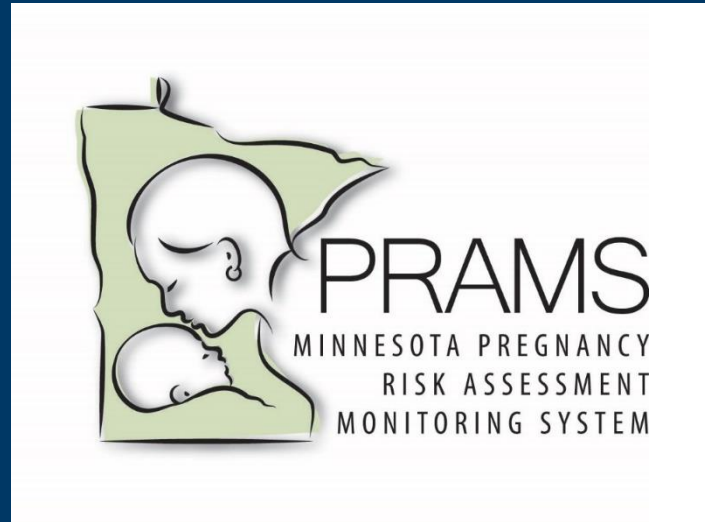
Ultimate goal: avert preventable fetal and infant deaths by improving education, services and community resources via a broad range of policies and interventions

Community Action Team charged with developing and implementing solutions to address systems- and community-level problems



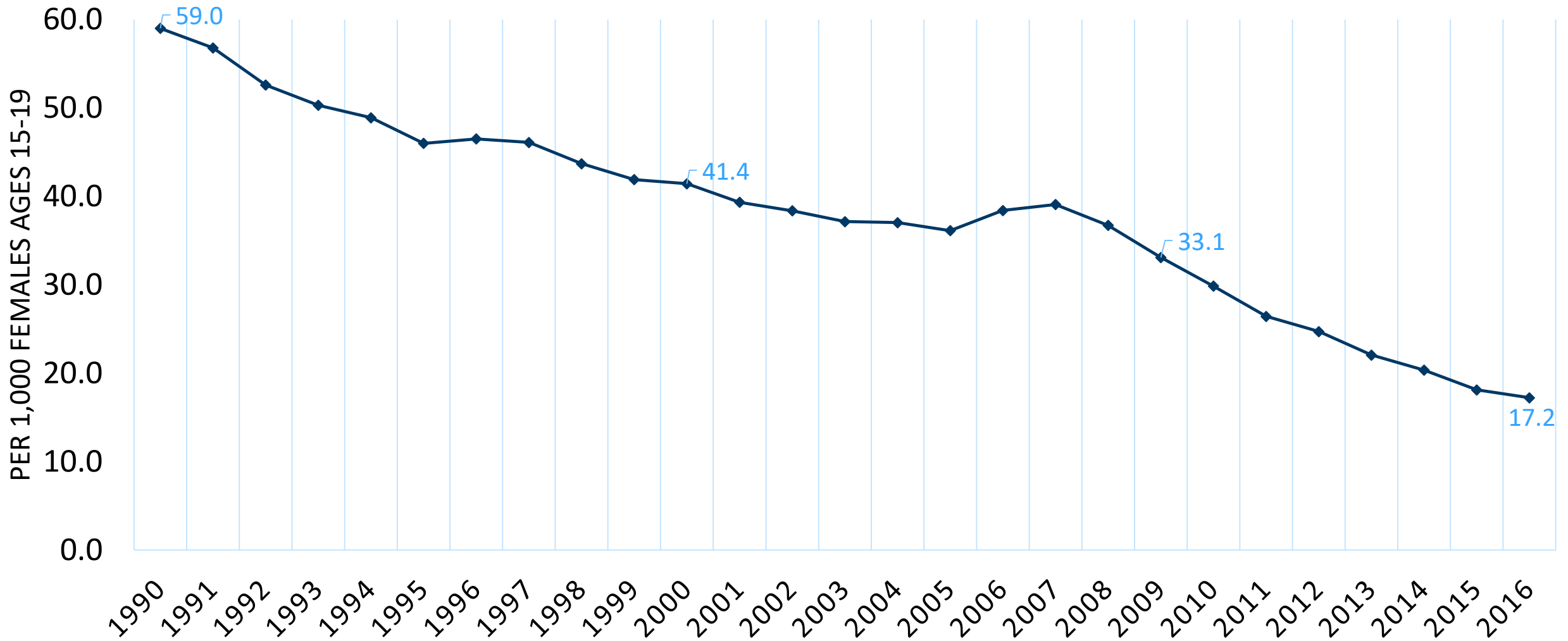
Conduct systematic, scientific, and objective review of cases to identify underlying causes, contributing factors and systems-level issues, monitoring trends and changes over time

Case summaries reviewed by an interdisciplinary team, develops recommendations based on themes or patterns in the information



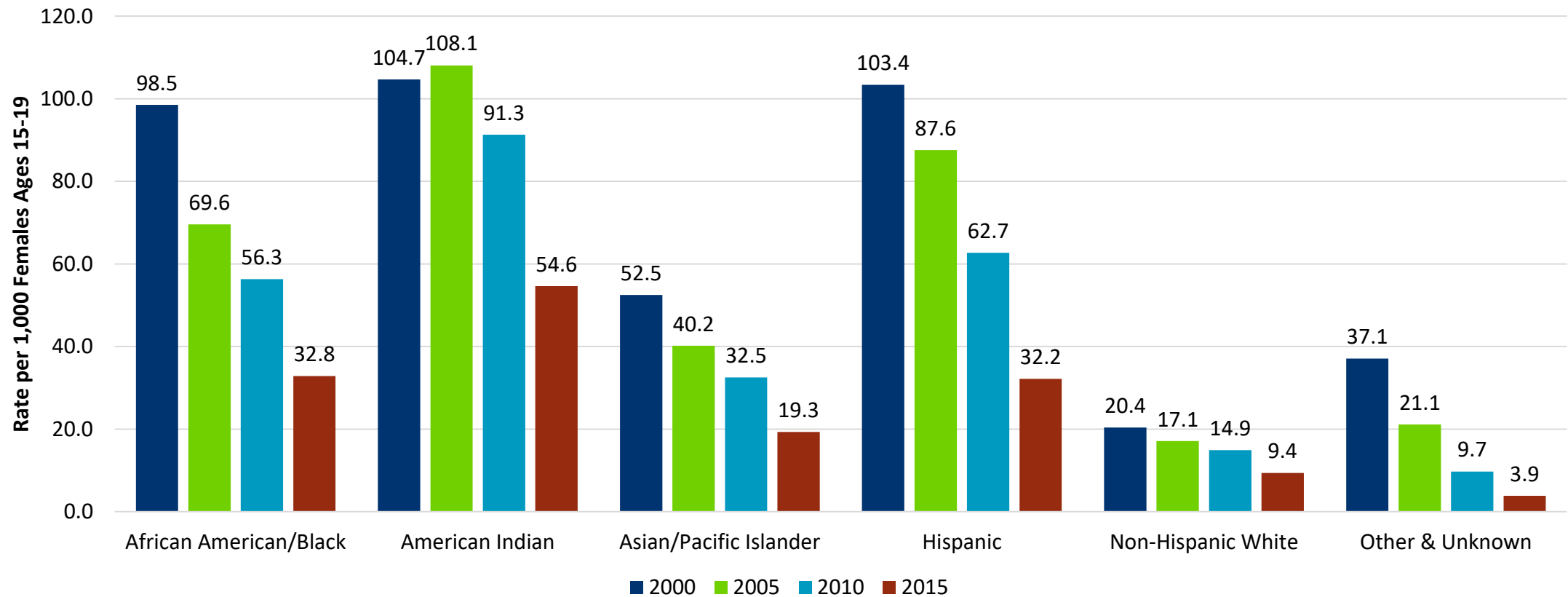
Maternal health

Minnesota teen pregnancy rate 1990-2016

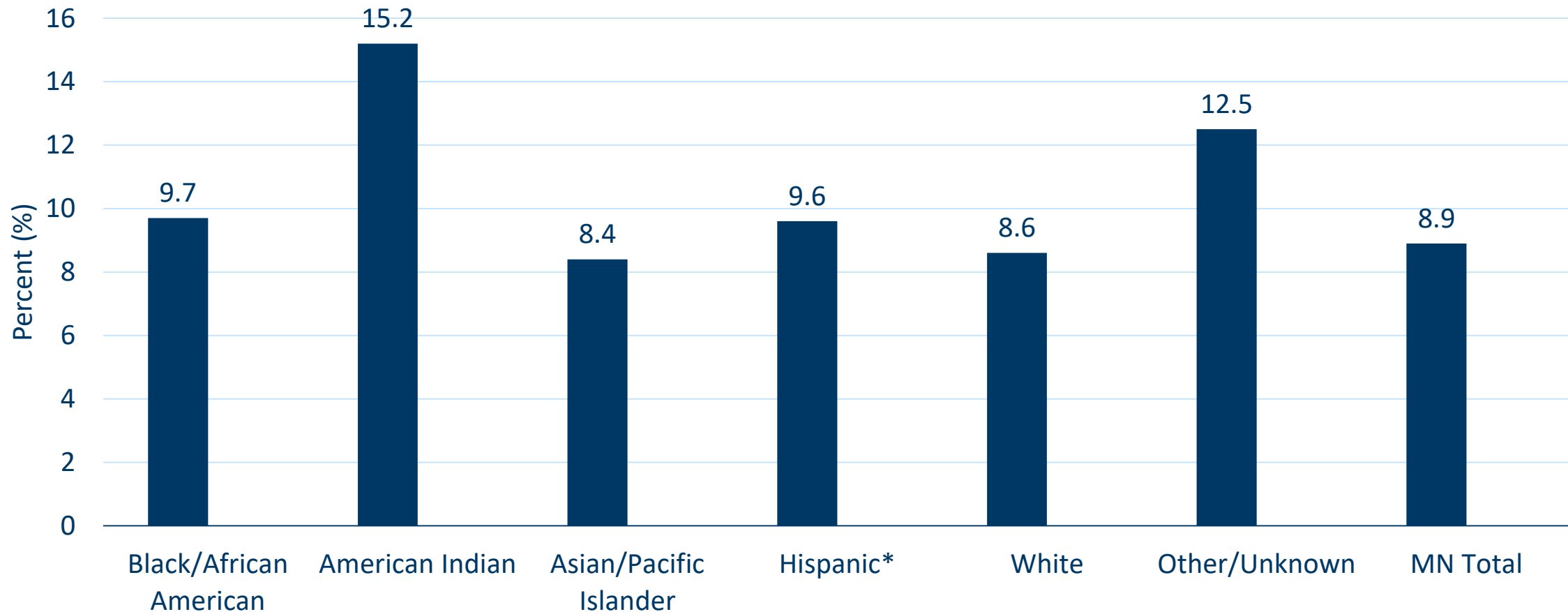


Teen Birth by Race/Ethnicity

Minnesota Teen Birth Rate by Race/Ethnicity

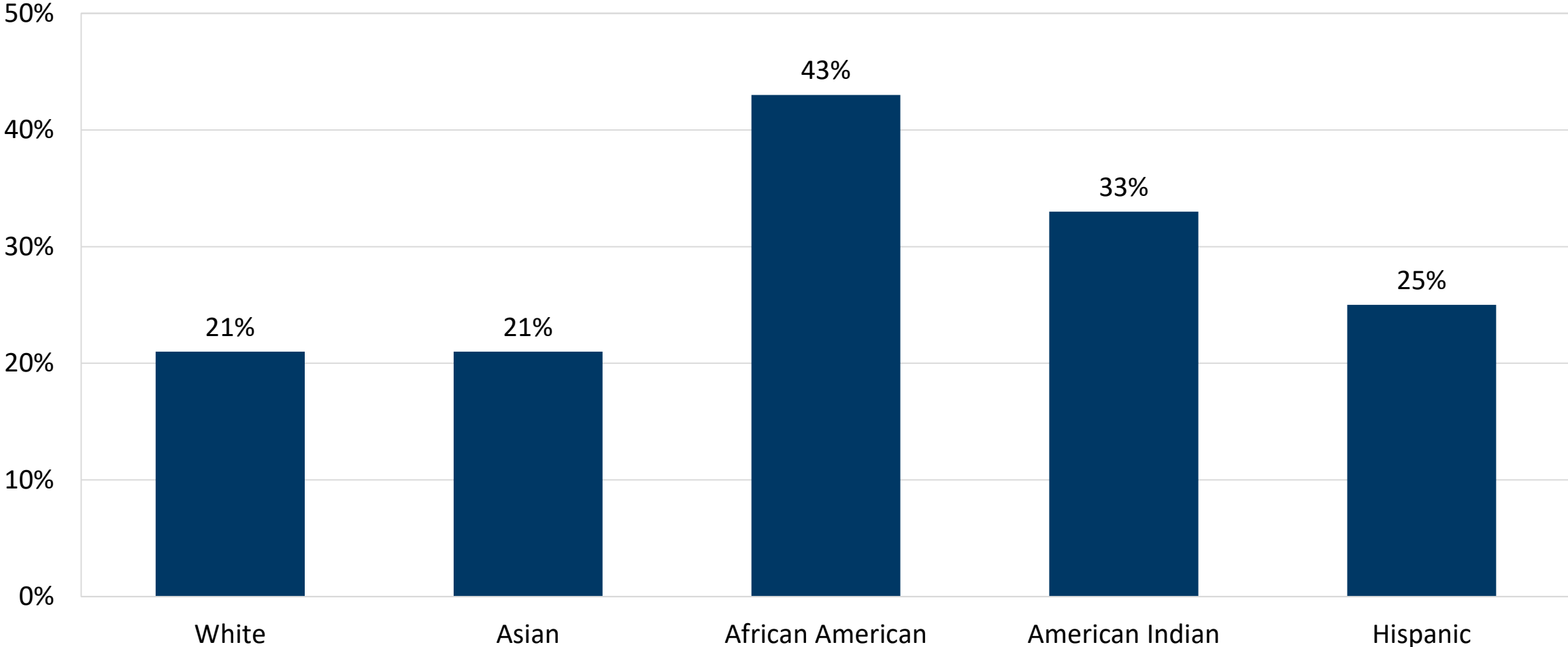


Percent Preterm Births by Race/Ethnicity of Mother Minnesota, 2017



Notes:*Hispanic can be of any race
Preterm births are births that occur before 37 completed weeks of gestation.
The data shown are for the percent (%) of all births that are preterm
Source: Minnesota Department of Health, Birth File

Percent of Unintended Pregnancies, 2013-2015



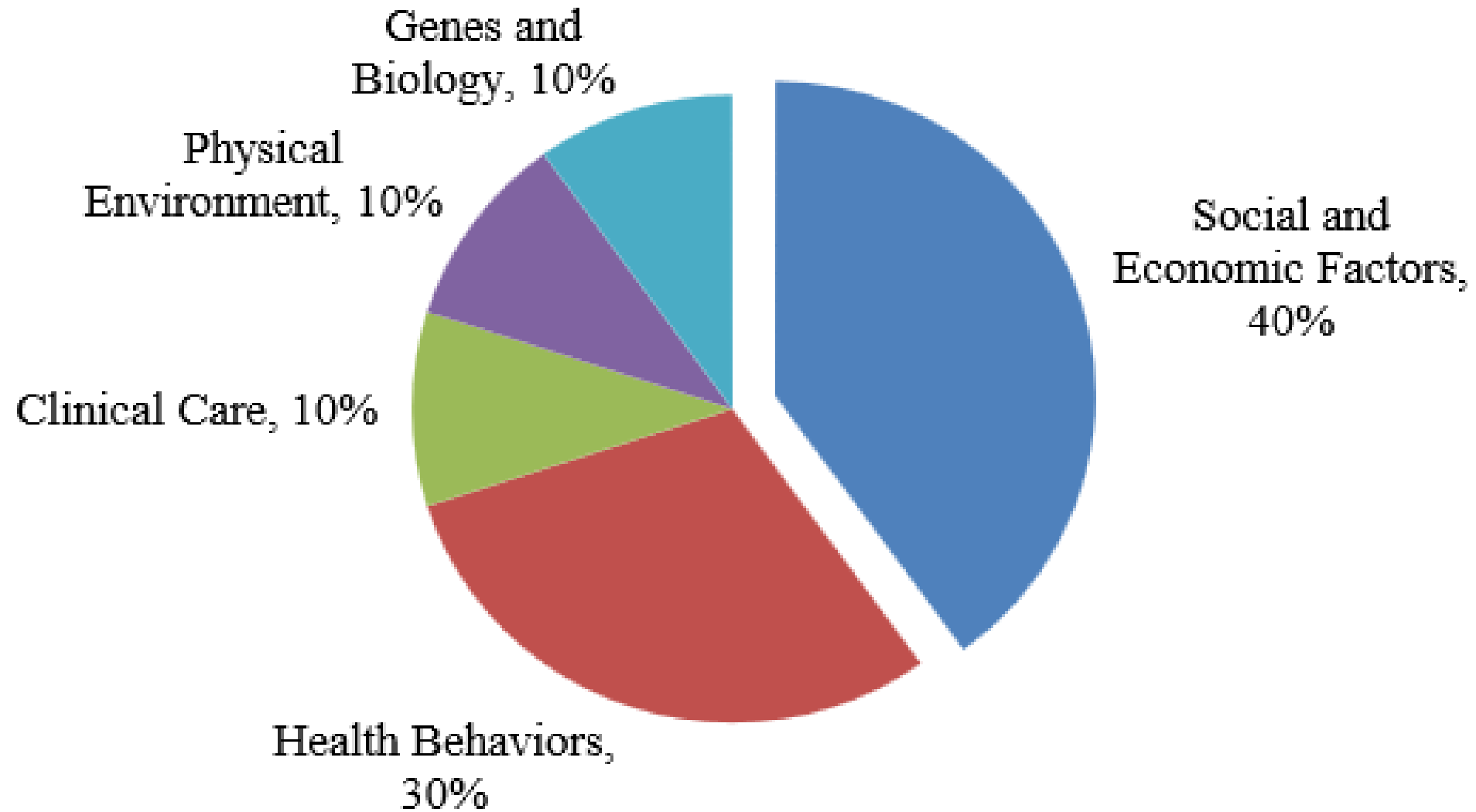
Data Source: Minnesota PRAMS

Maternal Depression

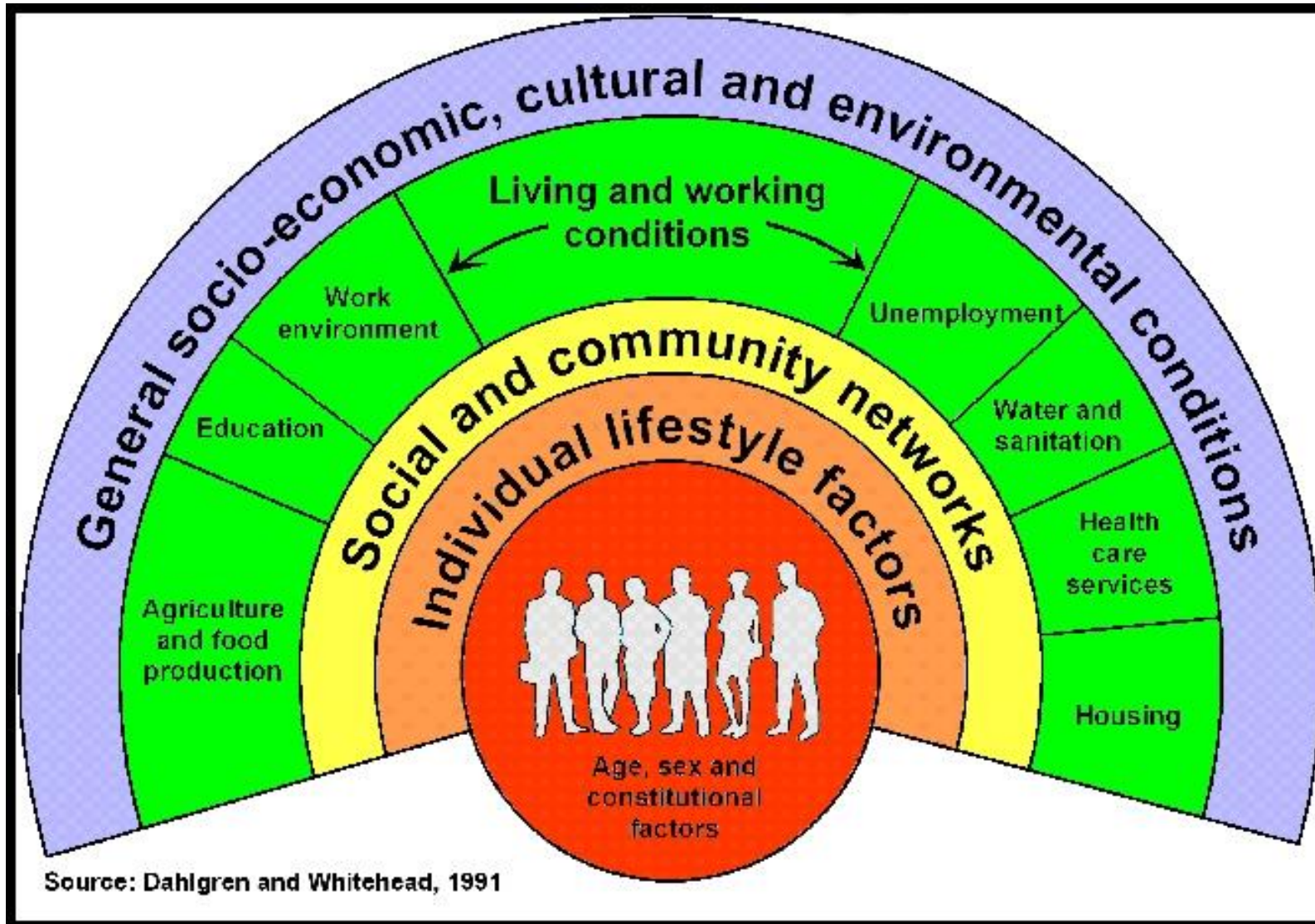
- Pregnancy – a vulnerable time for depression
- Research has demonstrated maternal depression can have a significant impact on infant development
- Prevalence of depression in pregnant and post-partum women range from 5%-25% depending on the source of the information and degree of severity. Can be:
 - Mild - Baby Blues, 50% - 80%
 - Moderate - Postpartum Depression, 10% - 20%
 - Severe - Postpartum Psychosis, 0.1% - 0.2%



Determinants of Health



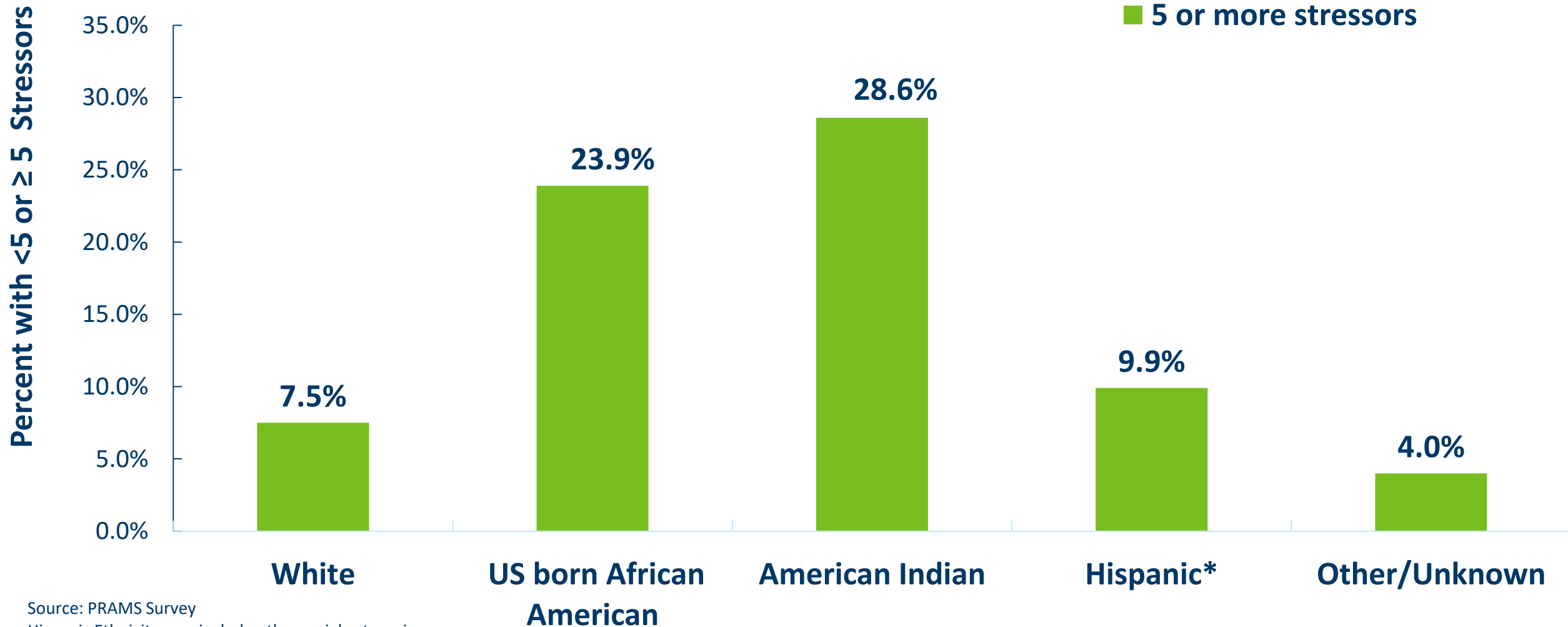
Factors that Influence on Health



Source: Dahlgren and Whitehead, 1991

Experiences During Pregnancy

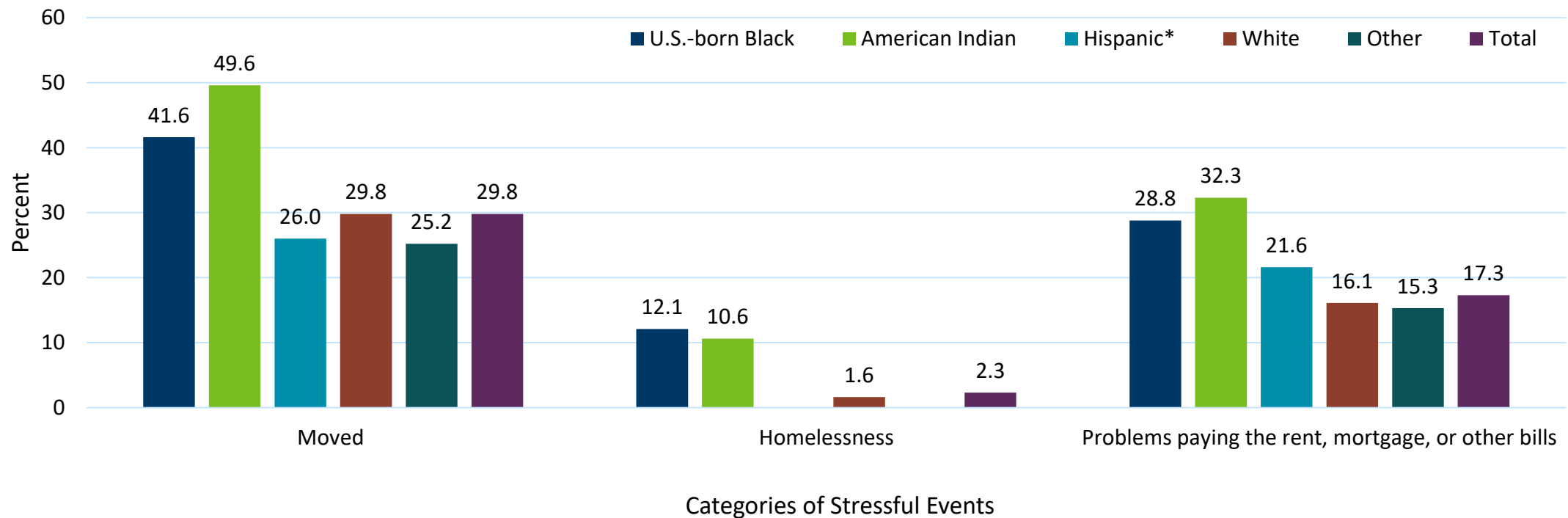
Stressors by Race/Ethnicity for pregnant women Minnesota, 2009-2013



Source: PRAMS Survey
Hispanic Ethnicity may include other racial categories

Stressful Life Events

Percentage of mothers who reported experiencing housing related stressors 12 months before the baby was born by race/ethnicity: Minnesota, 2012-2015



*Hispanic can be of any race

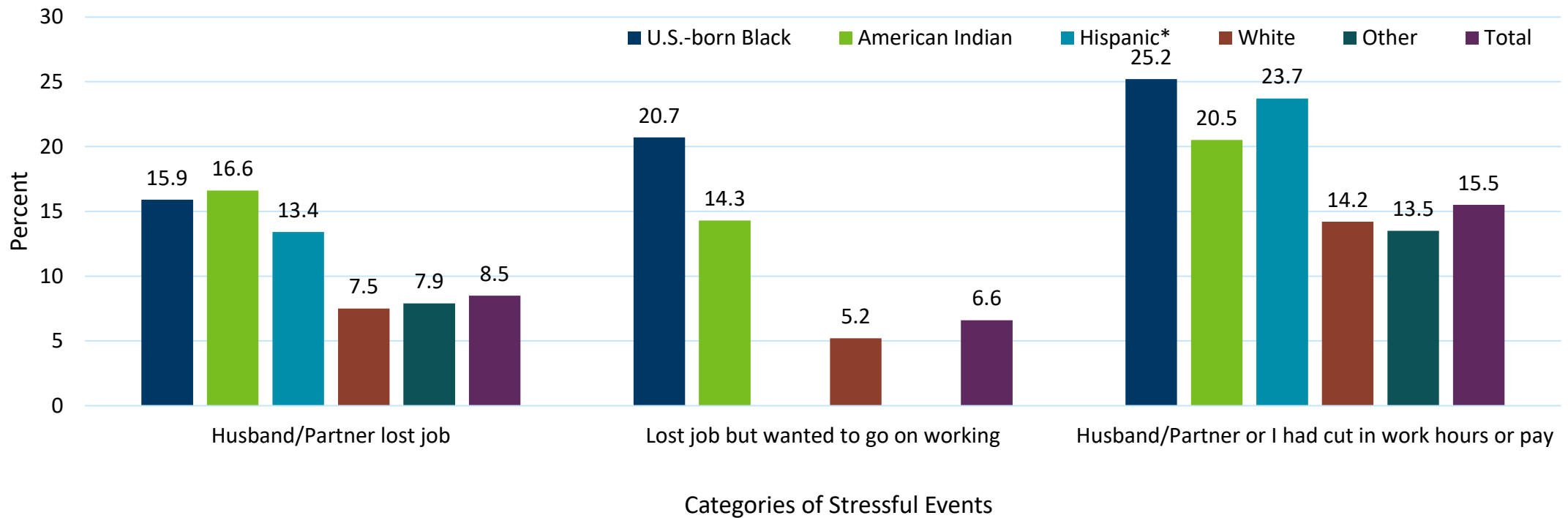
Data not shown when there are fewer than 30 cases

Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health.

Funding for MN PRAMS is made possible by grant number: 5U01DP006217-03 from the Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion

Stressful Life Events

Percentage of mothers who reported experiencing employment related stressors 12 months before the baby was born by race/ethnicity: Minnesota, 2012-2015



*Hispanic can be of any race

Data not shown when there are fewer than 30 cases

Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health.

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First Trimester Prenatal Care

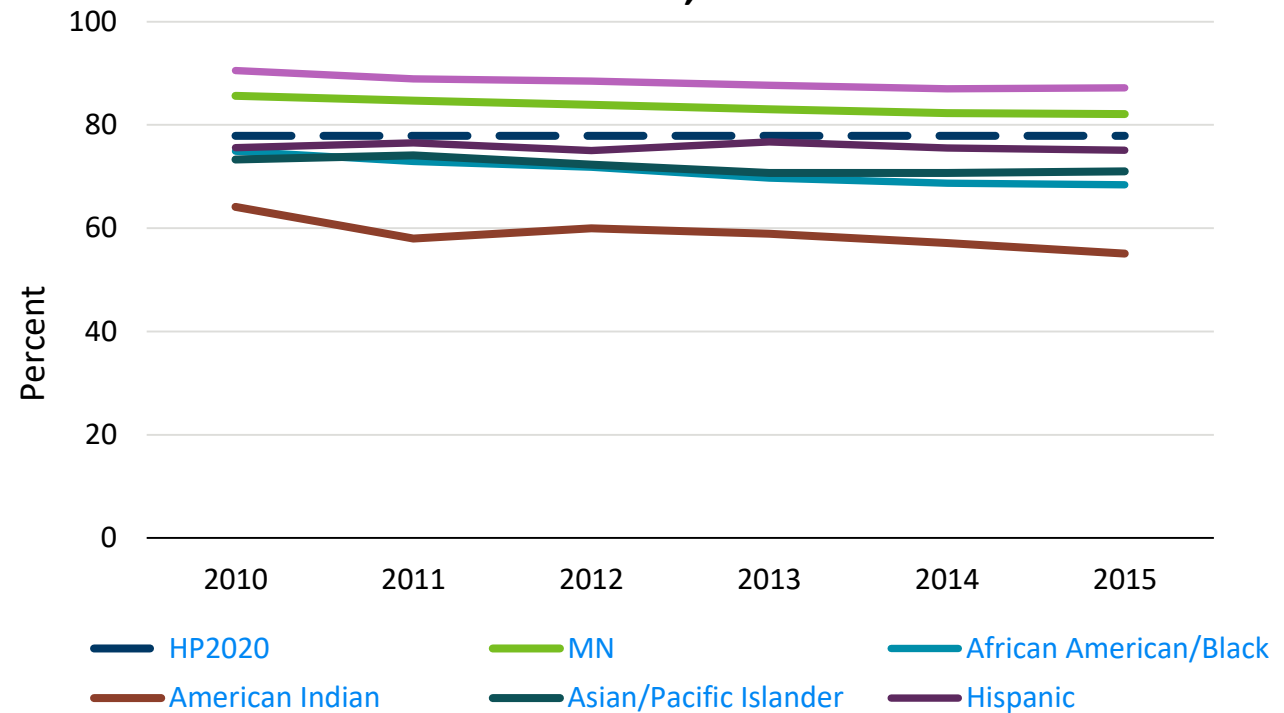
Early access:

- Healthy People 2020 goal: 77.9% of pregnant women to begin prenatal care in the first trimester
- Only non-Hispanic whites are above this HP goal



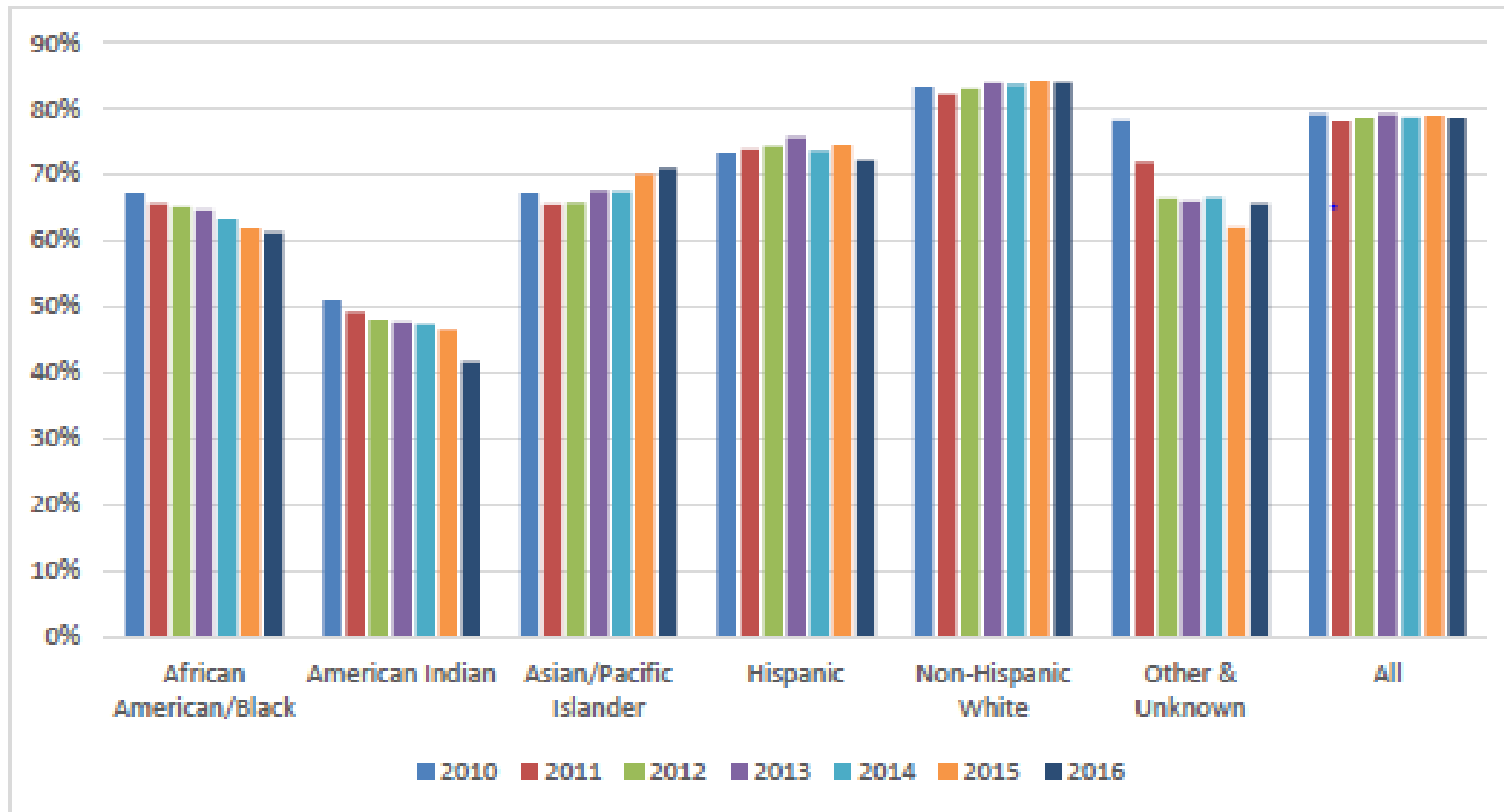
1/16/2019

Percent of Minnesota Births Starting Prenatal Care in First Trimester, 2010-2015



Source: Center for Health Statistics, Minnesota Department of Health 2010-2015

Adequacy of Prenatal Care, Minnesota 2010-2016

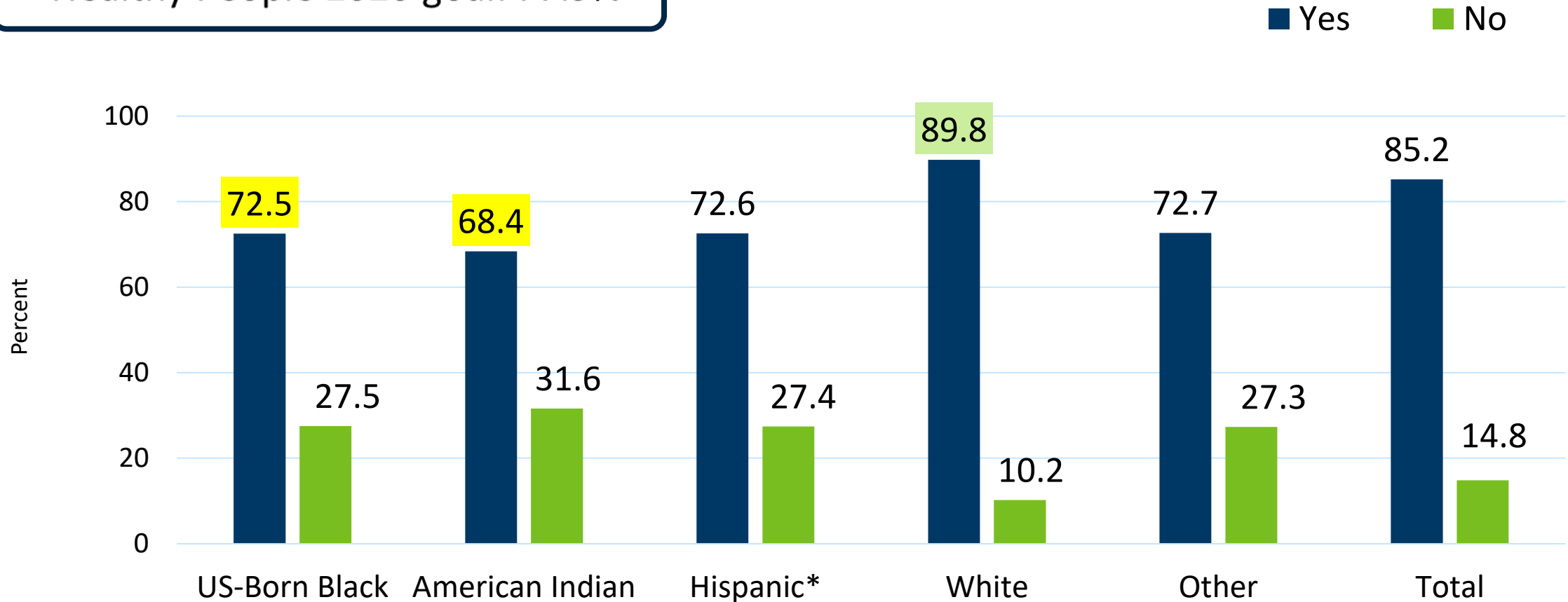


Source: Vital Records, Minnesota Department of Health, 2010-2016

Note: Race includes people identifying as single race; Hispanic includes any race; *Kotelchuck Index used to calculate adequacy and includes the number of prenatal care visits from time care began until delivery.

Percent Reporting No Prenatal Care First Trimester Minnesota, 2012-2015

• Healthy People 2020 goal: 77.9%



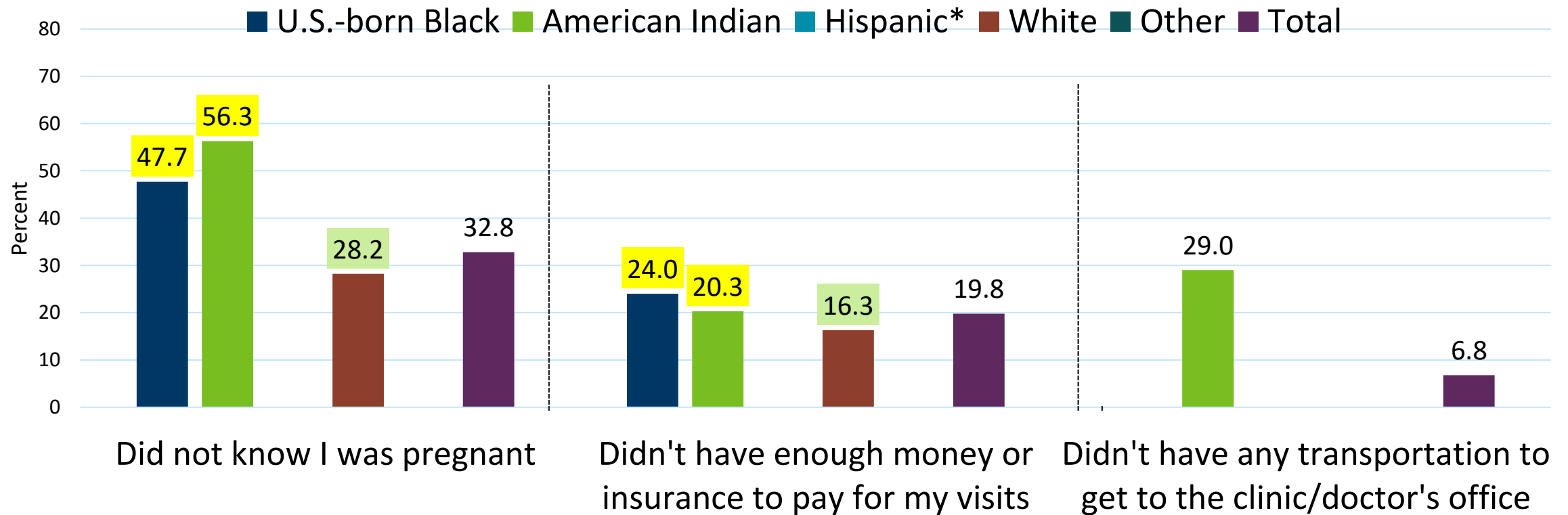
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Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health.

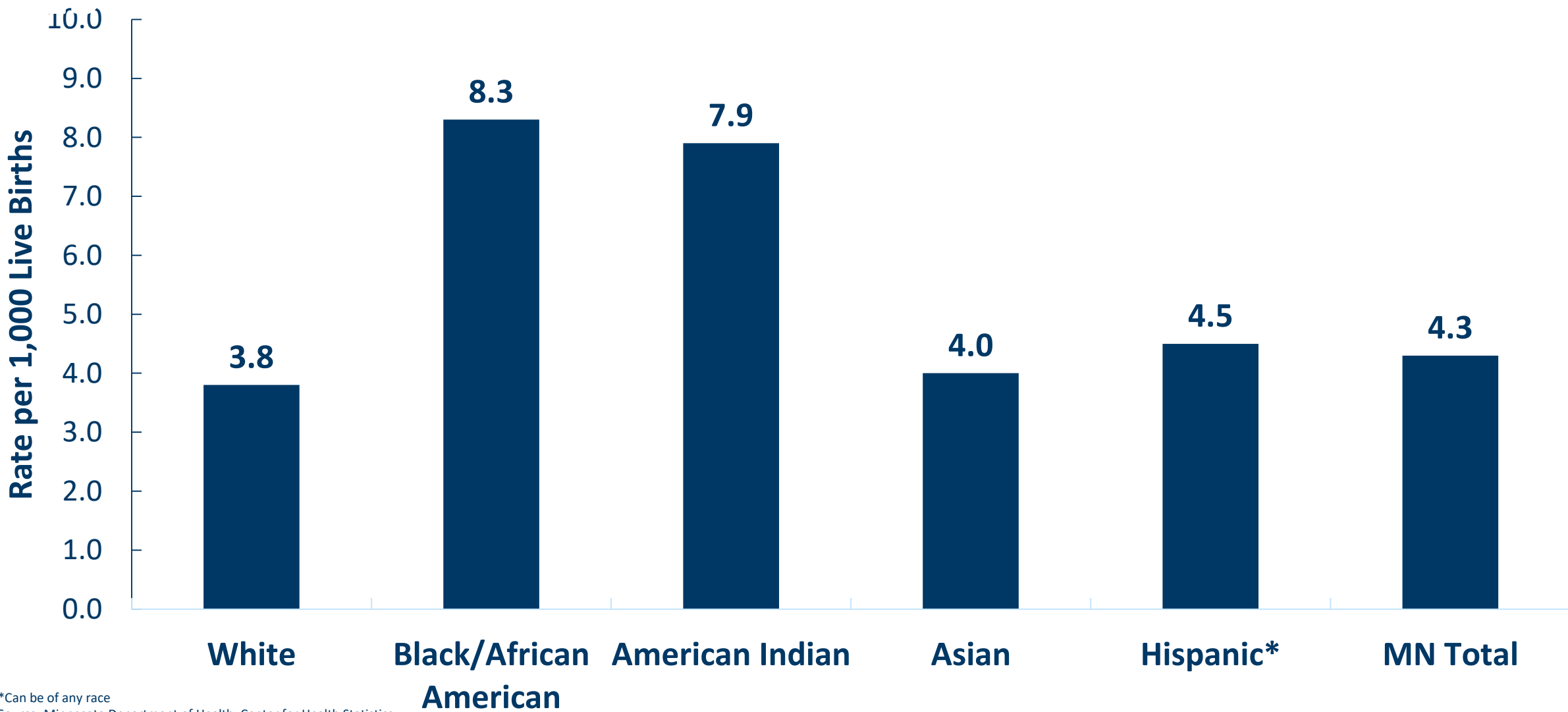
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Barriers to Prenatal Care

Percentage of mothers who reported experiencing the following barriers when trying to access prenatal care Minnesota, 2012-2015



Infant Mortality disparities persist despite first Trimester Prenatal Care Initiation, Minnesota 2009-

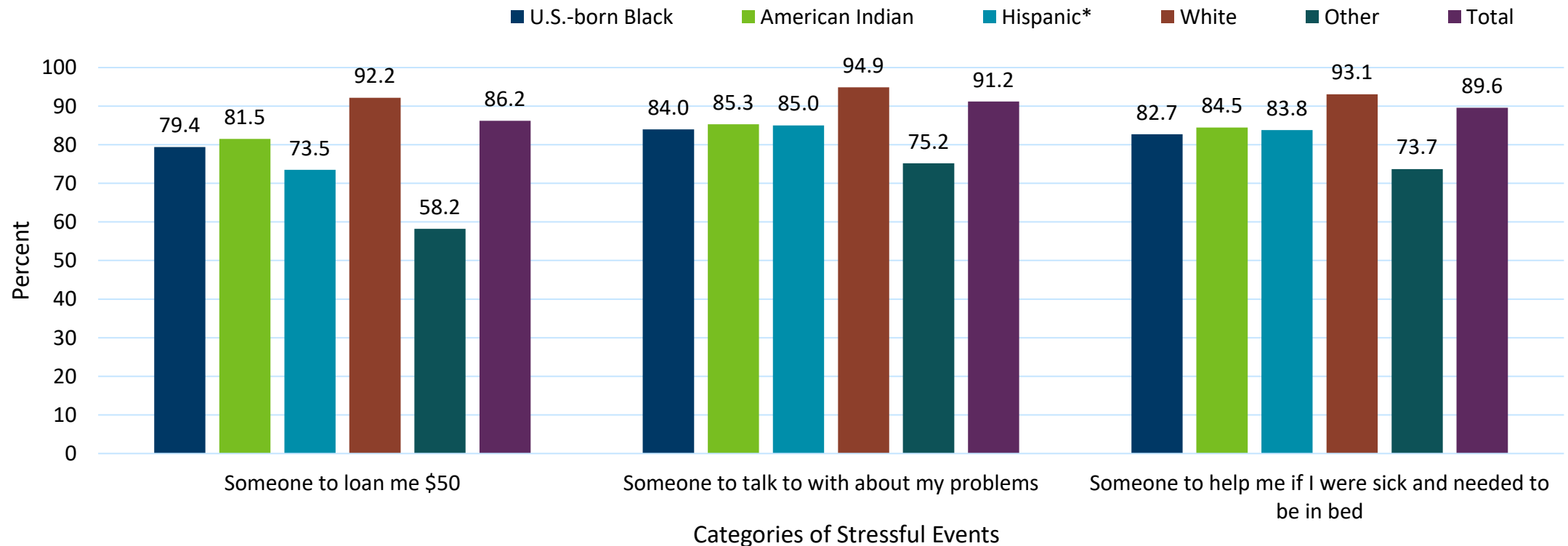


*Can be of any race
Source: Minnesota Department of Health, Center for Health Statistics

Experiences after the baby was born

Social Support After Pregnancy

Percentage of mothers who reported that they had the following types of social support after their baby was born by race/ethnicity: Minnesota, 2012-2015



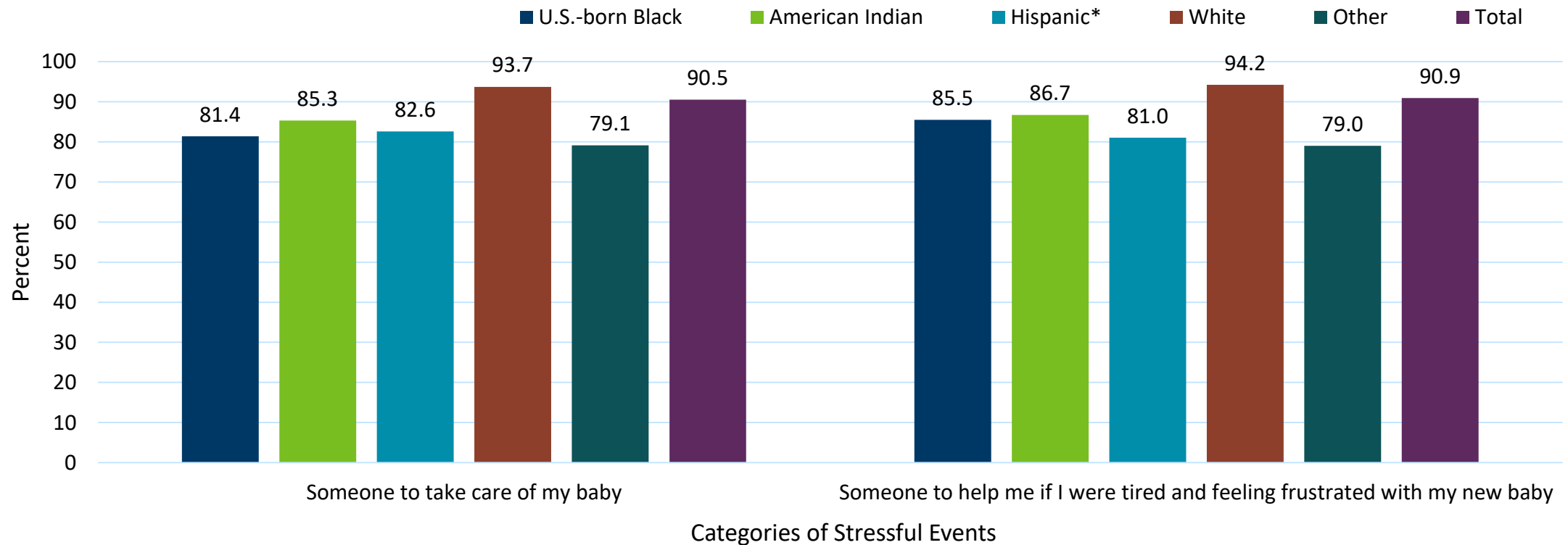
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Source: Minnesota Pregnancy Risk Assessment Monitoring System (PRAMS), Minnesota Department of Health, Division of Community and Family Health, Maternal and Child Health.

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Social Support After Pregnancy

Percentage of mothers who reported that they had the following types of social support after their most recent pregnancies months by race/ethnicity: Minnesota, 2012-2015



*Hispanic can be of any race

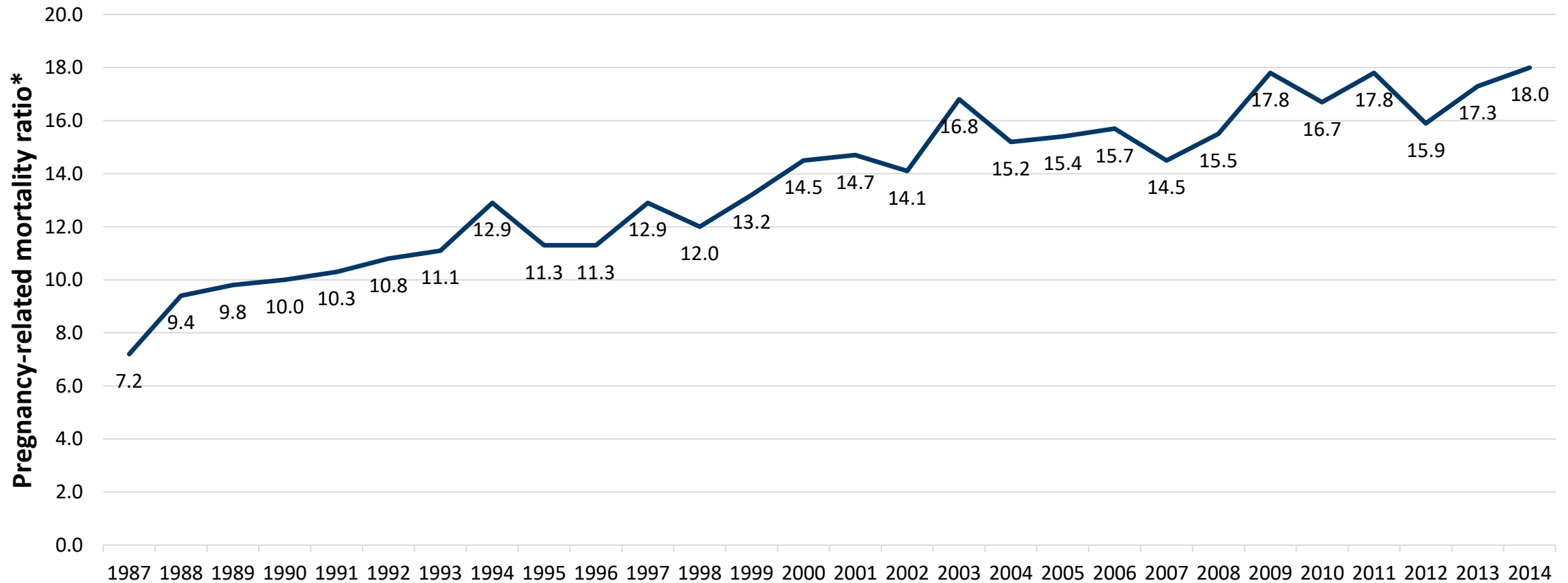
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Maternal Mortality

National Trends in Maternal Mortality

Trends in pregnancy-related mortality in the United States, 1987-2014

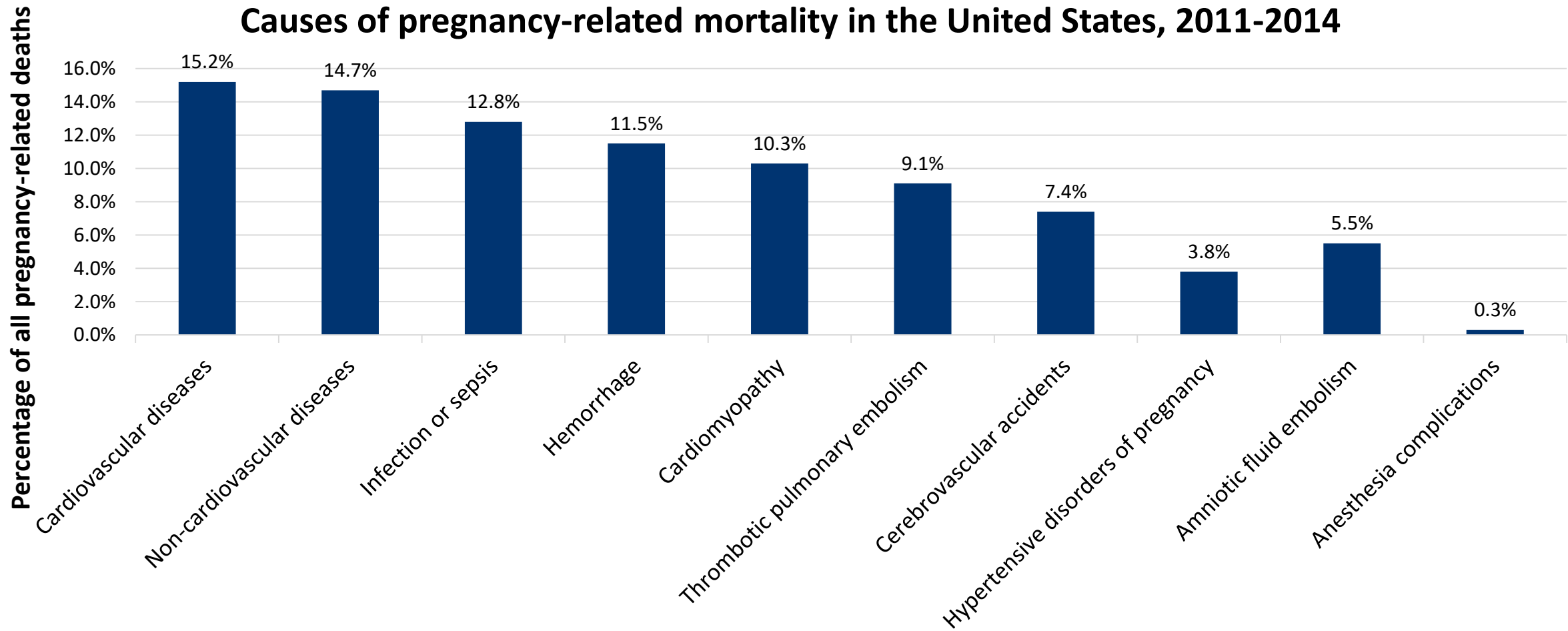


* Note: Number of pregnancy related deaths per 100,000 live births

- ACOG and CDC definitions
 - ***Pregnancy-associated death:*** The death of a woman while pregnant or within 1 year of termination of pregnancy, irrespective of cause.
 - ***Pregnancy-related death:*** The death of a woman while pregnant or within 1 year of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by her pregnancy or its management, but not from accidental or incidental causes.

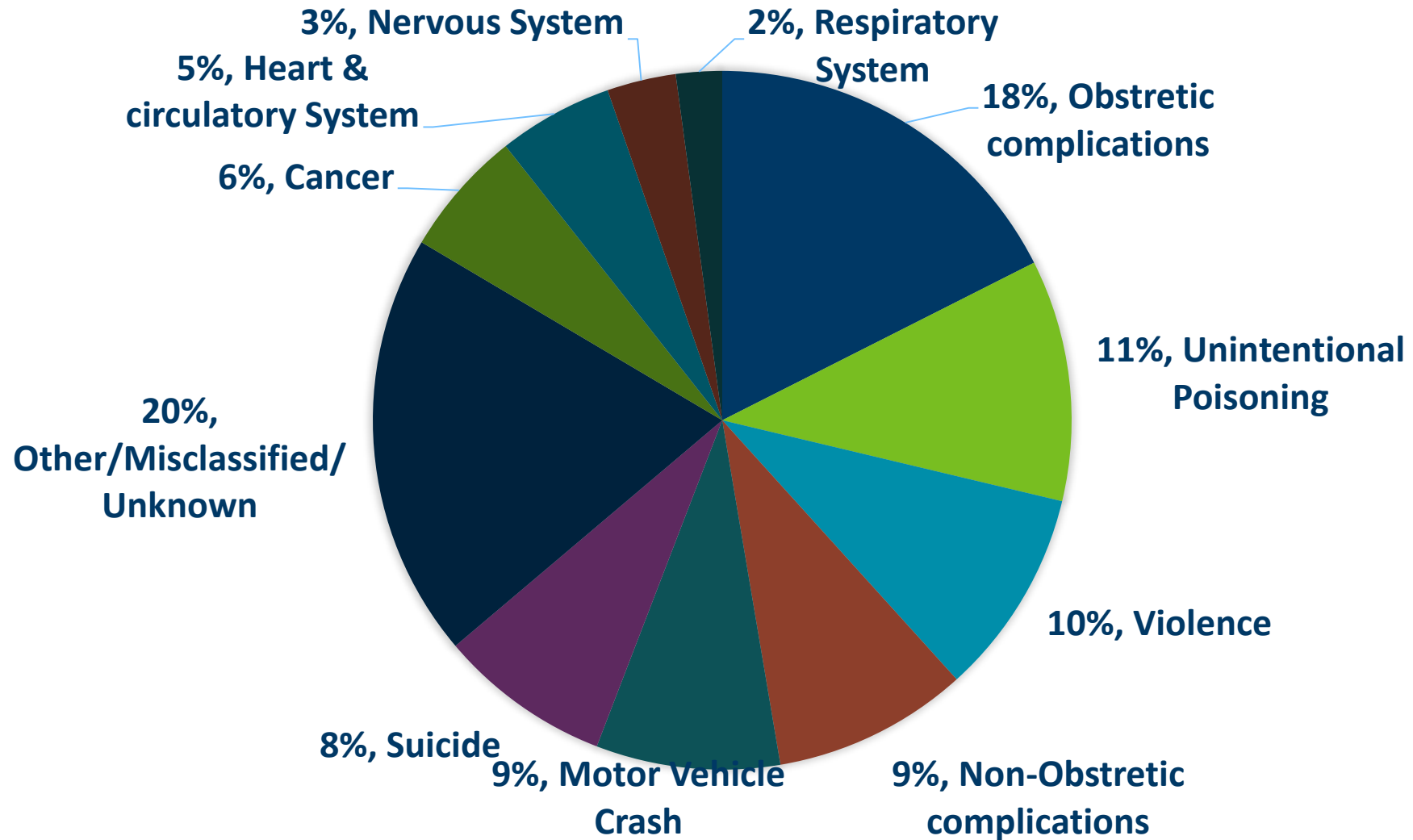
Berg, C., Danel, I., Atrash, H., Zane, S., & Bartlett, L. (2001). Strategies to reduce pregnancy-related deaths: From identification and review to action. *Centers for Disease Control and Prevention: 1-214*

National Maternal Causes of Death



* Note: The cause of death is unknown for 6.5% of all 2011-2014 pregnancy-related deaths.

Causes of Death, 2011-2017



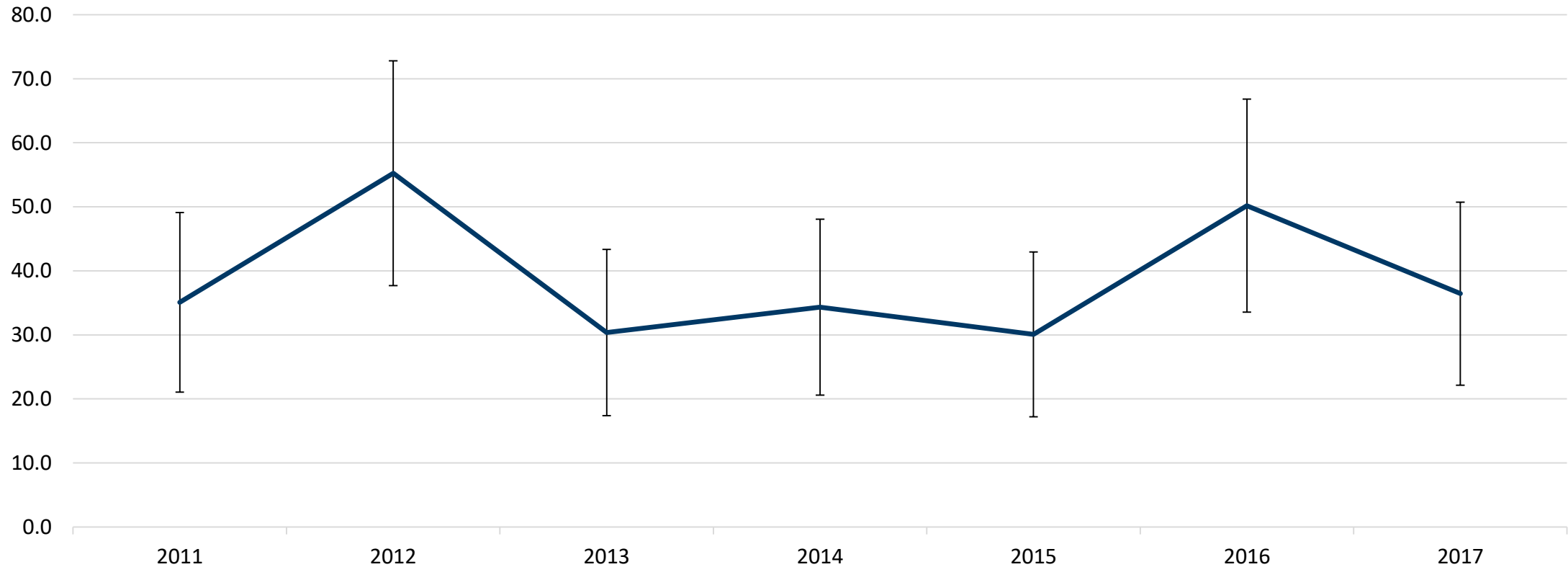
Data Source: Minnesota Department of Health, Minnesota Resident Maternal Mortality File

Minnesota Maternal Mortality Reviews

- Cases identified: check box on death certificate, clinician reporting and other
- Clinician conducts medical review of each case, develops a summary
- Review team assembles 2-3 times per year to review case summaries, identify causes, contributing factors and trends
- Some state include Morbidity reviews as well, would require statutory authority and resources to include in Minnesota

All Maternal Deaths - Preliminary

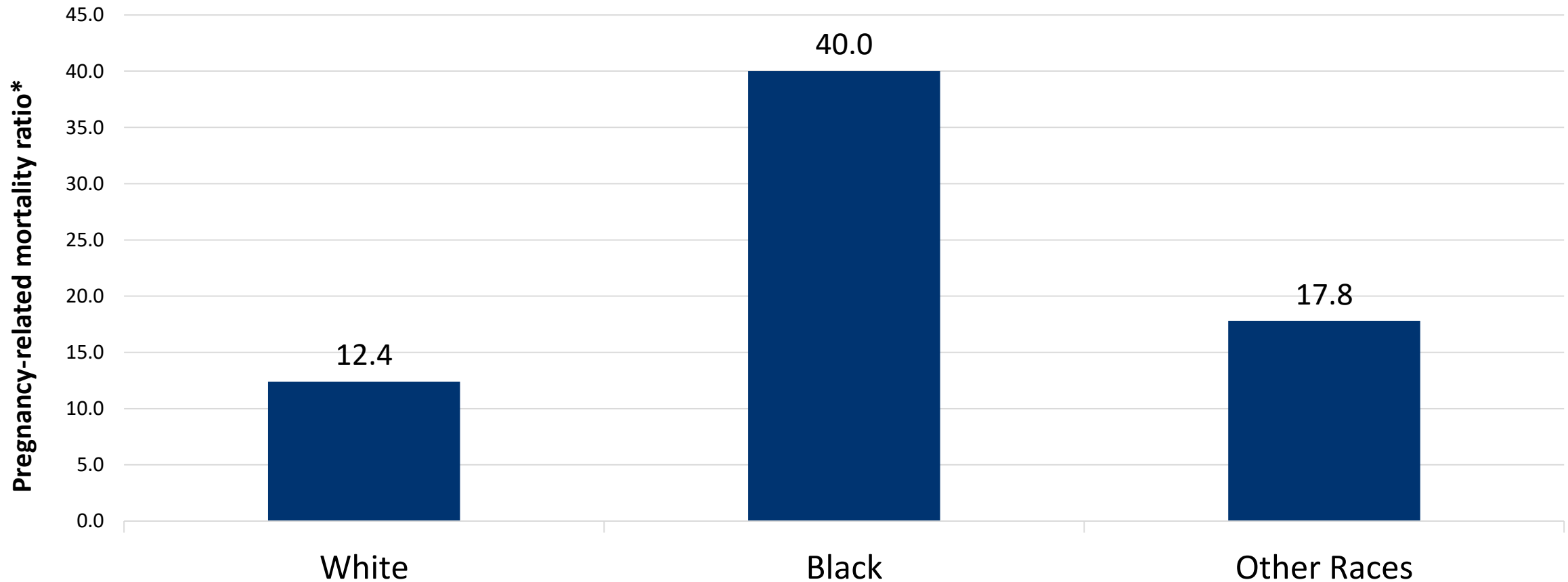
Minnesota's Maternal Mortality Rate, 2011-2017



Data Source: Minnesota Department of Health, Minnesota Resident Maternal Mortality File

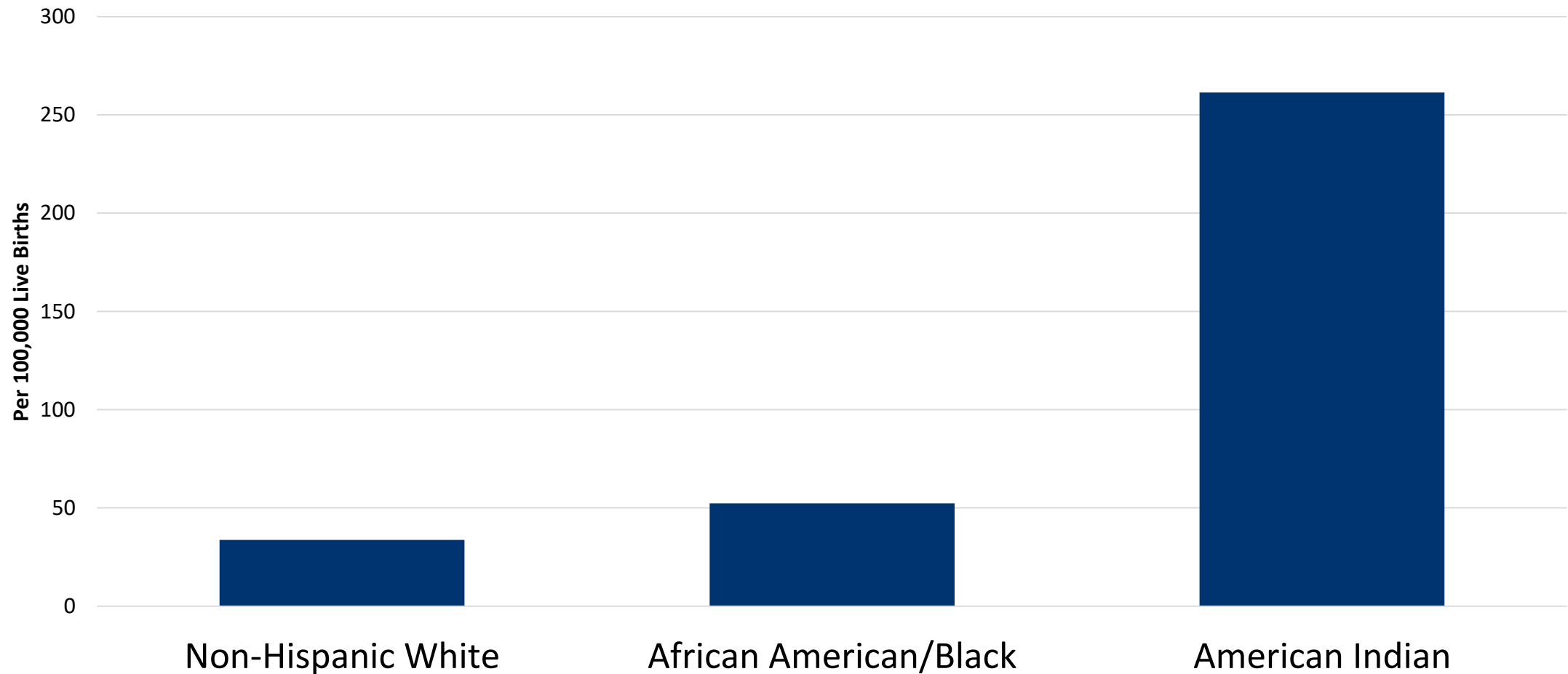
Disparities in pregnancy-related mortality, United States 2011-2015

Disparities in pregnancy-related mortality in the United States, 2011-2014



* Note: Number of pregnancy related deaths per 100,000 live births

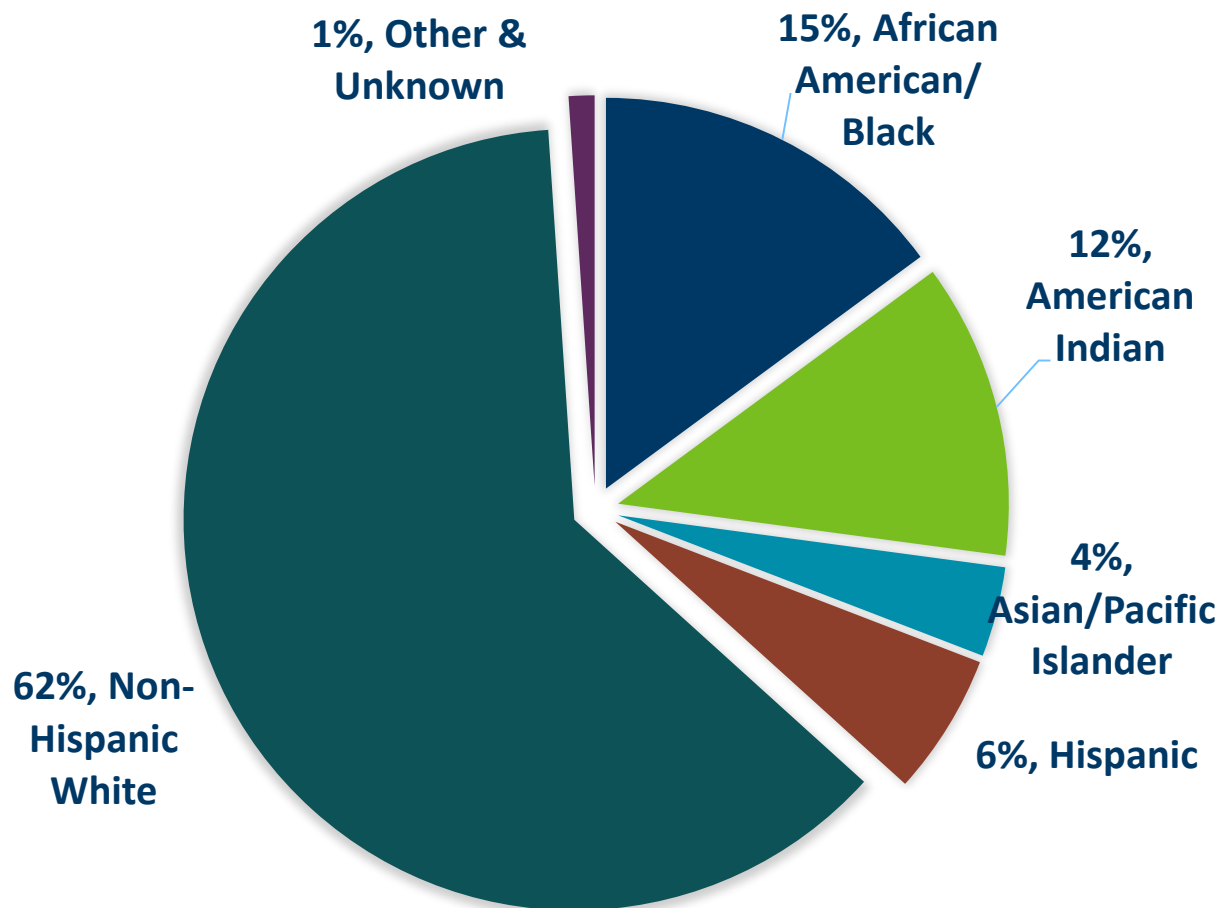
MN Maternal Mortality Rates by Race/Ethnicity 2011-2017



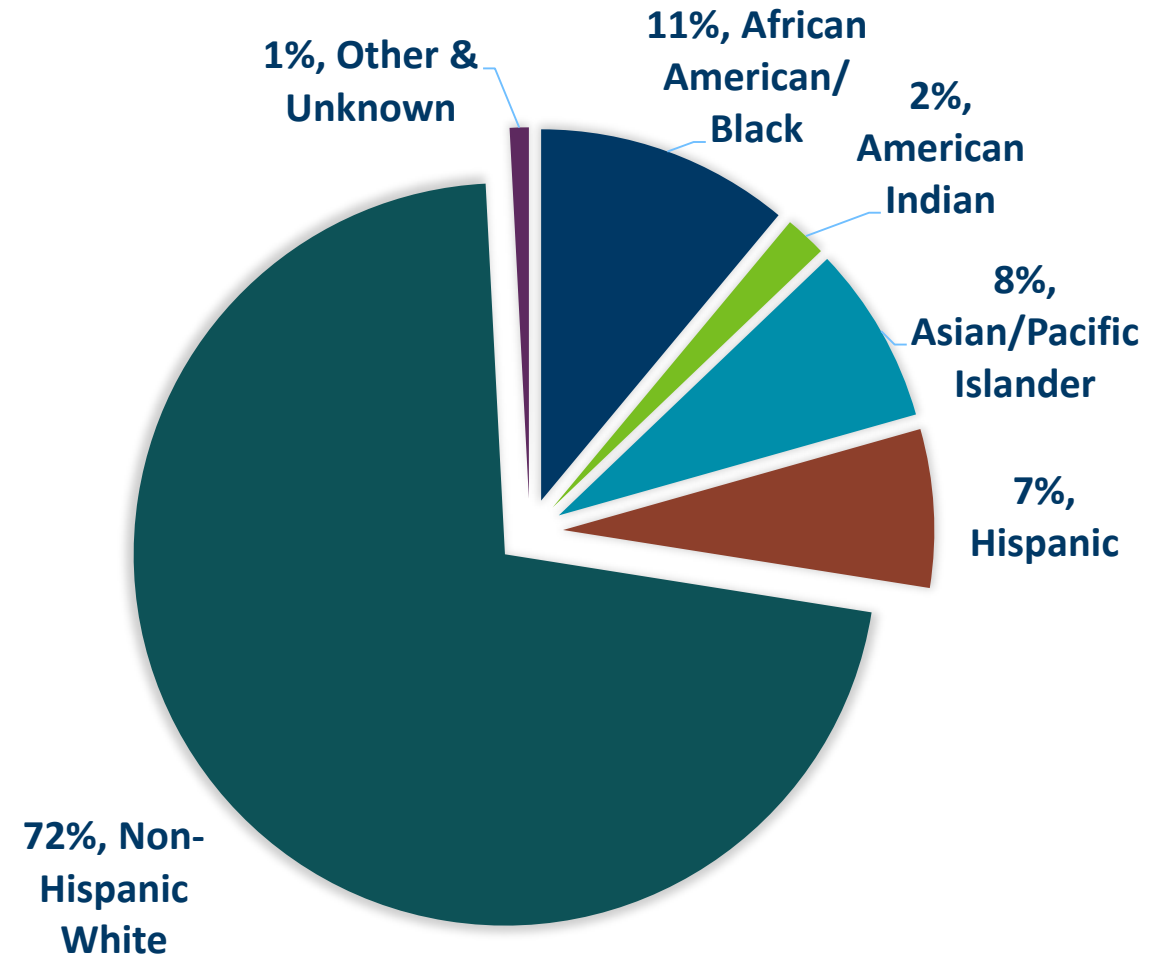
Data Source: Minnesota Department of Health, Minnesota Resident Maternal Mortality File

Maternal Mortality in Minnesota, 2011- 2017

PROPORTION OF MATERNAL DEATHS



PROPORTION OF BIRTHS



MN Place of Maternal Death, 2011-2017

Geographic Location

	Proportion of Deaths	Proportion of Births
Hennepin County	27%	24%
Ramsey County	9%	11%
Suburbs*	17%	22%
Greater Minnesota	47%	43%

*Suburbs include: Anoka, Carver, Dakota, Scott, Washington



Physical Location

- Inpatient Hospital 40%
- Hospital E.R. / Outpatient 17%
- At Home 26%
- Interstate/Hwy/Road 6%
- In transport to Hospital 1%
- Other 10%

Thank you

Susan Castellano | Maternal and Child Health Section Manager
Joan Brandt | Child and Family Health Division Director
Mira Grice Sheff | State MCH Epidemiologist, PRAMS PI
Katie Linde | Women and Infant Health Supervisor
Michelle Chiezah | Infant Mortality Specialist
Molly Meyer | Senior Research Scientist

Minnesota Department of Health
Susan.Castellano@state.mn.us
(651) 201-3872

