



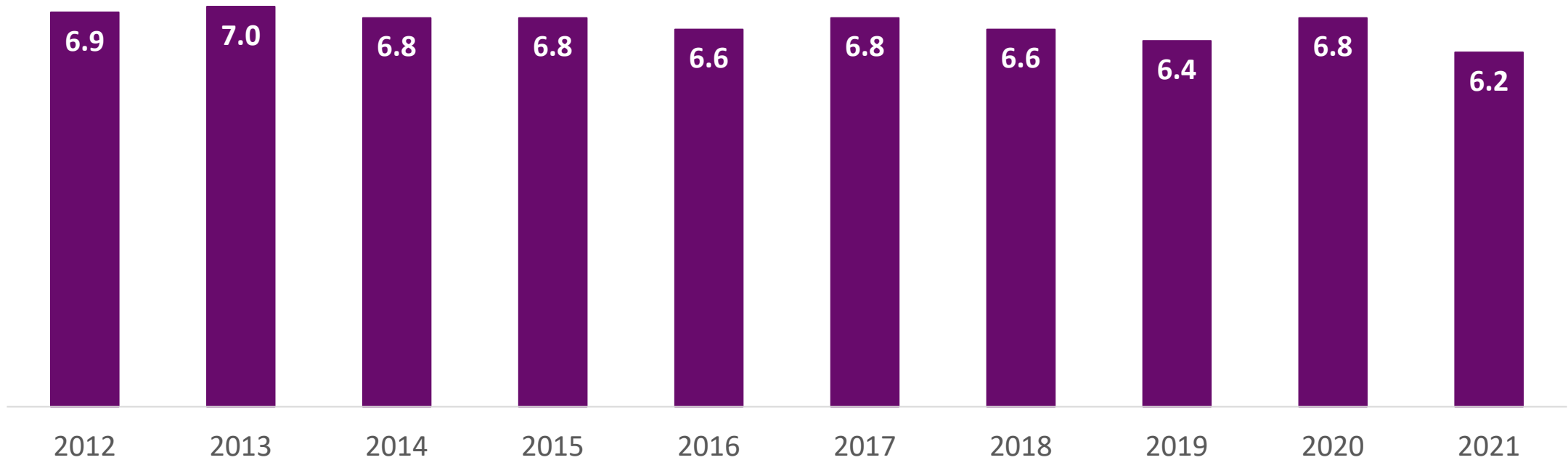
Maternal and Infant Health Statistics Michigan 2021

Prepared by Maternal and Child Health (MCH) Epidemiology Section,
Michigan Department of Health and Human Services (MDHHS)
Data source: Michigan resident live birth files (10/06/22) and infant mortality files (11/03/22),
Division for Vital Records and Health Statistics, MDHHS
July 2023

Infant Mortality Rate (IMR) 2012-2021

Infant Mortality Rate, 2012-2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.



Infant Mortality Rate by Maternal Race/Ethnicity, 2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.

Maternal Race	# Infant Deaths	# Live Births	Infant Mortality Rate (per 1,000 Live Births)
Overall	656	105,022	6.2
White Non-Hispanic	314	72,071	4.4
Black Non-Hispanic	247	18,175	13.6
Hispanic	46	7,056	6.5
American Indian	0<N<6	409	Data Not Sufficient
Asian/Pacific Islander	21	3,653	5.7

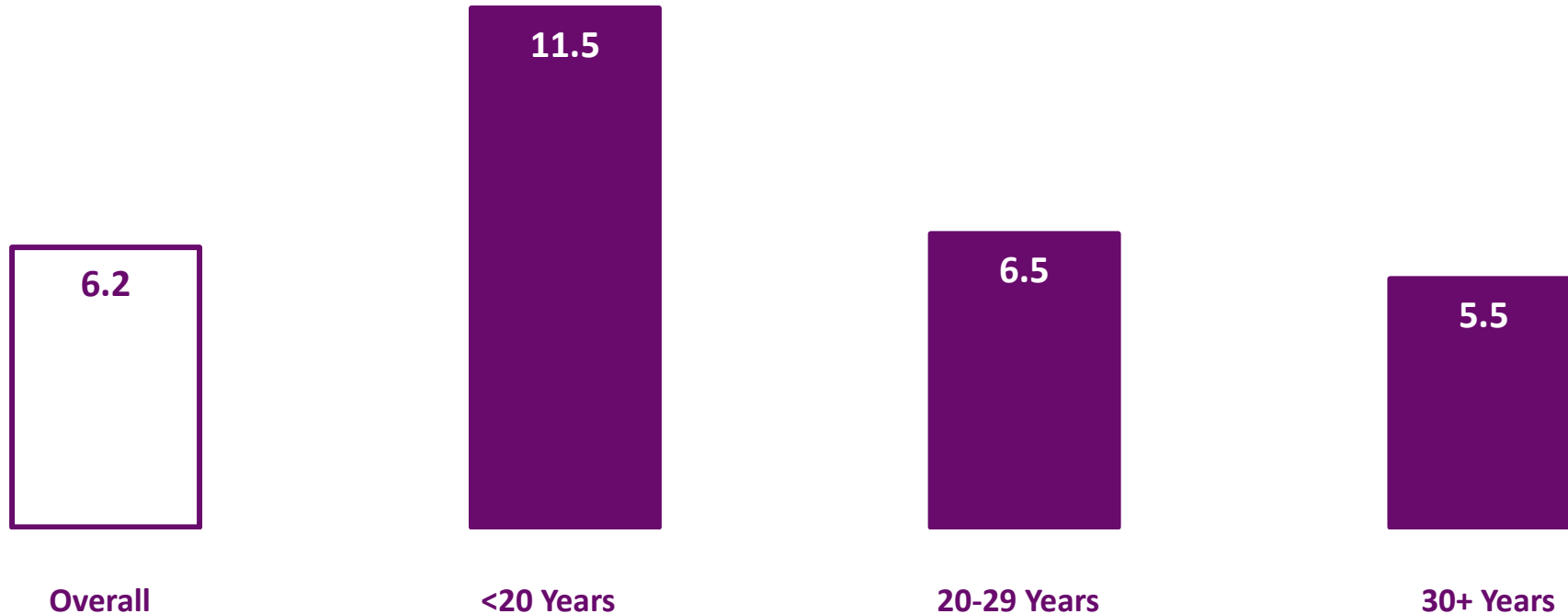
Birth Outcomes by Race/Ethnicity Michigan, 2017-2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.
Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# Live Births	# Infant Deaths	# Low Birthweight	# Preterm	IMR per 1,000 Live Births	% Low Birthweight	% Preterm
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	1,985	11	167	201	5.5	8.4%	10.1%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	3,562	20	316	368	5.6	8.9%	10.3%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e. American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	5,728	30	476	547	5.2	8.3%	9.5%

Infant Mortality Rate by Maternal Age, 2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.



Infant Deaths

656

45

326

281

Live Births

105,022

3,924

50,022

51,047

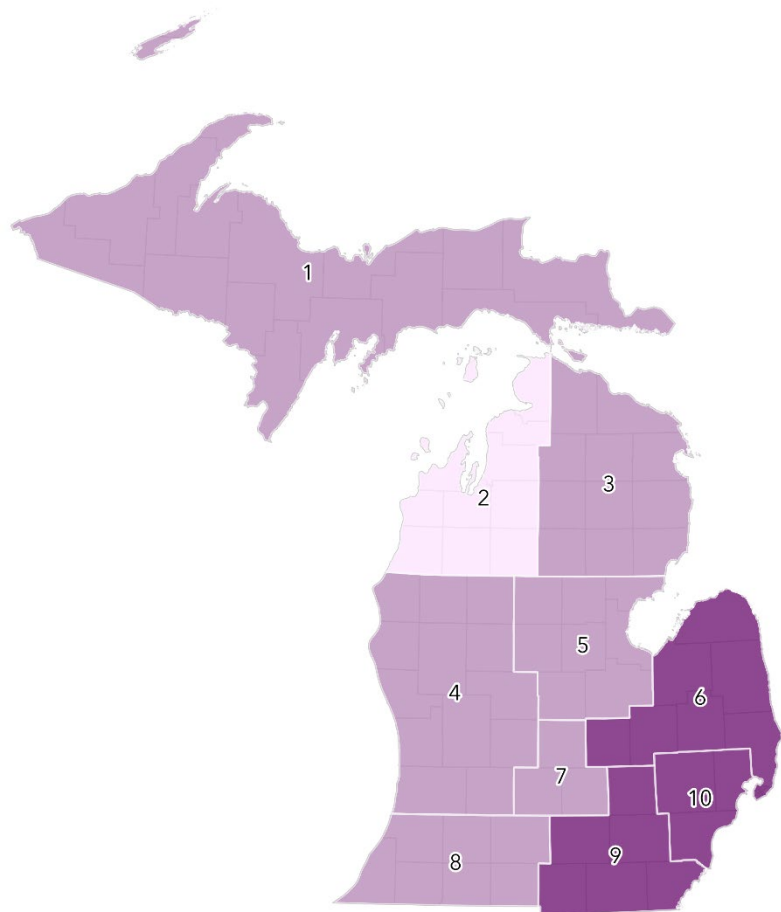
Infant Mortality Rate by Intended Payment Source, 2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.

Payment	# Infant Deaths	# Live Births		Infant Mortality Rate (per 1,000 Live Births)
Overall	656	105,022	6.2	6.2
Private Insurance	266	60,370	4.4	4.4
Medicaid	359	40,716	8.8	8.8

Infant Mortality Rate by Prosperity Region, 2021

Infant mortality is defined as a death of a baby before his or her first birthday and is expressed as a rate per 1,000 live births.

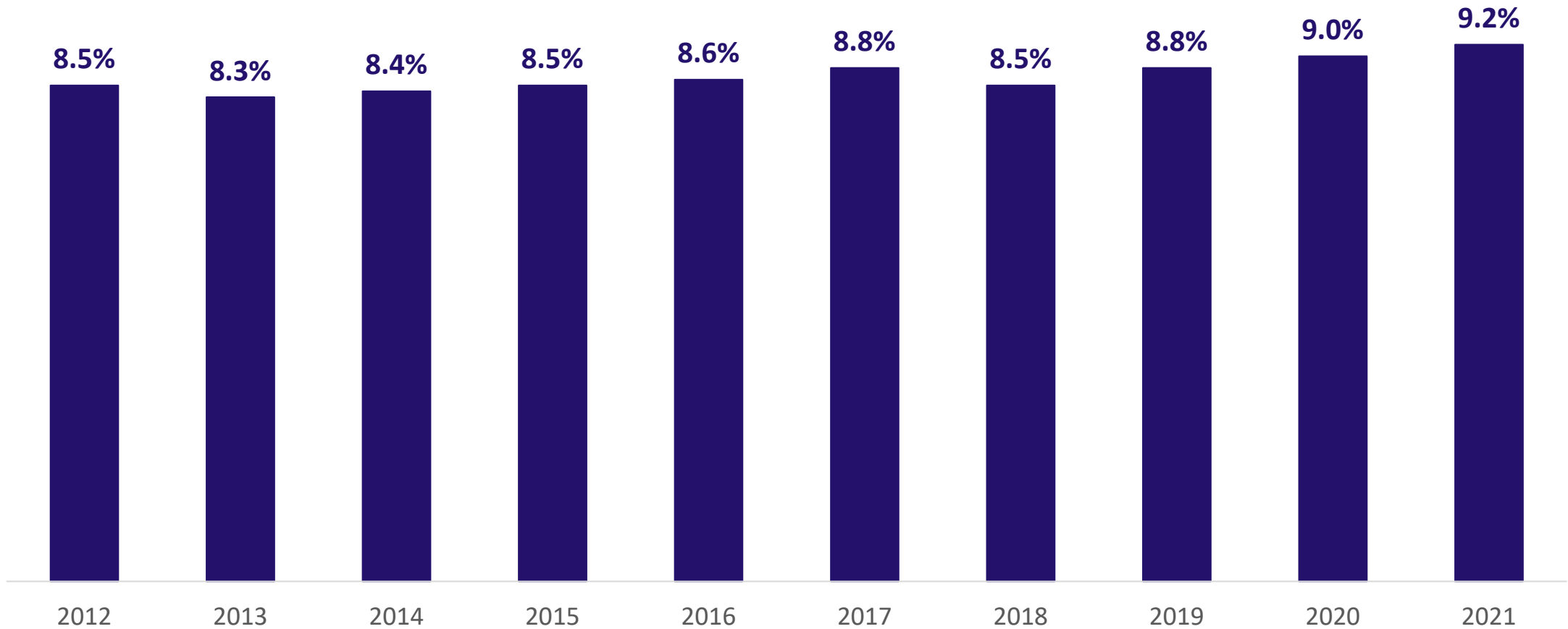


	# Infant Deaths	# Live Births	Rate per 1,000 Live Births
Overall	656	105,022	6.2
Region 1	15	2,585	5.8
Region 2	8	2,776	2.9
Region 3	8	1,714	4.7
Region 4	82	18,253	4.5
Region 5	25	5,459	4.6
Region 6	61	8,527	7.2
Region 7	25	4,651	5.4
Region 8	49	8,364	5.9
Region 9	68	9,663	7.0
Region 10	315	43,025	7.3

Low Birthweight (LBW) 2012-2021

Low Birthweight Michigan, 2012-2021

Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.



Low Birthweight by Maternal Race/Ethnicity Michigan, 2021

Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.

Maternal Race	# LBW	# Live Births	Percent (%) Low Birthweight
Overall	9,710	105,022	9.2%
White non-Hispanic	5,490	72,071	7.6%
Black non-Hispanic	2,878	18,175	15.8%
Hispanic	603	7,056	8.5%
American Indian	36	409	8.8%
Asian/Pacific Islander	363	3,653	9.9%

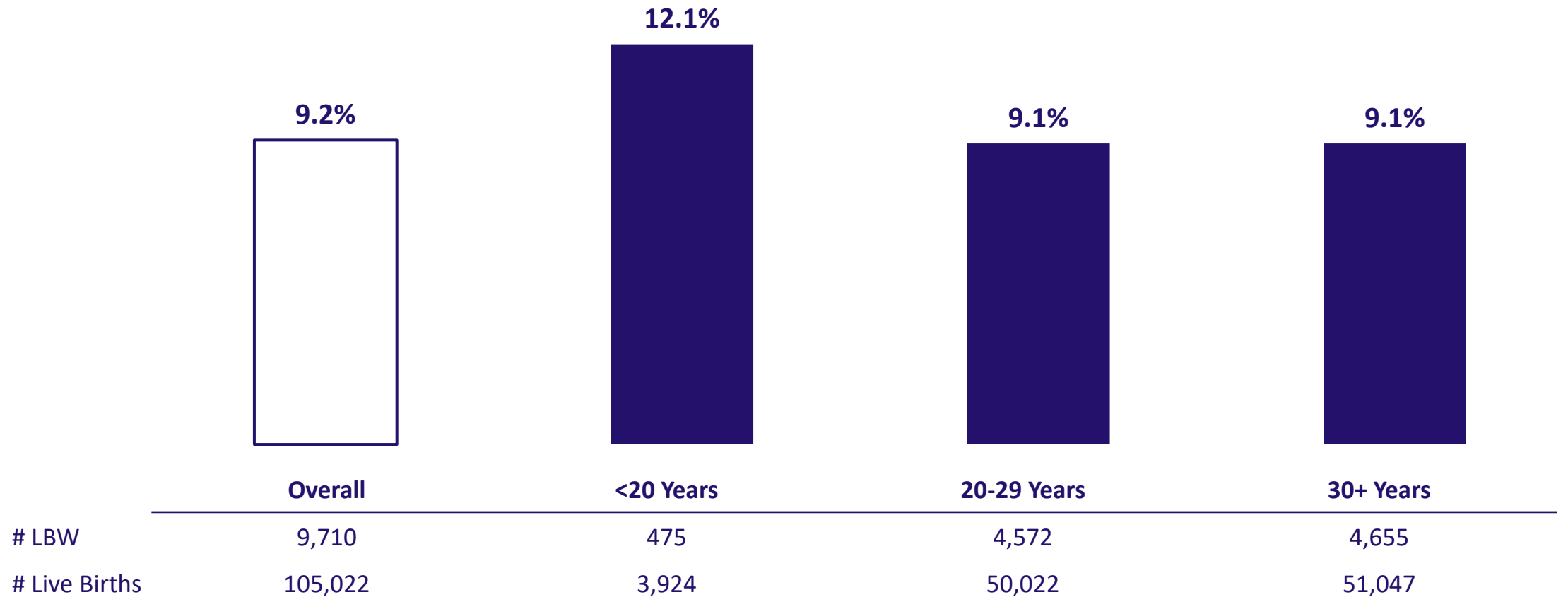
Birth Outcomes by Race/Ethnicity Michigan, 2017-2021

Low birthweight (LBW) rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.
Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# Live Births	# Infant Deaths	# Low Birthweight	# Preterm	IMR per 1,000 Live Births	% Low Birthweight	% Preterm
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	1,985	11	167	201	5.5	8.4%	10.1%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	3,562	20	316	368	5.6	8.9%	10.3%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	5,728	30	476	547	5.2	8.3%	9.5%

Low Birthweight by Maternal Age Michigan, 2021

Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.



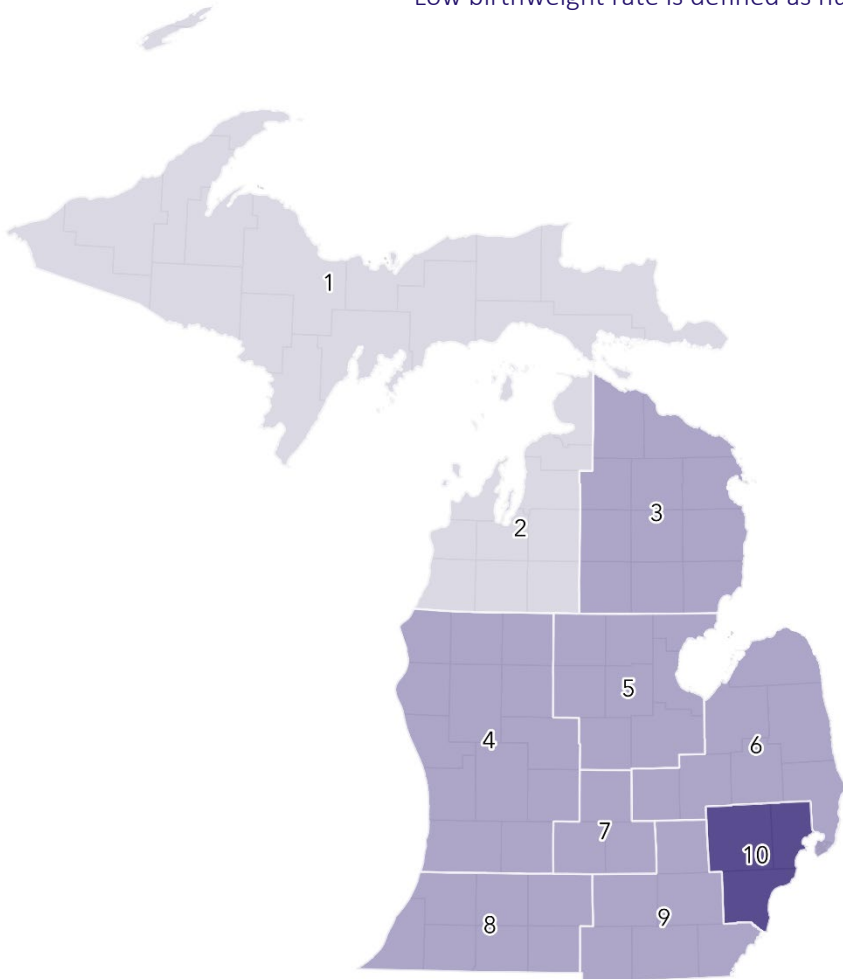
Low Birthweight by Intended Payment Source Michigan, 2021

Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.

Payment	# LBW	# Live Births	Percent (%) Low Birthweight
Overall	9,710	105,022	9.2%
Private Insurance	4,754	60,370	7.9%
Medicaid	4,710	40,716	11.6%

Low Birthweight by Prosperity Region, 2021

Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.

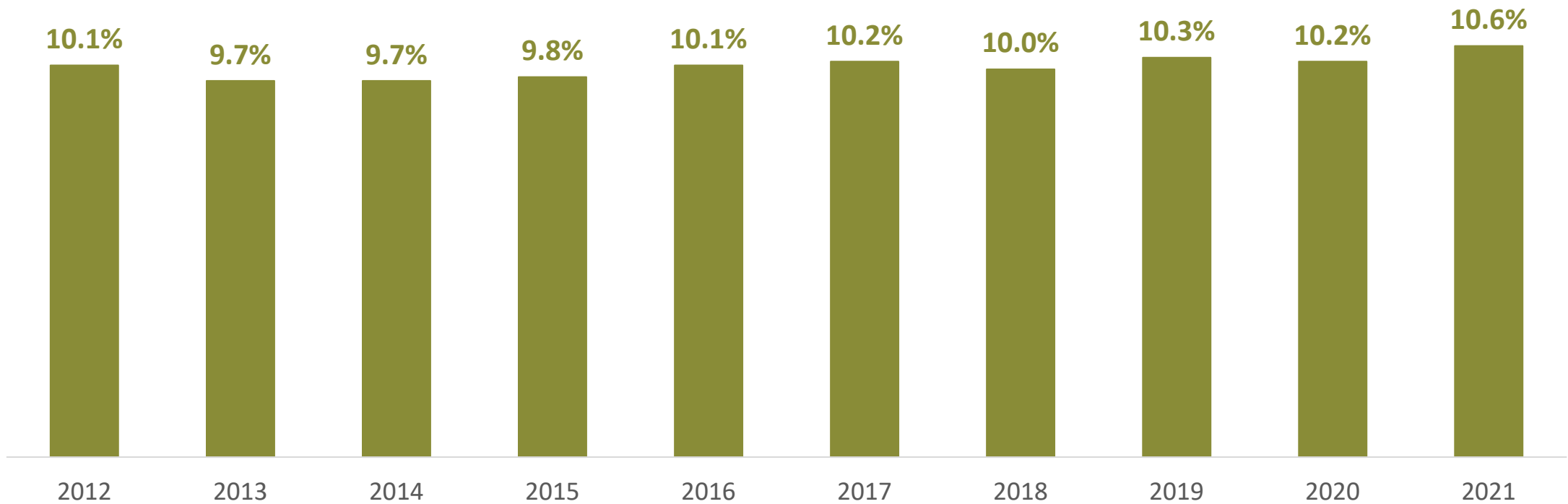


	# Low Birthweight	# Live Births	% LBW
Overall	9,710	105,022	9.2
Region 1	163	2,585	6.3
Region 2	208	2,776	7.5
Region 3	153	1,714	8.9
Region 4	1,554	18,253	8.5
Region 5	507	5,459	9.3
Region 6	751	8,527	8.8
Region 7	410	4,651	8.8
Region 8	687	8,364	8.2
Region 9	826	9,663	8.5
Region 10	4,450	43,025	10.3

Preterm Births 2012-2021

Preterm Births Michigan, 2012-2021

Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.



Preterm Birth by Maternal Race/Ethnicity Michigan, 2021

Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

Maternal Race	# Preterm	# Live Births	Percent (%) Preterm
Overall	11,124	105,022	10.6%
White non-Hispanic	6,968	72,071	9.7%
Black non-Hispanic	2,711	18,175	14.9%
Hispanic	730	7,056	10.3%
American Indian	46	409	11.2%
Asian/Pacific Islander	341	3,653	9.3%

Birth Outcomes by Race/Ethnicity Michigan, 2017-2021

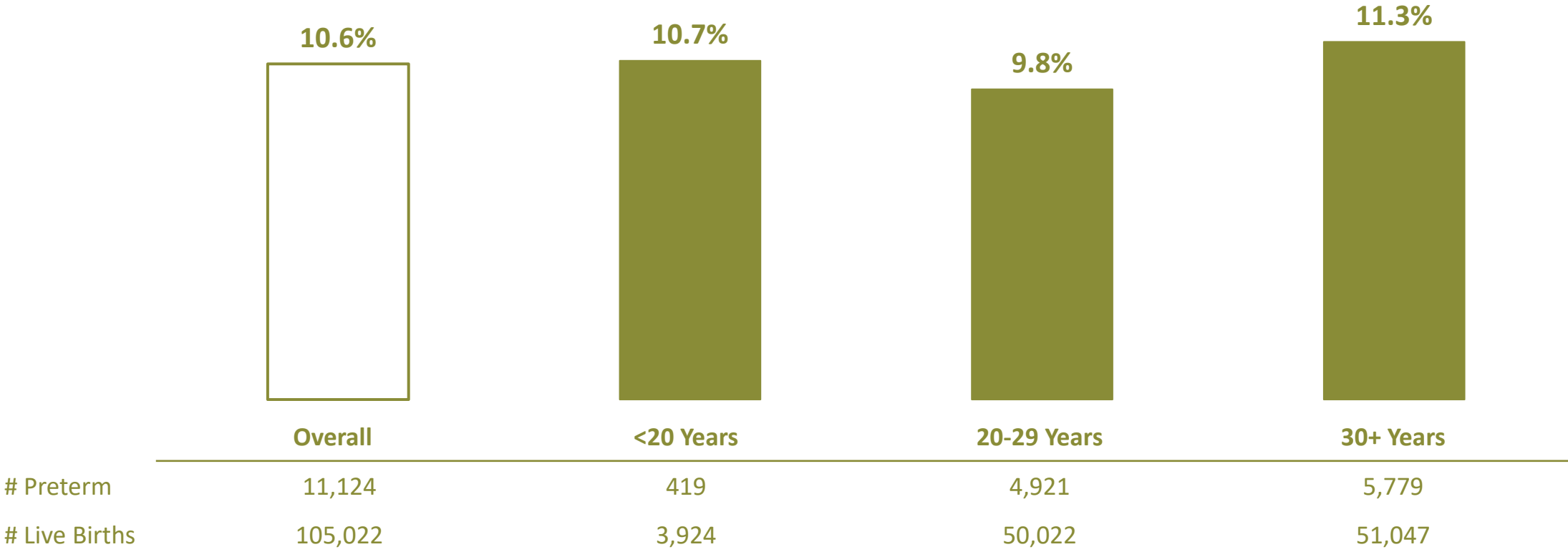
Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# Live Births	# Infant Deaths	# Low Birthweight	# Preterm	IMR per 1,000 Live Births	% Low Birthweight	% Preterm
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	1,985	11	167	201	5.5	8.4%	10.1%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	3,562	20	316	368	5.6	8.9%	10.3%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	5,728	30	476	547	5.2	8.3%	9.5%

Preterm Birth by Maternal Age Michigan, 2021

Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.



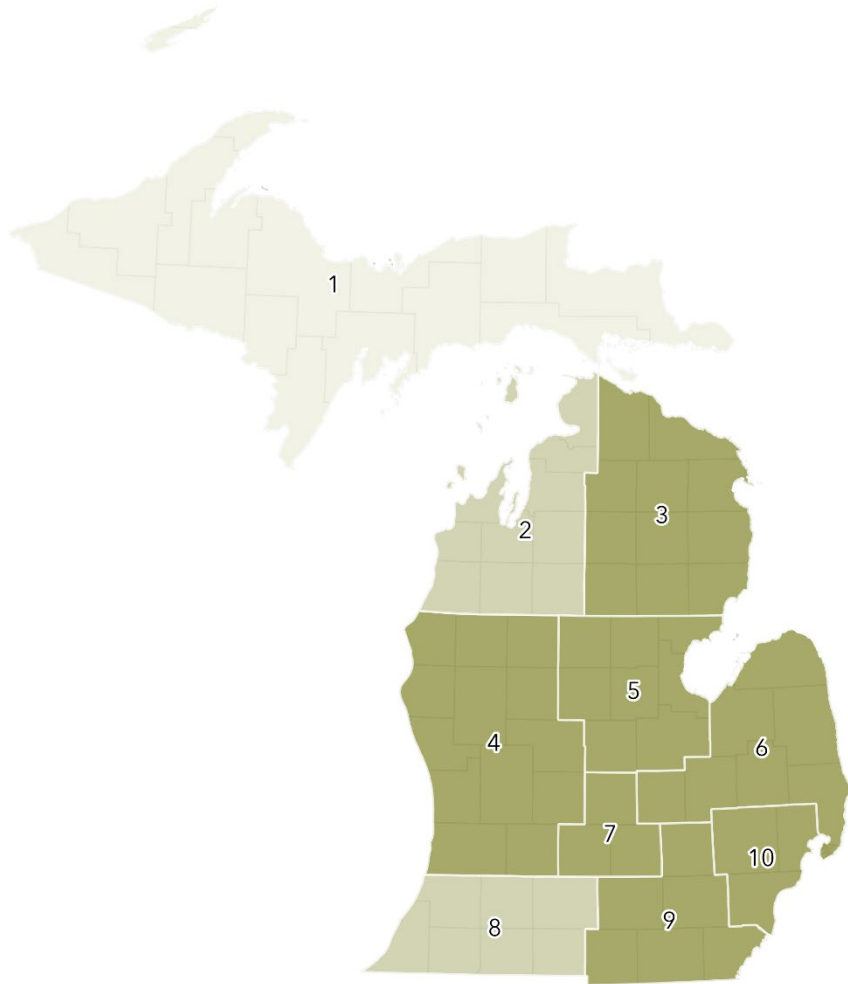
Preterm Birth by Intended Payment Source Michigan, 2021

Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

Payment	# Preterm	# Live Births		Percent (%) Preterm
Overall	11,124	105,022	10.6%	10.6%
Private Insurance	5,968	60,370	9.9%	9.9%
Medicaid	4,903	40,716	12.0%	12.0%

Preterm Birth by Prosperity Region, 2021







Preterm birth rate is defined as number of births delivered before 37 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.



	# Preterm	# Live Births	% Preterm
Overall	11,124	105,022	10.6
Region 1	204	2,585	7.9
Region 2	236	2,776	8.5
Region 3	174	1,714	10.2
Region 4	1,891	18,253	10.4
Region 5	558	5,459	10.2
Region 6	954	8,527	11.2
Region 7	489	4,651	10.5
Region 8	804	8,364	9.6
Region 9	1,010	9,663	10.5
Region 10	4,803	43,025	11.2

Smoking During Pregnancy 2021

Smoking During Pregnancy by Maternal Race/Ethnicity Michigan, 2021

Maternal Race	# Smoke During Pregnancy	# Live Births		Percent (%) Smoking During Pregnancy
Overall	11,085	105,022	10.6%	 10.6%
White non-Hispanic	8,597	72,071	11.9%	 11.9%
Black non-Hispanic	1,679	18,175	9.2%	 9.2%
Hispanic	514	7,056	7.3%	 7.3%
American Indian	139	409	34.0%	 34.0%
Asian/Pacific Islander	34	3,653	0.9%	 0.9%

Smoking During Pregnancy by Race/Ethnicity Michigan, 2017-2021

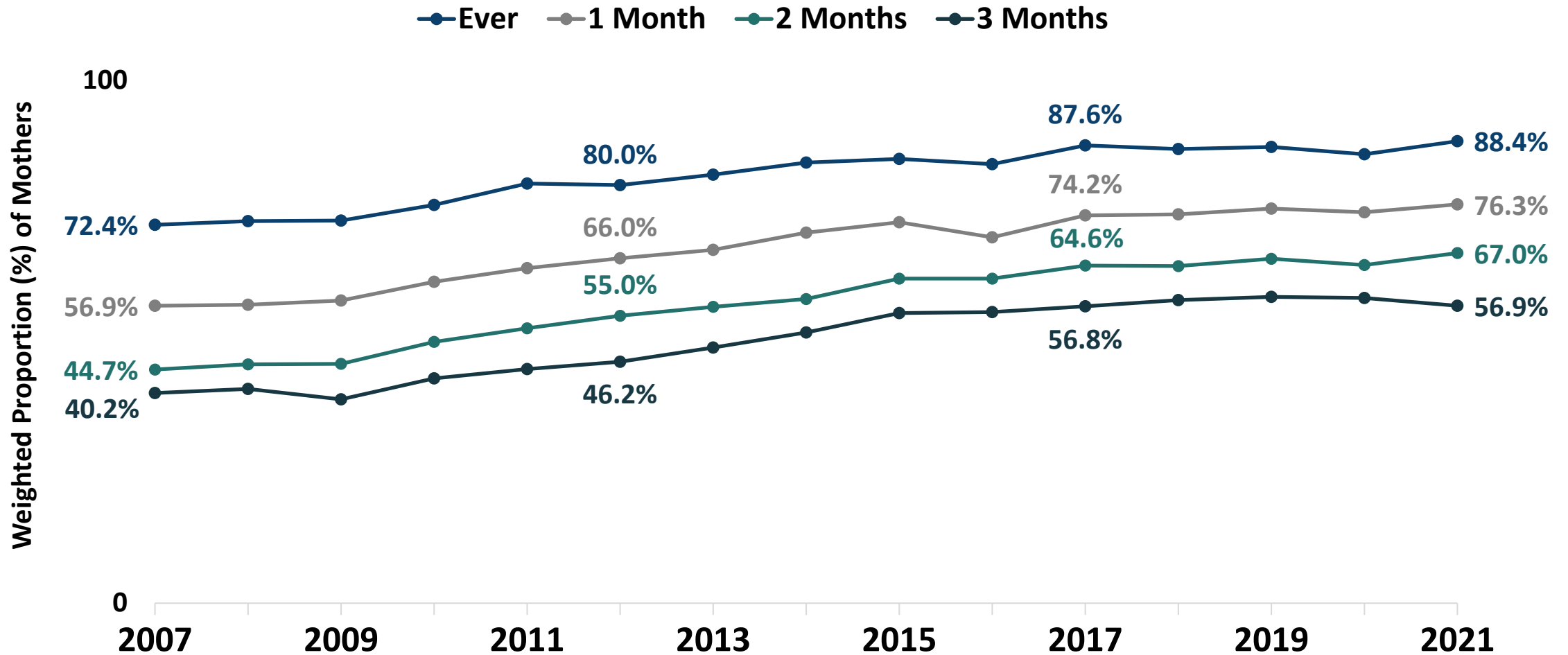
Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# Smoke during Pregnancy	# Live Births	Percent (%) Smoke during Pregnancy
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	702	1,985	35.4%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	1,111	3,562	31.2%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	1,710	5,728	29.9%

Breastfeeding Initiation and Duration 2007-2021

Breastfeeding Initiation + Duration Michigan, 2007-2021

Significance test for all linear trends: $p < 0.0001$



Late Entry into Prenatal Care 2021

Late Entry into Prenatal Care by Maternal Race/Ethnicity Michigan, 2021

Late entry into prenatal care refers to begin prenatal care in the 7th – 9th month of gestation

Maternal Race	# Late PNC	# Live Births		Percent (%) Late Entry into Prenatal Care
Overall	4,254	105,022	4.1%	4.1%
White non-Hispanic	2,687	72,071	3.7%	3.7%
Black non-Hispanic	811	18,175	4.5%	4.5%
Hispanic	418	7,056	5.9%	5.9%
American Indian	26	409	6.4%	6.4%
Asian/Pacific Islander	141	3,653	3.9%	3.9%

Late Entry into Prenatal Care by Race/Ethnicity Michigan, 2017-2021

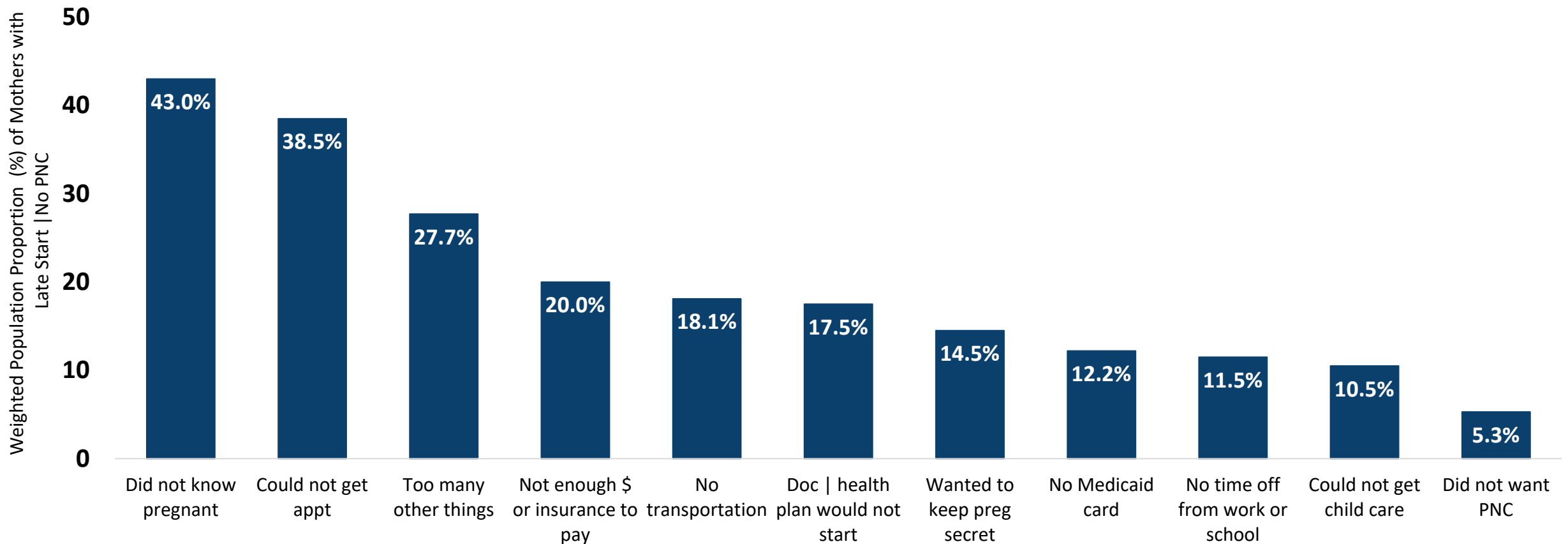
Late entry into prenatal care refers to begin prenatal care in the 7th – 9th month of gestation
Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# Late Prenatal Care	# Live Births	Percent (%) Late Prenatal Care
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	119	1,985	6.0%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	188	3,562	5.3%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	273	5,728	4.8%

**Barriers to Prenatal Care
Michigan
2016-2021**

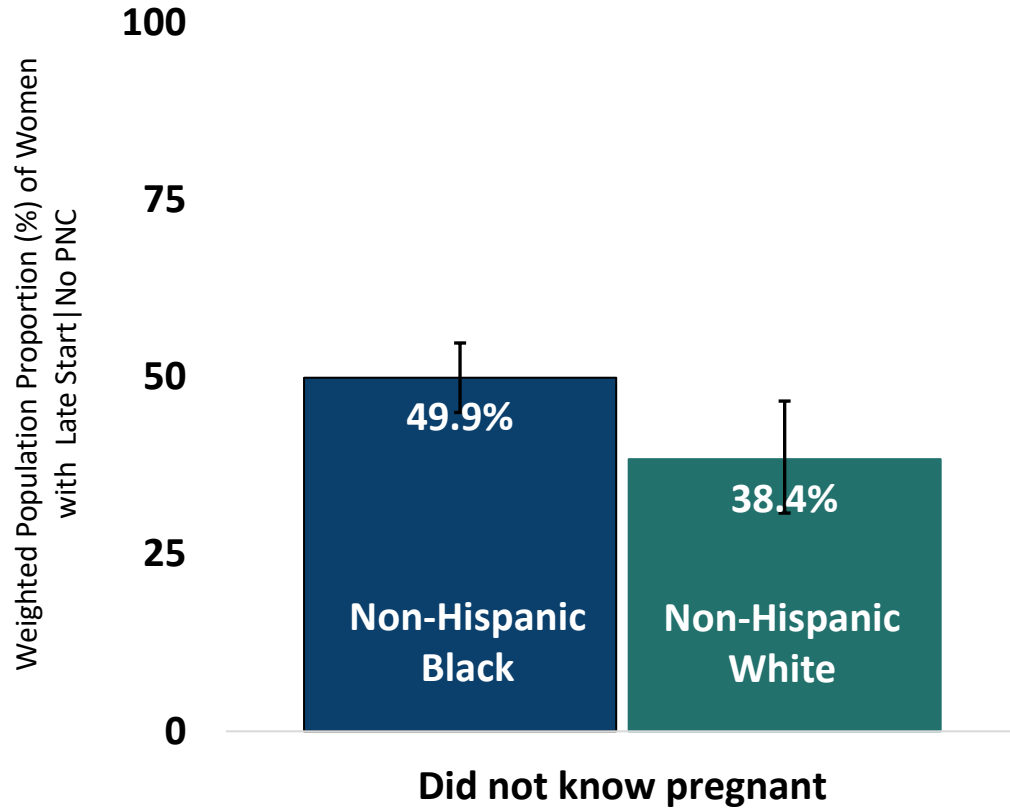
Barriers to Prenatal Care among Mothers who started PNC *after* 1st trimester and wanted to start sooner, 2016-2021

Around half (51.7%) of mothers who started PNC after the first trimester were okay with that timing.

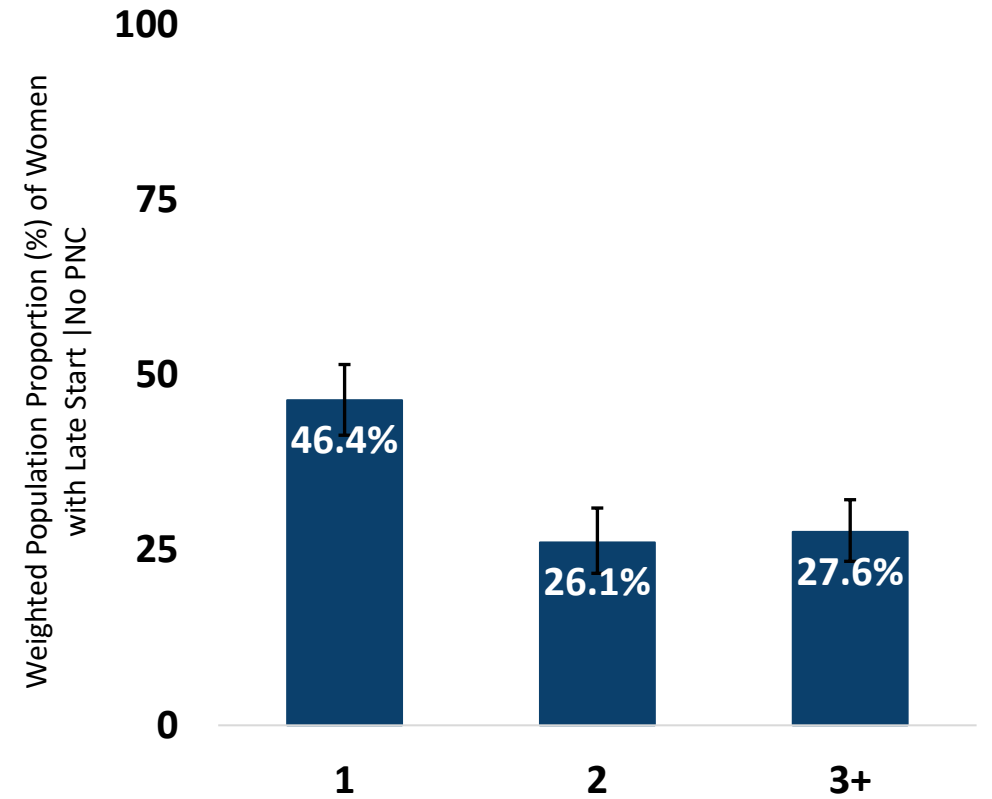


Barriers to Prenatal Care among Mothers who started PNC *after* 1st trimester and wanted to start sooner, 2016-2021

Selected Barriers with Significant Differences by Maternal Race/Ethnicity



Number of Barriers among Mothers with Late | No PNC



Neonatal Abstinence Syndrome (NAS) 2012-2021

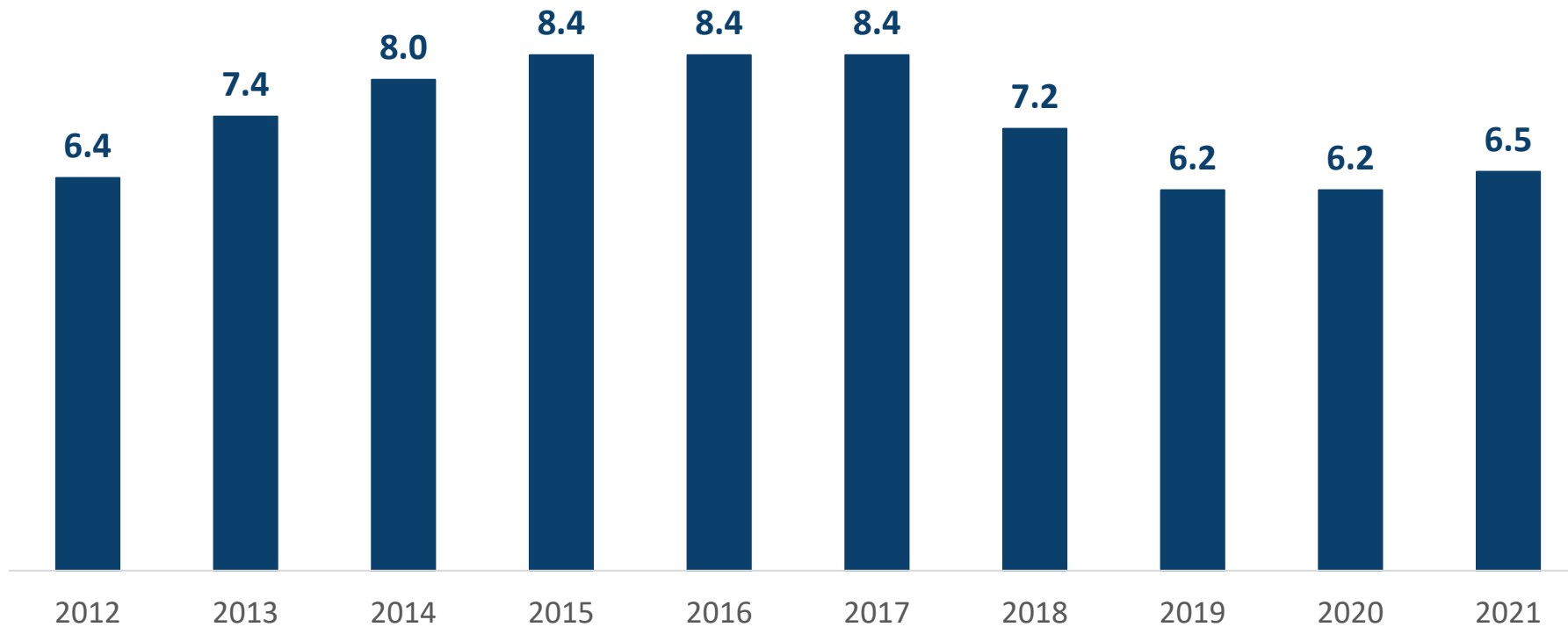
About the Data

1. NAS cases are identified by diagnosis code (ICD-9 779.5 or ICD-10 P96.1) from the Michigan Inpatient Database. The transition from ICD-9 to ICD-10 started in Fall 2015. This may contribute to some fluctuation in the data.
2. NAS cases may be underreported with the increasing popularity of non-pharmacological interventions, which may not be consistently captured in the data.
3. The goal of NAS surveillance is *not* to reduce the number of cases to zero. This is due to limitations with current surveillance practices. They do not allow us to distinguish between a) women with untreated opioid use or other substance use disorder or b) women with opioid use disorder on medicated assisted therapy, or c) women on long term opioid, benzodiazepine or barbiturate therapy for a chronic disease condition.
4. NAS rates are calculated per 1,000 live births in order to be consistent with the CSTE case definition. Previous reports published by MDHHS include NAS rates per 100,000 live births.

Neonatal Abstinence Syndrome Michigan, 2012-2021

2010-2015: 779.5 (drug withdrawal syndrome in newborn) and 2016-current: P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction)

NAS Rate per 1,000 Live Births



Birth Year	# Cases	# Births	Rate
2012	716	112,708	6.4
2013	843	113,732	7.4
2014	911	114,460	8.0
2015	947	113,211	8.4
2016	949	113,374	8.4
2017	932	111,507	8.4
2018	791	110,093	7.2
2019	672	107,917	6.2
2020	650	104,149	6.2
2021	685	105,022	6.5

Neonatal Abstinence Syndrome by Maternal Race/Ethnicity, 2021

2010-2015: 779.5 (drug withdrawal syndrome in newborn) and 2016-current: P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction)

Maternal Race	# NAS Cases	# Live Births		Neonatal Abstinence Syndrome (Rate per 1,000 Live Births)
Overall	685	105,022	6.5	6.5
White non-Hispanic	537	72,071	7.5	7.5
Black non-Hispanic	75	18,175	4.1	4.1
Hispanic	34	7,056	4.8	4.8
American Indian	19	409	46.5	46.5

Neonatal Abstinence Syndrome by Race/Ethnicity Michigan, 2017-2021

2010-2015: 779.5 (drug withdrawal syndrome in newborn) and 2016-current: P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction)

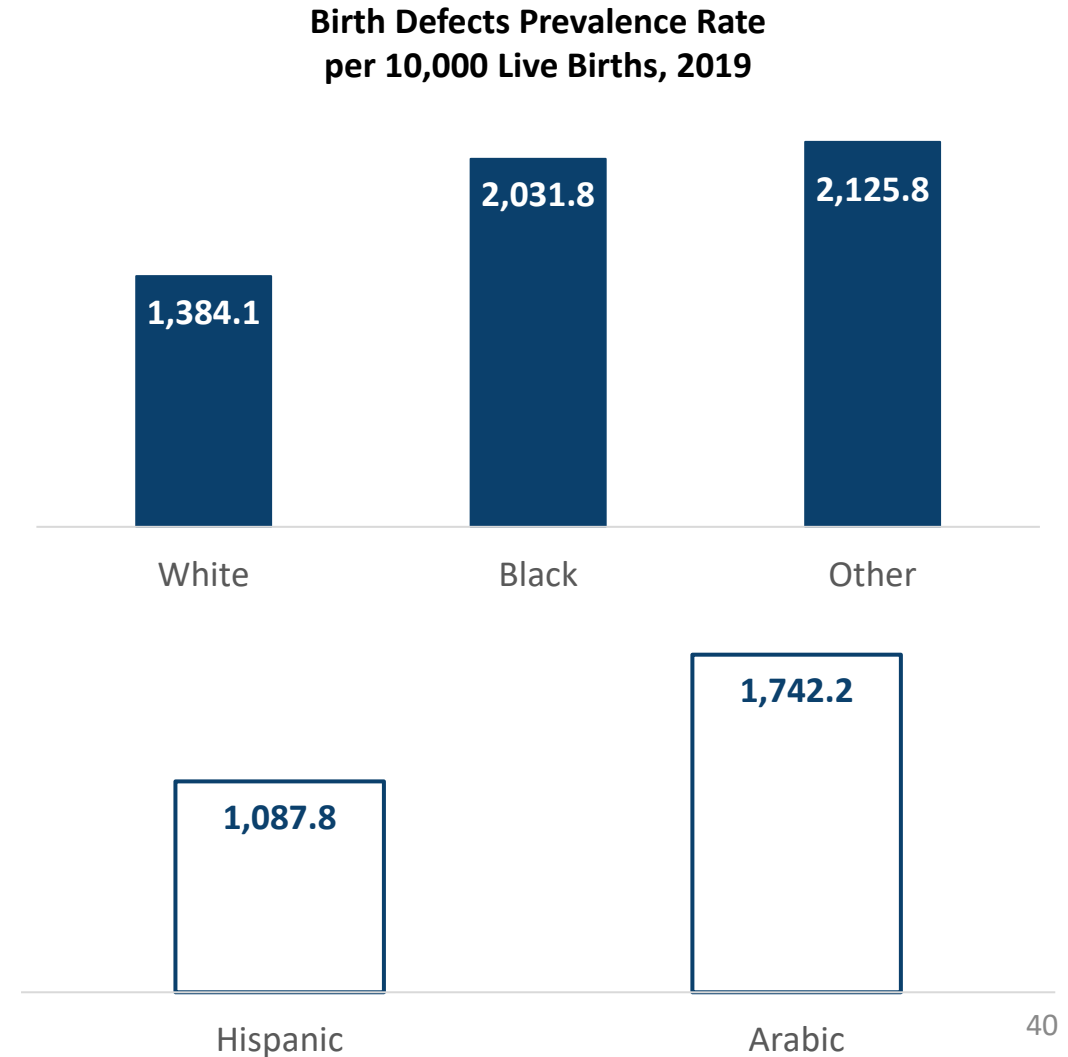
Data on this slide is aggregated over 5 years

Comparison of methods used to measure cases among Native Americans	# NAS Cases	# Live Births	NAS Rate (per 1,000 Live Births)
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	93	1,985	46.9
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	125	3,562	35.1
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	168	5,728	29.3

**Birth Defects
by Maternal Race/Ethnicity &
Prosperity Region
2019**

Birth Defect Prevalence by Maternal Race/ethnicity, 2019

- Throughout birth years 2013-2019, the birth defect prevalence rate for Michigan remained fairly steady at an average rate of 1,444.1 cases per 10,000 live births.
- In 2019, the race-specific birth defect prevalence rate for cases born to mothers of “other” races (2125.8 per 10,000 live births) exceeded that of cases born to black mothers (2031.8 cases per 10,000 live births) and cases born to white mothers (1,384.1 cases per 10,000 live births).
- In 2019, the ethnicity-specific birth defect prevalence rate for cases born to a mother reporting Arabic ethnicity (1,742.2 cases per 10,000 live births) was greater than that of cases born to a mother reporting Hispanic ethnicity (1,406.5 cases per 10,000 live births).

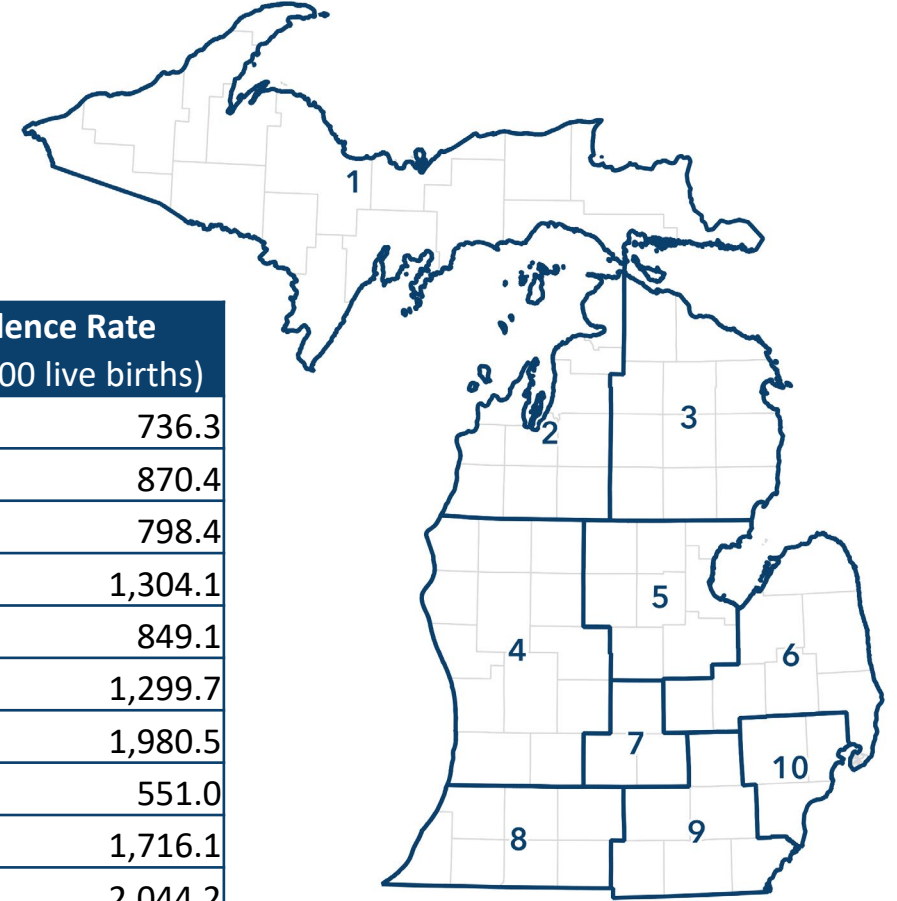


Birth Defect Prevalence Rates by Prosperity Region, 2019

Prevalence rates are based on births to mothers living in Michigan at the time of delivery. Regions approximate prosperity region boundaries

- The State of Michigan is broken up into 10 prosperity regions based on shared geographic, demographic, and economic interests.
- In 2019, Michigan prosperity regions 7 and 10 reported the highest birth defect prevalence rates of 1,980.5 and 2,044.25 cases per 10,000 live births respectively.
- The prosperity region that reported the lowest birth defect prevalence was region 8 with a prevalence rate of 551.0 cases per 10,000 live births.

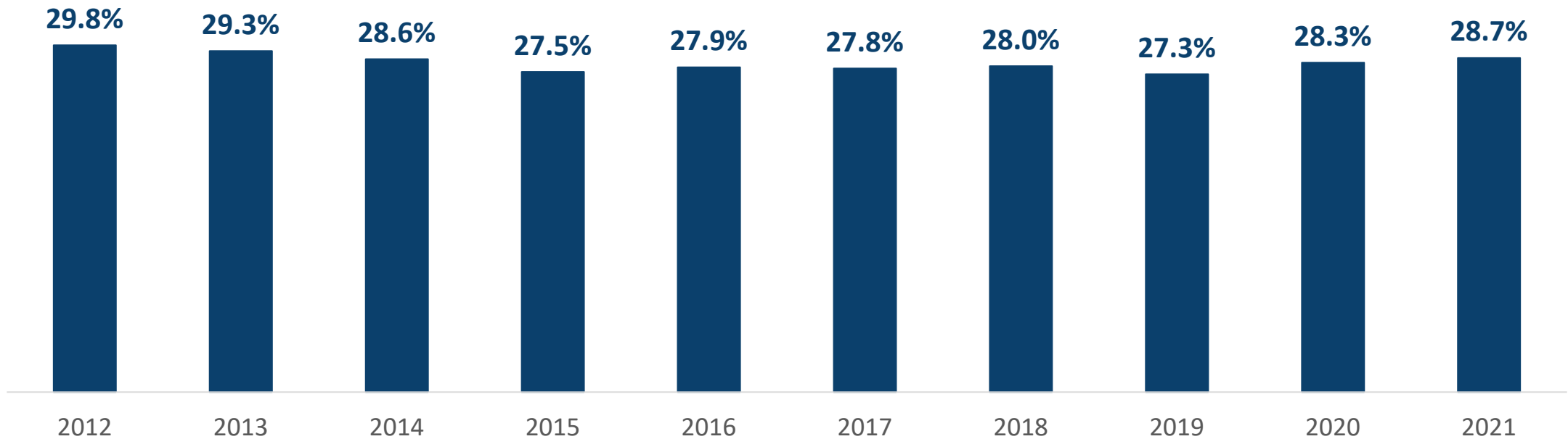
Region	# Cases	Prevalence Rate (per 10,000 live births)
1	184	736.3
2	235	870.4
3	135	798.4
4	2,400	1,304.1
5	480	849.1
6	1,145	1,299.7
7	976	1,980.5
8	480	551.0
9	1,707	1,716.1
10	9,112	2,044.2
Total	16,854	1,561.8



Low Risk Cesarean 2012-2021

Low Risk Cesarean Trend Michigan, 2015-2021

Low risk cesarean is a ratio of the number of first births delivered by cesarean section to low risk females (full-term, singleton births, vertex presentation) to the number of first births to low-risk females (full-term, singleton births, vertex presentation)



Low Risk Cesarean by Maternal Race/Ethnicity Michigan, 2021

Low risk cesarean is a ratio of the number of first births delivered by cesarean section to low risk females (full-term, singleton births, vertex presentation) to the number of first births to low-risk females (full-term, singleton births, vertex presentation)

Maternal Race	# Low Risk Cesarean	# Low Risk Live Birth	Percent (%) low-risk females with no prior birth had a cesarean
Overall	7,989	27,835	28.7%
White non-Hispanic	5,473	19,731	27.7%
Black non-Hispanic	1,272	4,085	31.1%
Hispanic	510	1,799	28.3%
American Indian	28	97	28.9%
Asian/Pacific Islander	421	1,229	34.3%

Low Risk Cesarean by Race/Ethnicity Michigan, 2017-2021

Low risk cesarean is a ratio of the number of first births delivered by cesarean section to low risk females (full-term, singleton births, vertex presentation) to the number of first births to low-risk females (full-term, singleton births, vertex presentation). Data on this slide is aggregated over 5 years.

Comparison of methods used to measure cases among Native Americans	# Low Risk Cesarean	# Low Risk Live Births	Percent (%) cesarean among low-risk females with no prior birth
#1: Birthing mother is identified on the birth certificate as American Indian and Non-Hispanic	162	532	30.5%
#2: Birthing mother is identified on the birth certificate as American Indian or Mixed Race (i.e., American Indian or Alaskan Native).	289	988	29.3%
#3: Birthing mother is identified on the birth certificate as American Indian or Mixed race (i.e., American Indian or Alaskan Native) OR the father is listed as American Indian or Mixed Race (i.e., American Indian or Alaskan Native)	463	1,653	28.0%

Sleep-Related Infant Death Rate 2010-2020

Overview of Sleep-Related Infant Deaths Michigan, 2010-2020

- Between 2010 and 2020 there were **1,597** sleep-related infant deaths in Michigan.
- The rate of sleep-related infant deaths has fluctuated slightly but has not statistically significantly differed between years (Figure 1).
- Between 2010 and 2020 Black Infants were **3.8** times more likely to die of sleep-related causes as compared to white Infants. American Indian infants were **2.5** times more likely to die of sleep-related causes as compared to white infants (Figure 2).

Figure 1. Rate of Sleep-Related Infant Deaths
per 1,000 Live Births

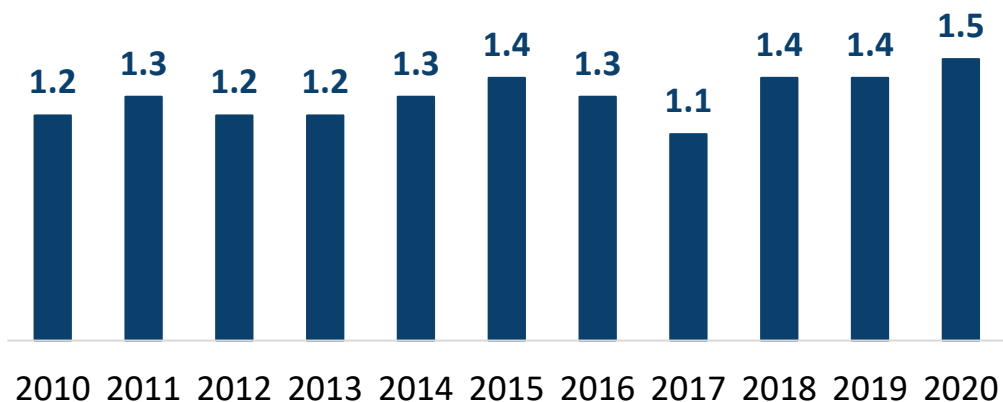
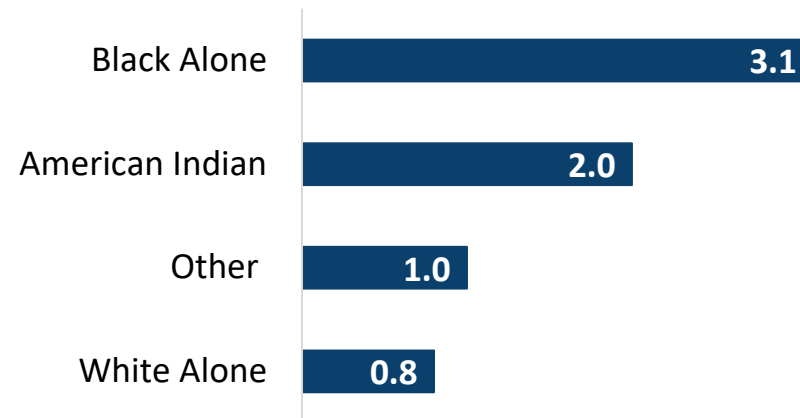


Figure 2. Rate of Sleep-Related Infant Deaths
per 1,000 Live Births

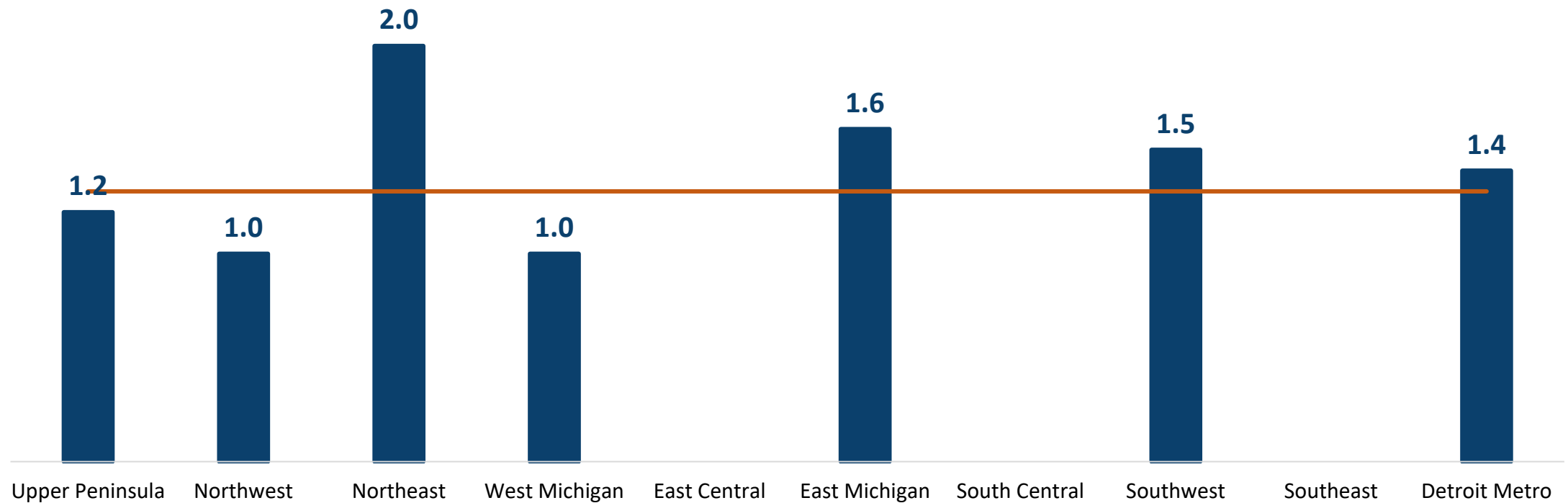


Sleep-Related Infant Death Rate by Prosperity Region, 2010-2020

Data for regions 5, 7, and 9 suppressed as to not inadvertently identify suppressed county level statistics.

Sleep-Related Infant Death Rate per 1,000 Live Births

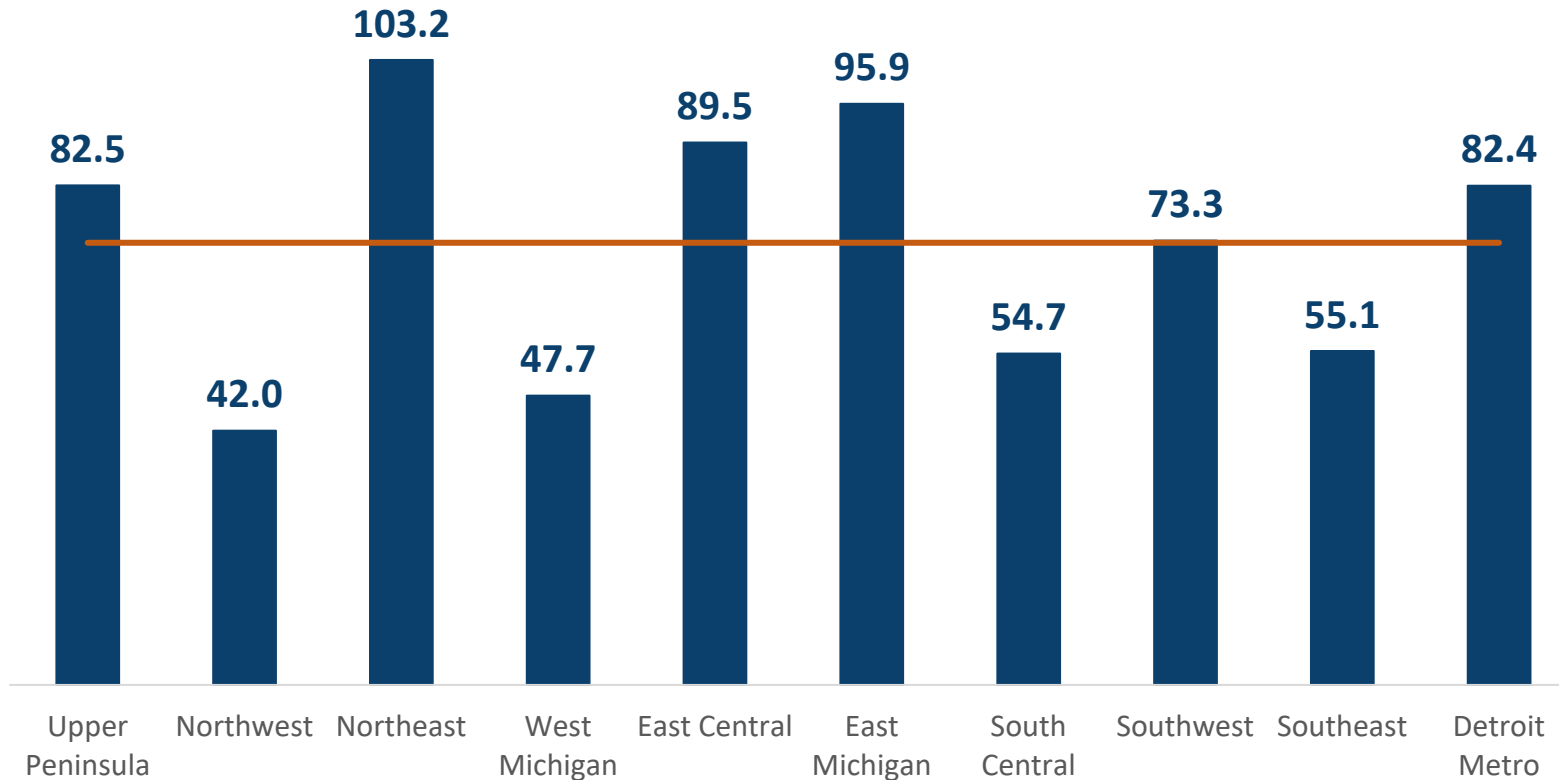
Michigan: 1.3



Maternal Mortality Ratio 2015-2019

Maternal Mortality Ratio by Prosperity Region, 2015-2019

Total (Pregnancy Associated) Maternal Mortality Ratio
per 100,000 Live Births
Michigan Ratio : 73.0

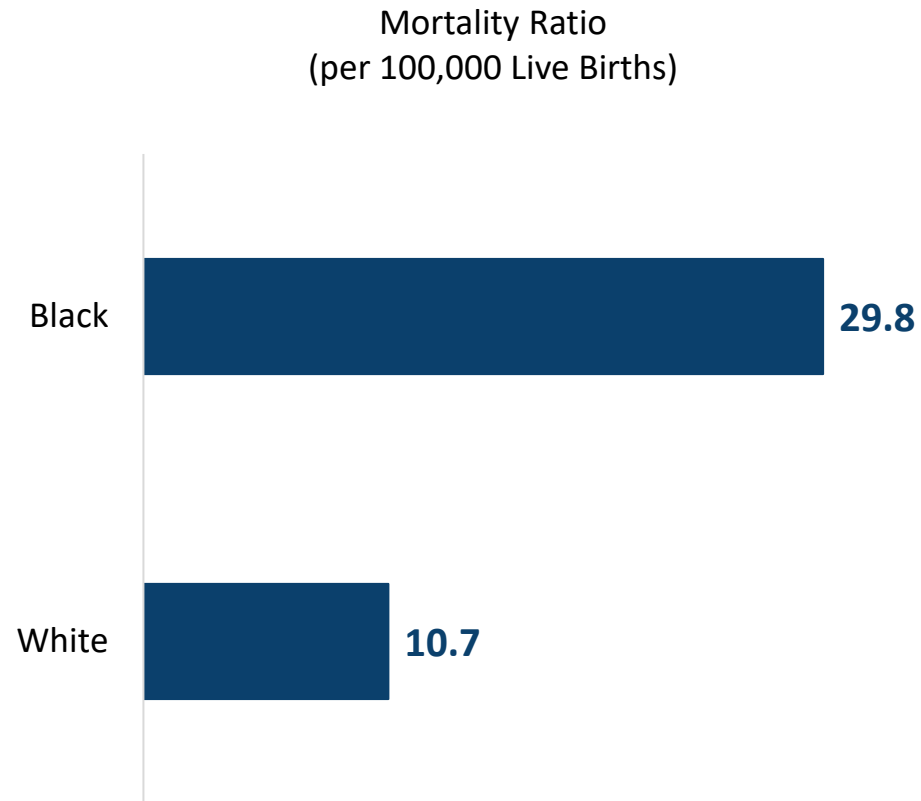


- Maternal deaths include deaths that occur during pregnancy, at delivery or within one year of pregnancy.
- Pregnancy associated (total) maternal mortality includes:
 - 1- pregnancy associated, not related mortality (*unrelated to the pregnancy*),
 - 2- pregnancy-related mortality (*related to or aggravated by the pregnancy*),
 - 3- deaths where pregnancy-relatedness is unable to be determined.

Maternal Mortality Ratio by Race Michigan, 2015-2019

Pregnancy-Related Maternal Mortality

(directly related to or aggravated by the pregnancy)



Pregnancy-Associated, Not Related, Maternal Mortality

(death unrelated to the pregnancy)

