Infant Health Statistics, Michigan, 2018

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Michigan Department of Health and Human Services (MDHHS)
Data source: Michigan resident live birth files and infant mortality files (1/22/2020),
Division of Vital Records and Health Statistics, MDHHS
February 2020

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This presentation provides updated 2018 infant health statistics for the State of Michigan.

This presentation was prepared by Yan Tian, Maternal and Child Health Epidemiology Section, Michigan Department of Health and Human Services (MDHHS).

Data source: Michigan resident live birth files and infant mortality files (1/22/2020), Division for Vital Records and Health Statistics, MDHHS

Revised: February 2020

Infant Mortality Rate (IMR), Michigan, 2018

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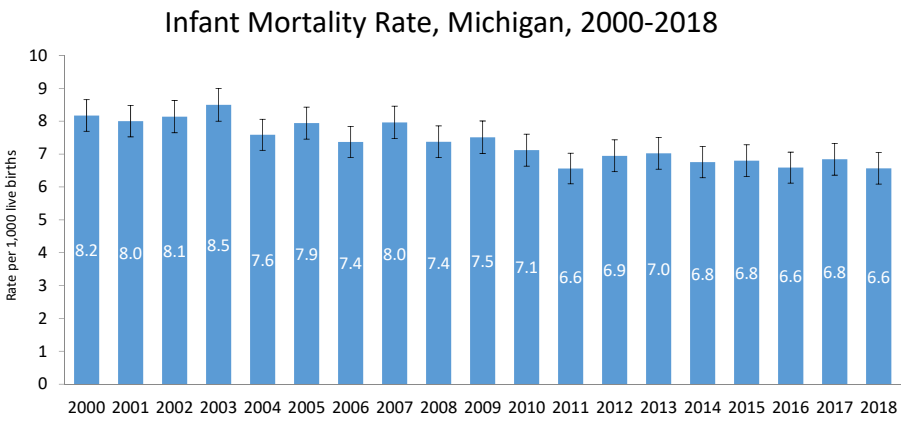
The next several slides contain updated infant mortality rates for the State of Michigan.

Infant Mortality Rate: Michigan, 2000-2018

(rate per 1,000 live births)



Year	# Live Births	# Infant Death	IMR
2000	136,048	1,112	8.2
2001	133,247	1,066	8.0
2002	129,518	1,054	8.1
2003	130,850	1,112	8.5
2004	129,710	984	7.6
2005	127,518	1,013	7.9
2006	127,537	940	7.4
2007	125,172	997	8.0
2008	121,231	894	7.4
2009	117,309	881	7.5
2010	114,717	817	7.1
2011	114,159	749	6.6
2012	112,708	783	6.9
2013	113,732	799	7.0
2014	114,460	773	6.8
2015	113,211	770	6.8
2016	113,374	747	6.6
2017	111,507	763	6.8
2018	110,093	723	6.6

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

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

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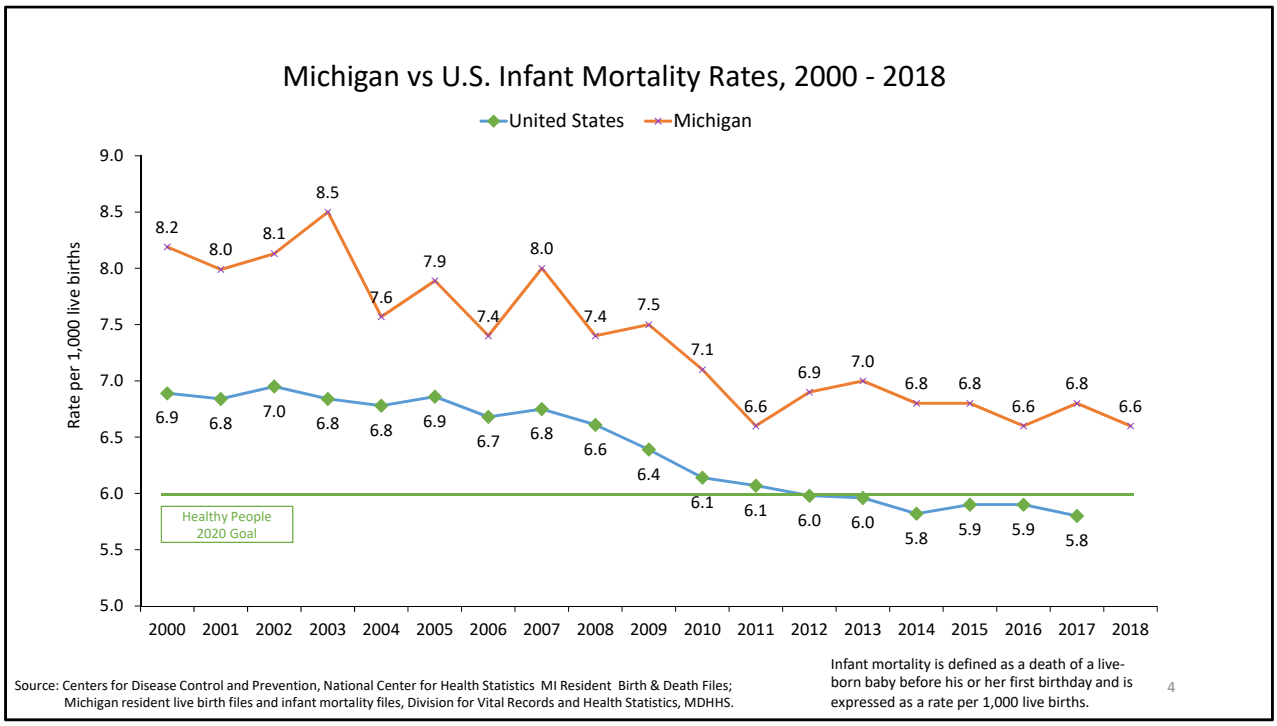
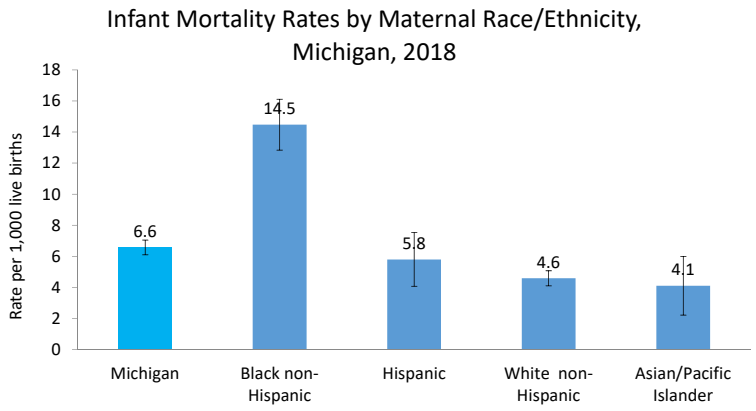
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates within Michigan from 2000 through 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was 6.6 infant deaths per 1,000 live births. Infant mortality within Michigan has been on a slow decline over the past decade.



Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates within the United States and Michigan from 2000 through 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2017, the infant mortality rate in the United States was 5.8 infant deaths per 1,000 live births and the rate in Michigan was 6.8 per 1,000 live births. Infant mortality rates within the United States and Michigan have been on a slow decline over the past decade and the United States rate is currently below the Healthy People 2020 goal.

Infant Mortality Rates by Maternal Race/Ethnicity, Michigan, 2018 (rate per 1,000 live births)



Race/Ethnicity	# Live Births	# Infant Death	2018 IMR
Michigan	110,093	723	6.6
Black non-Hispanic	20,440	296	14.5
Hispanic	7,421	43	5.8
White non-Hispanic	74,453	341	4.6
Asian/Pacific Islander	4,385	18	4.1

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

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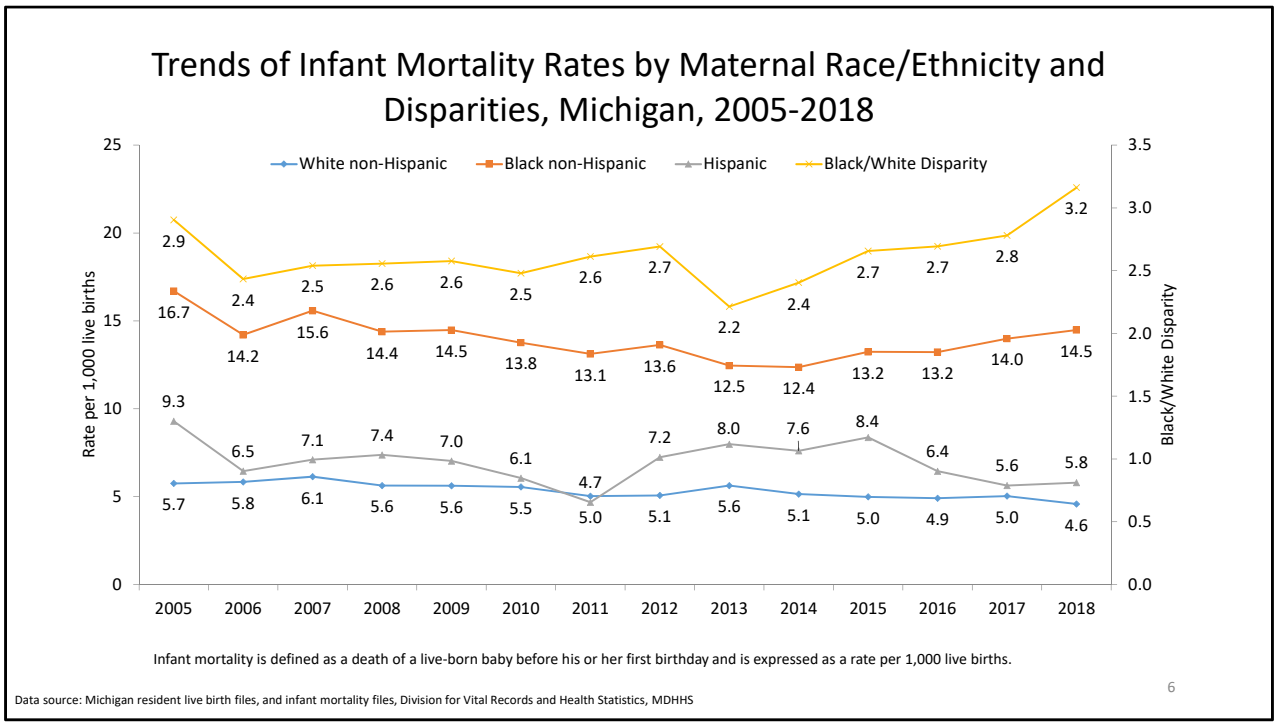
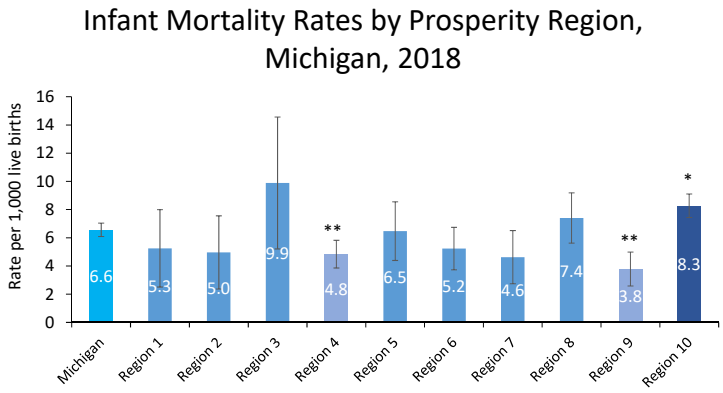
Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by maternal race/ethnicity within Michigan for 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, there was a threefold difference in infant mortality rates by maternal race/ethnicity, from a high of 14.5 per 1,000 live births for Black non-Hispanic women to a low of 4.1 per 1,000 live births for Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher infant mortality rate when compared to other racial/ethnic groups.

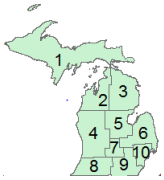


Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by maternal race/ethnicity within Michigan from 2005 to 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. Infant mortality rates within Michigan among White non-Hispanic and Black non-Hispanic women have been on a slow decline over the past decade. The Black/White non-Hispanic ratio went down from 2005 to 2013 and then increased from 2013 to 2018.

Infant Mortality Rate by Prosperity Region, Michigan, 2018 (rate per 1,000 live births)



Prosperity Region	# Live Births	# Infant Death	2018 IMR
Michigan	110,093	723	6.6
1. Upper Peninsula Prosperity Alliance	2,666	14	5.3
2. Northwest Prosperity Region	2,821	14	5.0
3. Northeast Prosperity Region	1,720	17	9.9
4. West Michigan Prosperity Alliance	19,218	93	4.8
5. East Central Michigan Prosperity Region	5,720	37	6.5
6. East Michigan Prosperity Region	8,792	46	5.2
7. South Central Prosperity Region	4,972	23	4.6
8. Southwest Prosperity Region	8,915	66	7.4
9. Southeast Michigan Prosperity Region	10,035	38	3.8
10. Detroit Metro Prosperity Region	45,233	374	8.3



* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

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

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

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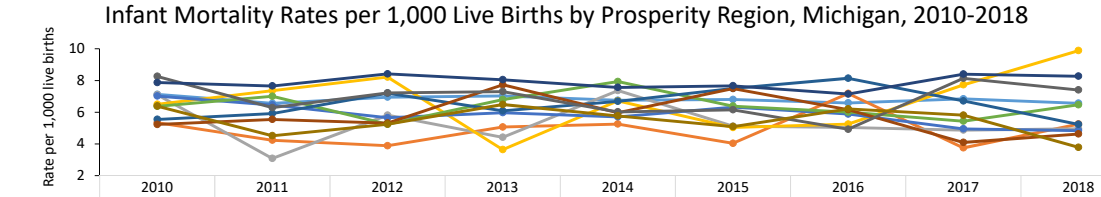
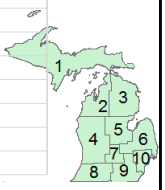
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by prosperity region within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate was the highest (9.9 per 1,000 live births) in the Northeast prosperity region and was the lowest (3.8 per 1,000 live births) in the Southeast Michigan prosperity region. The infant mortality rate was significantly higher in region 10 (8.3 per 1,000 live births) and was significantly lower in regions 4 (4.8 per 1,000 live births) and 9 (3.8 per 1,000 live births), compared to the rate within the State of Michigan (6.6 per 1,000 live births).

Infant Mortality Rate by Prosperity Region, Michigan, 2010-2018 (rate per 1,000 live births)



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	7.1	6.6	6.9	7.0	6.8	6.8	6.6	6.8	6.6
1	5.3	4.2	3.9	5.1	5.3	4.0	7.2	3.8	5.3
2	7.1	3.1	5.8	4.4	7.4	5.1	5.0	4.9	5.0
3	6.5	7.4	8.2	3.6	6.7	5.0	5.2	7.7	9.9
4	7.0	6.5	5.7	6.0	5.7	6.3	5.9	5.0	4.8
5	6.4	7.0	5.2	6.8	7.9	6.4	6.0	5.4	6.5
6	5.5	5.9	7.2	6.1	6.7	7.5	8.1	6.7	5.2
7	5.2	5.5	5.3	7.7	6.0	7.5	6.2	4.1	4.6
8	8.3	6.3	7.2	7.3	6.0	6.2	4.9	8.1	7.4
9	6.4	4.5	5.2	6.5	5.8	5.1	6.2	5.8	3.8
10	7.9	7.7	8.4	8.1	7.6	7.7	7.1	8.4	8.3



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

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

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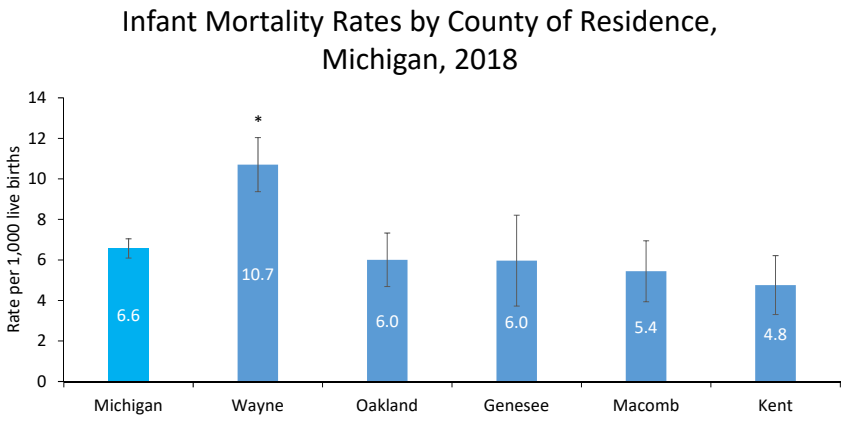
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by prosperity region within Michigan, 2010-2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. The infant mortality rates within most prosperity regions have been on a slow decline since 2010, except within regions 3, 5, and 10 which have increased some fluctuation between 2010 and 2018. In most years, the infant mortality rates were higher in region 10 and lower in region 1, compared to the rates within the State of Michigan and other prosperity regions.

Infant Mortality Rate by Selected County of Residence at Birth, Michigan, 2018 (rate per 1,000 live births)



County	# Live Births	# Infant Death	2018 IMR
Michigan	110,093	723	6.6
Wayne	22,892	245	10.7
Oakland	13,152	79	6.0
Genesee	4,526	27	6.0
Macomb	9,189	50	5.4
Kent	8,613	41	4.8

* = significantly higher than the State of Michigan; Selected county has more than 20 infant deaths.

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

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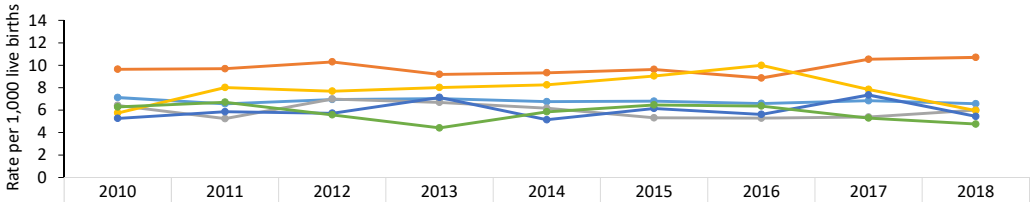
Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by county of residence at birth within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. All selected counties had more than 20 infant deaths in 2018. In 2018, the infant mortality rate was 10.7 per 1,000 live births in Wayne County, 6.0 per 1,000 live births in Oakland County, 6.0 per 1,000 live births in Genesee County, 5.4 per 1,000 live births in Macomb County, and 4.8 per 1,000 live births in Kent County. The infant mortality rate was significantly higher in Wayne County compared to the rate within the State of Michigan.

Infant Mortality Rate by Selected County of Residence at Birth, Michigan, 2010-2018 (rate per 1,000 live births)

Infant Mortality Rates per 1,000 Live Births by Selected County of Residence, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	7.1	6.6	6.9	7.0	6.8	6.8	6.6	6.8	6.6
Wayne	9.6	9.7	10.3	9.2	9.3	9.6	8.9	10.5	10.7
Oakland	6.4	5.2	7.0	6.7	6.2	5.3	5.3	5.4	6.0
Genesee	5.7	8.0	7.7	8.0	8.3	9.0	10.0	7.9	6.0
Macomb	5.3	5.9	5.7	7.1	5.1	6.2	5.6	7.3	5.4
Kent	6.3	6.7	5.6	4.4	5.9	6.5	6.4	5.3	4.8

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

Selected county has more than 20 infant deaths.

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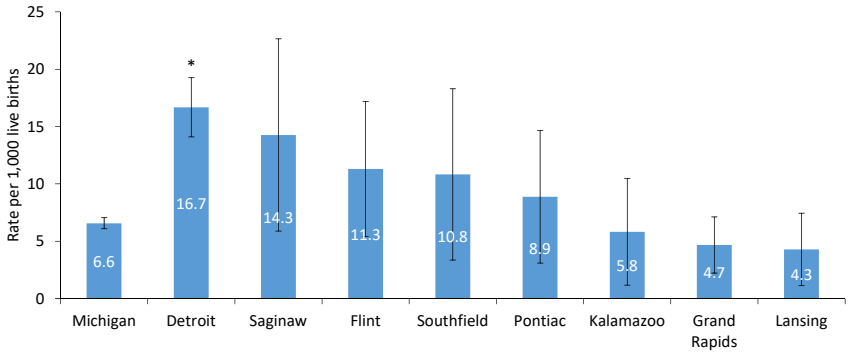
Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by county of residence at birth within Michigan, 2010-2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. All selected counties had more than 20 infant deaths, 2010-2018. The infant mortality rates within Wayne County were significantly higher than the State of Michigan rates for each year between 2010 and 2018. From 2010 to 2018, the infant mortality rates within Wayne County, Genesee County, and Macomb County have shown a slow increasing trend, however, the infant mortality rates have declined within Oakland County and Kent County over the same time period.

Infant Mortality Rate by Selected City of Residence at Birth, Michigan, 2018 (rate per 1,000 live births)

Infant Mortality Rates by City of Residence, Michigan, 2018



City	# Live Births	# Infant Death	2018 IMR
Michigan	110093	723	6.6
Detroit	9476	158	16.7
Saginaw	771	11	14.3
Flint	1239	14	11.3
Southfield	739	8	10.8
Pontiac	1014	9	8.9
Kalamazoo	1030	6	5.8
Grand Rapids	2996	14	4.7
Lansing	1632	7	4.3

* = significantly higher than the State of Michigan; selected city has more than 5 infant deaths.

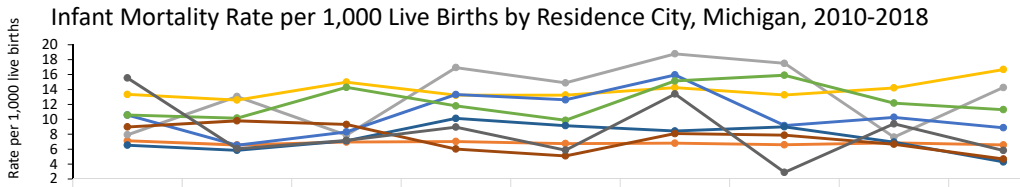
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

11

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by city of residence at birth within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. All selected cities had more than 5 infant deaths in 2018. In 2018, the infant mortality rate was 16.7 per 1,000 live births in the City of Detroit, 14.3 per 1,000 live births in the City of Saginaw, 11.3 per 1,000 live births in the City of Flint, and 4.7 per 1,000 live births in the City of Grand Rapids. The infant mortality rate within the City of Detroit was significantly higher than the rate within the State of Michigan.

Infant Mortality Rate by Selected City of Residence at Birth, Michigan, 2010-2018 (rate per 1,000 live births)



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	7.1	6.6	6.9	7.0	6.8	6.8	6.6	6.8	6.6
Saginaw	7.9	13.0	7.9	16.9	14.9	18.8	17.5	7.6	14.3
Detroit	13.3	12.6	15.0	13.2	13.2	14.2	13.3	14.2	16.7
Pontiac	10.6	6.5	8.3	13.3	12.6	15.9	9.2	10.3	8.9
Flint	10.6	10.2	14.3	11.8	9.9	15.1	15.9	12.2	11.3
Lansing	6.5	5.8	7.1	10.1	9.2	8.4	9.0	6.9	4.3
Grand Rapids	9.0	9.8	9.3	6.0	5.1	8.1	7.9	6.7	4.7
Kalamazoo	15.5	6.1	7.2	9.0	5.9	13.4	2.9	9.4	5.8

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

Selected city has more than 5 infant deaths.

12

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by city of residence at birth within Michigan, 2010-2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. All selected cities had more than 5 infant deaths, 2010-2018. The infant mortality rates within the City of Detroit were significantly higher than the State of Michigan rates for each year between 2010 and 2018. From 2010 to 2018, the infant mortality rates within the cities of Saginaw, Detroit, and Flint have shown a slow increasing trend, however, the infant mortality rates within the cities of Pontiac, Lansing, Grand Rapids, and Kalamazoo have declined over the same time period.

Infant Mortality Rate (IMR) by Maternal and Infant Characteristics, Michigan, 2018

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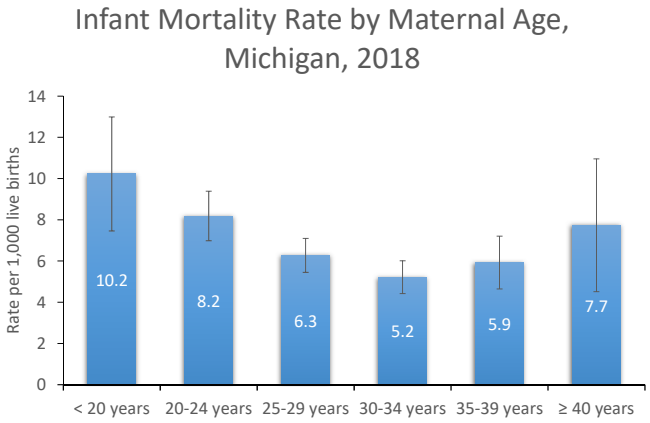
The next several slides contain updated infant mortality rates by maternal and infant characteristics for the State of Michigan, 2018.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Maternal Age					
< 20 years	52	7.2	5,087	4.6	10.2
20-24 years	177	24.5	21,621	19.6	8.2
25-29 years	221	30.6	35,232	32.0	6.3
30-34 years	164	22.7	31,452	28.6	5.2
35-39 years	82	11.3	13,837	12.6	5.9
≥ 40 years	22	3.0	2,844	2.6	7.7

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

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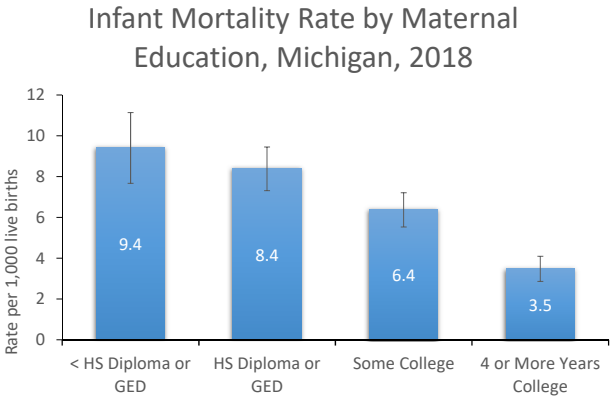
Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by maternal age within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was higher among women aged less than 20 years (10.2 per 1,000 live births) when compared to rates among other age groups.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Maternal Education					
< HS Diploma or GED	112	15.5	11,904	10.8	9.4
HS Diploma or GED	233	32.2	27,792	25.2	8.4
Some College	220	30.4	34,538	31.4	6.4
4 or More Years College	121	16.7	34,795	31.6	3.5

* HS=High School; GED=General Equivalency Diploma.

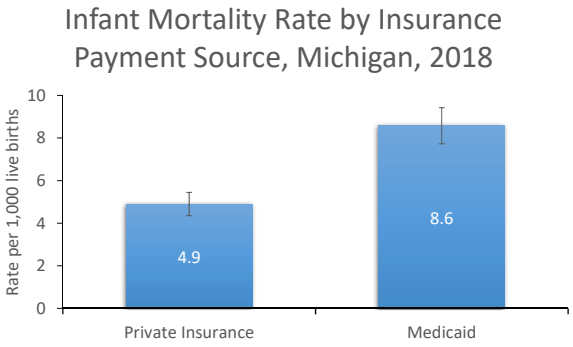
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

15

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by maternal education within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was higher among women who did not finish high school (9.4 per 1,000 live births) when compared to rates among other education groups.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Payment Source					
Private Insurance	305	42.2	62,220	56.5	4.9
Medicaid	389	53.8	45,382	41.2	8.6

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

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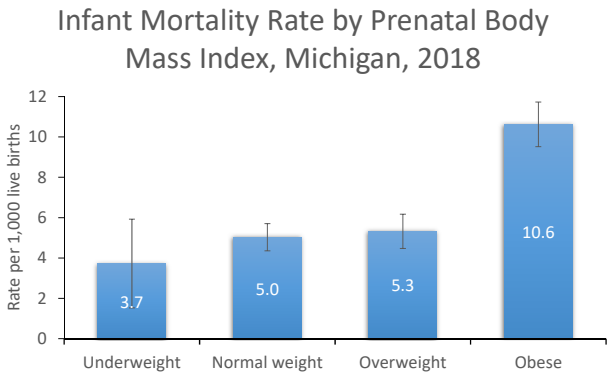
Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by insurance payment source within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among women intending to use Medicaid as the payment source at delivery (8.6 per 1,000 live births) than those using private insurance.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Prenatal Body Mass Index (BMI)					
Underweight	11	1.5	2,953	2.7	3.7
Normal weight	212	29.3	42,156	38.3	5.0
Overweight	150	20.7	28,181	25.6	5.3
Obese	350	48.4	32,943	29.9	10.6

Body Mass Index (BMI) is a person's weight in kilograms divided by the square of height in meters.
BMI is categorized as underweight (under 18.5 kg/m^2), normal weight (18.5 to 25), overweight (25 to 30), and obese (over 30).

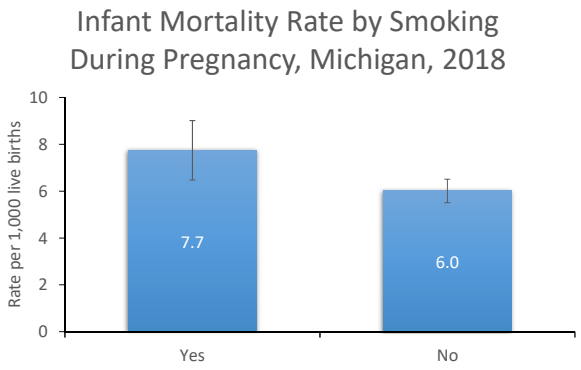
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

17

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by prenatal body mass index within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among obese women (10.6 per 1,000 live births) than those in other weight status groups.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Smoking During Pregnancy					
Yes	142	19.6	18,331	16.7	7.7
No	547	75.7	91,006	82.7	6.0

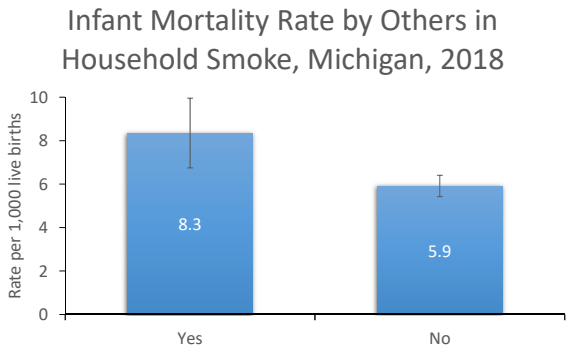
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

18

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by smoking status during pregnancy within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among women who smoked during pregnancy (7.7 per 1,000 live births) than that among women who did not smoke during pregnancy.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Others in Household Smoke					
Yes	103	14.2	12,337	11.2	8.3
No	550	76.1	93,011	84.5	5.9

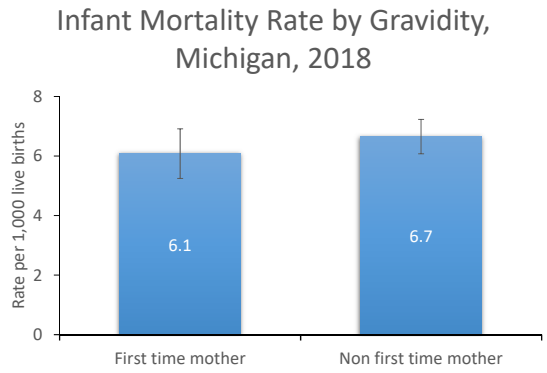
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

19

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by household smoking status within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among women living in a house where others smoked (8.3 per 1,000 live births) than that among women living in a house in which nobody smoked.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Gravidity					
First time mother	203	28.1	33,376	30.3	6.1
Non first time mother	509	70.4	76,490	69.5	6.7

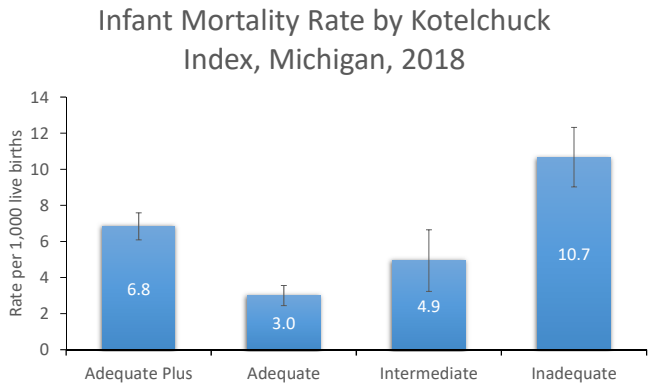
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

20

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by gravidity within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, babies in Michigan whose mothers were not first-time mothers had a higher risk of infant mortality (6.7 per 1,000 live births) than babies from non first-time mothers.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Kotelchuck Index					
Adequate Plus	317	43.8	46,379	42.1	6.8
Adequate	111	15.4	36,963	33.6	3.0
Intermediate	32	4.4	6,481	5.9	4.9
Inadequate	159	22.0	14,905	13.5	10.7

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

21

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the graphs of infant mortality rates by Kotelchuck Index within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was higher among pregnant women with adequate plus Kotelchuck index (6.8 per 1,000 live births) and inadequate Kotelchuck index (10.7 per 1,000 live births) when compared to other Kotelchuck index status groups.

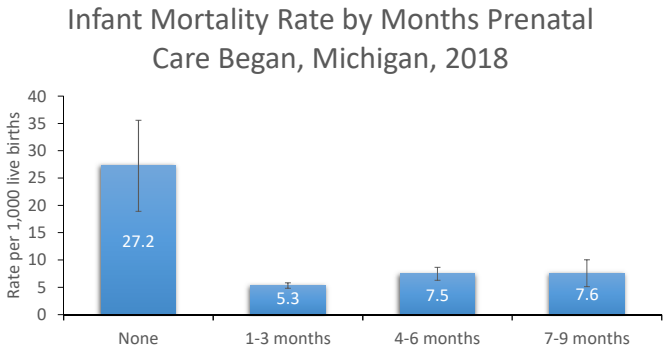
The Kotelchuck Index uses two crucial elements obtained from birth certificate data: when prenatal care began (initiation) and the number of prenatal visits from when prenatal care began until delivery (received services). The Kotelchuck Index classifies the adequacy of initiation as follows: pregnancy months 1 and 2, months 3 and 4, months 5 and 6, and months 7 to 9, with the underlying assumption that the earlier prenatal care begins the better. To classify the adequacy of received services, the number of prenatal visits is compared to the expected number of visits for the period between when care began and the delivery date. The expected number of visits is based on the American College of Obstetricians and Gynecologists prenatal care standards for uncomplicated pregnancies and is adjusted for the gestational age when care began and for the gestational age at delivery. A ratio of observed to expected visits is calculated and grouped into four categories-Inadequate (received less than 50% of expected visits), Intermediate (50%-79%),

Adequate (80%-109%), and Adequate Plus (110% or more). The final Kotelchuck index measure combines these two dimensions into a single summary score. The profiles define adequate prenatal care as a score of 80% or greater on the Kotelchuck Index, or the sum of the Adequate and Adequate Plus categories.

The Kotelchuck Index does not measure the quality of prenatal care. It also depends on the accuracy of the patient or health care provider's recall of the timing of the first visit and the number of subsequent visits. The Kotelchuck Index uses recommendations for low-risk pregnancies and may not measure the adequacy of care for high-risk women. The Kotelchuck Index is preferable to other indices because it includes a category for women who receive more than the recommended amount of care (adequate plus, or intensive utilization).

* Kotelchuck, M. An Evaluation of the Kessner Adequacy of Prenatal Care Index and a Proposed Adequacy of Prenatal Care Utilization
Index. Am J Public Health. 1994; 84:1414-1420.

Infant Mortality Rate by Maternal Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Prenatal Care Began					
None	40	5.5	1,468	1.3	27.2
1-3 months	430	59.5	80,775	73.4	5.3
4-6 months	152	21.0	20,343	18.5	7.5
7-9 months	36	5.0	4,752	4.3	7.6

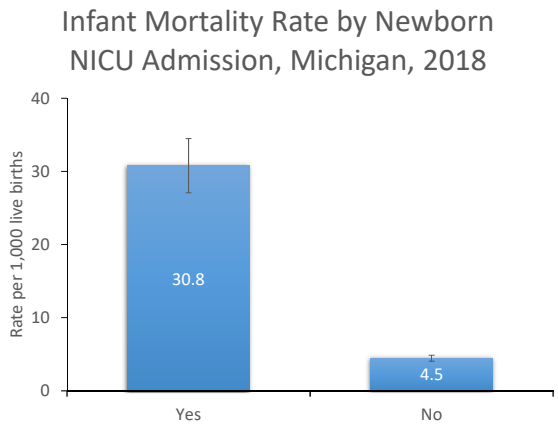
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

22

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by prenatal care within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among women without prenatal care (27.2 per 1,000 live births) than those women who entered prenatal care.

Infant Mortality Rate by Infant Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Newborn NICU Admission					
Yes	256	35.4	8,318	7.6	30.8
No	453	62.7	101,665	92.3	4.5

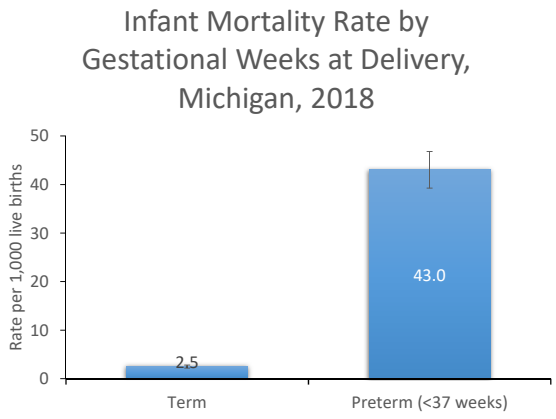
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

23

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by newborn NICU admission status within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. Higher risk babies are more likely to be admitted to the neonatal intensive care unit (NICU). In 2018, babies in Michigan with a newborn NICU admission had a significantly higher risk of infant mortality (30.8 per 1,000 live births) than non-NICU babies.

Infant Mortality Rate by Infant Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Gestational Weeks at Delivery					
Term	247	34.2	98,984	89.9	2.5
Preterm (<37 weeks)	475	65.7	11,038	10.0	43.0

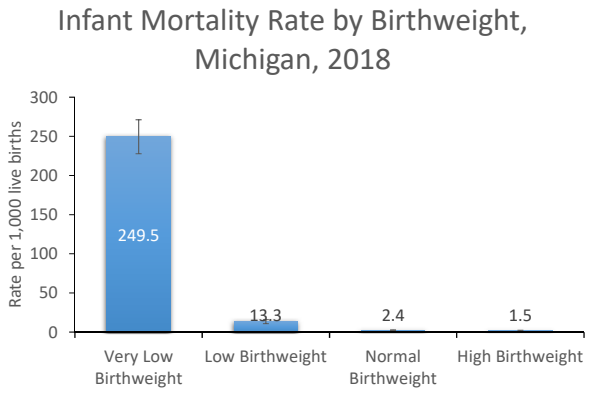
Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births.

24

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by preterm birth within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. In 2018, the infant mortality rate in Michigan was significantly higher among preterm birth babies (43.0 per 1,000 live births) than that among term babies.

Infant Mortality Rate by Infant Characteristics, Michigan, 2018



	Infant Death (N=723)		Live Birth (N=110,093)		IMR
	N	%	N	%	Per 1,000
Birthweight					
Very Low Birthweight (<1500g)	382	52.8	1,531	1.4	249.5
Low Birthweight (1500g - 2499g)	104	14.4	7,819	7.1	13.3
Normal Birthweight (2500g - 3999g)	219	30.3	91,177	82.8	2.4
High Birthweight (≥ 4000g)	14	1.9	9,530	8.7	1.5

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

25

Data source: Michigan resident live birth files and infant mortality files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the infant mortality rates by low birthweight within Michigan in 2018. Infant mortality is defined as a death of a live-born baby before his or her first birthday and is expressed as a rate per 1,000 live births. In 2018, the infant mortality rate in Michigan was significantly higher among babies with very low birthweight (249.5 per 1,000 live births) and low birthweight (13.3 per 1,000 live births) than those among normal and high birthweight babies.

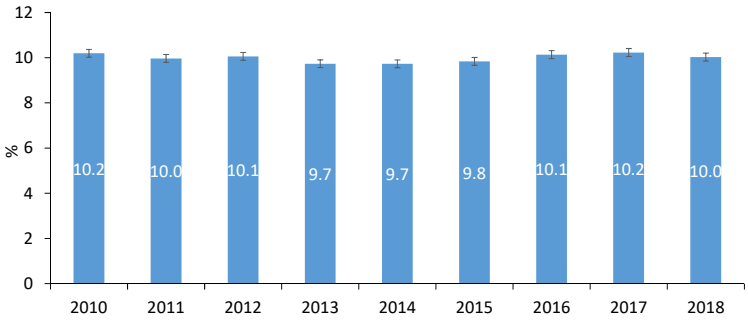
Preterm Birth, Michigan, 2010-2018

26

The next several slides contain updated preterm birth statistics for the State of Michigan.

Preterm Birth, Michigan, 2010-2018

Percent Preterm Birth (Estimated Gestational Age <37 Weeks), Michigan, 2010-2018



Year	# Live Births	# PTB	PTB %
2010	114,717	11,696	10.2
2011	114,159	11,378	10.0
2012	112,708	11,338	10.1
2013	113,732	11,069	9.7
2014	114,460	11,136	9.7
2015	113,211	11,136	9.8
2016	113,374	11,490	10.1
2017	111,507	11,406	10.2
2018	110,093	11,038	10.0

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.

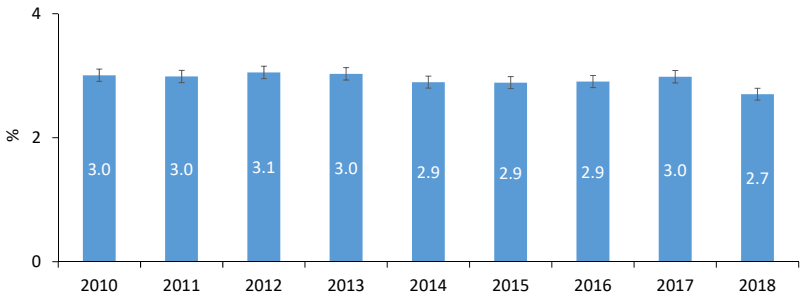
27

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of preterm birth within Michigan from 2010 through 2018. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of preterm birth is calculated as the number of preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of preterm birth in Michigan was 10.0%. The incidence of preterm birth within Michigan has remained relatively stable over the last nine years.

Early Preterm Birth, Michigan, 2010-2018

Percent Early Preterm Birth (Estimated Gestational Age <34 Weeks), Michigan, 2010-2018



Year	# Live Births	# EPTB	EPTB %
2010	114,717	3,450	3.0
2011	114,159	3,411	3.0
2012	112,708	3,441	3.1
2013	113,732	3,446	3.0
2014	114,460	3,316	2.9
2015	113,211	3,271	2.9
2016	113,374	3,295	2.9
2017	111,507	3,327	3.0
2018	110,093	2,974	2.7

Early preterm birth rate is defined as number of births delivered before 34 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

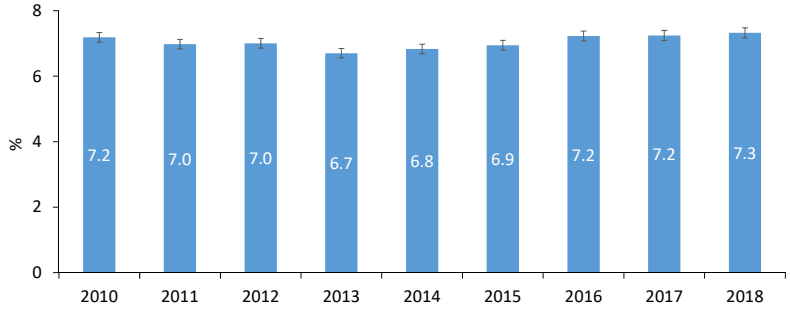
28

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of early preterm birth within Michigan from 2010 through 2018. Early preterm birth is defined as a birth of a baby less than 34 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of early preterm birth is calculated as the number of early preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of early preterm birth in Michigan was 2.7%. The incidence of early preterm birth within Michigan was stable from 2010 through 2017 but decreased significantly in 2018.

Late Preterm Birth, Michigan, 2010-2018

Percent Late Preterm Birth (Estimated Gestational Age 34-36 Weeks), Michigan, 2010-2018



Year	# Live Births	# LPTB	LPTB %
2010	114,717	8,246	7.2
2011	114,159	7,967	7.0
2012	112,708	7,897	7.0
2013	113,732	7,623	6.7
2014	114,460	7,820	6.8
2015	113,211	7,865	6.9
2016	113,374	8,195	7.2
2017	111,507	8,079	7.2
2018	110,093	8,064	7.3

Late preterm birth rate is defined as number of births delivered at 34-36 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

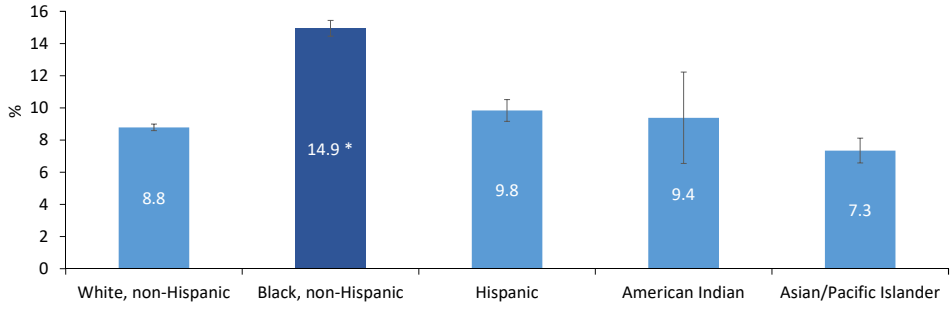
29

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of late preterm birth within Michigan from 2010 through 2018. Late preterm birth is defined as a birth of a baby at 34-36 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of late preterm birth is calculated as the number of late preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of late preterm birth in Michigan was 7.3%. The incidence of late preterm birth within Michigan has increased slowly since 2013.

Preterm Birth, Michigan, 2018

Percent Preterm Birth by Maternal Race/Ethnicity, Michigan, 2018



* = significantly higher than all other racial/ethnic groups

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.

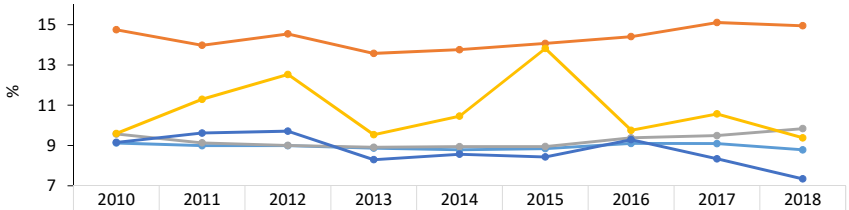
30

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of preterm birth by maternal race/ethnicity within Michigan in 2018. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of preterm birth is calculated as the number of preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of preterm birth in Michigan was 8.8% among White, non-Hispanic women, 14.9% among Black, non-Hispanics, 9.8% among Hispanics, 9.4% among American Indians, and 7.3% among Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher risk of delivering preterm when compared to other racial/ethnic groups.

Preterm Birth, Michigan, 2010-2018

Percent Preterm Birth (Estimated Gestational Age <37 Weeks)
by Maternal Race/Ethnicity, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
White, non-Hispanic	9.1	9.0	9.0	8.9	8.8	8.8	9.1	9.1	8.8
Black, non-Hispanic	14.7	14.0	14.5	13.6	13.8	14.1	14.4	15.1	14.9
Hispanic	9.6	9.1	9.0	8.9	8.9	8.9	9.4	9.5	9.8
American Indian	9.6	11.3	12.5	9.5	10.5	13.8	9.8	10.6	9.4
Asian/Pacific Islander	9.2	9.6	9.7	8.3	8.6	8.4	9.3	8.3	7.3

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.

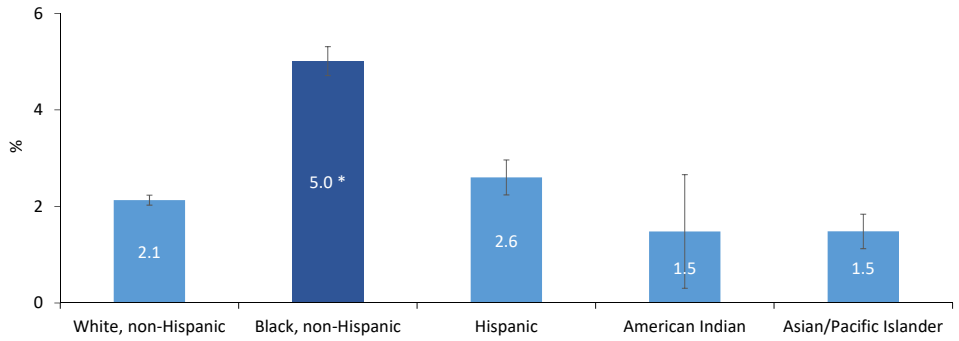
31

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of preterm birth by maternal race/ethnicity within Michigan from 2010 through 2018. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of preterm birth is calculated as the number of preterm births divided by the number of live births multiplied by 100. The incidence of preterm birth among Black non-Hispanic and Hispanic women has increased slowly over the past several years. Due to a small sample size, the incidence of preterm birth is not stable for Native American women from 2010 to 2018. Black non-Hispanic women have the highest risk of delivering preterm when compared to other racial/ethnic groups.

Early Preterm Birth, Michigan, 2018

Percent Early Preterm Birth by Maternal Race/Ethnicity, Michigan, 2018



* = significantly higher than all other racial/ethnic groups

Early preterm birth rate is defined as number of births delivered before 34 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

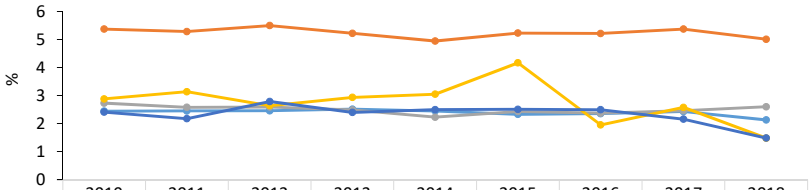
32

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of early preterm birth by maternal race/ethnicity within Michigan in 2018. Early preterm birth is defined as a birth of a baby less than 34 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of early preterm birth is calculated as the number of early preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of early preterm birth in Michigan was 2.1% among White, non-Hispanic women, 5.0% among Black, non-Hispanics, 2.6% among Hispanics, 1.5% among American Indians, and 1.5% among Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher risk of delivering early preterm when compared to other racial/ethnic groups.

Early Preterm Birth, Michigan, 2010-2018

Percent Early Preterm Birth (Estimated Gestational Age <34 Weeks) by Maternal Race/Ethnicity, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
White, non-Hispanic	2.4	2.5	2.5	2.5	2.4	2.3	2.4	2.4	2.1
Black, non-Hispanic	5.4	5.3	5.5	5.2	4.9	5.2	5.2	5.4	5.0
Hispanic	2.7	2.6	2.6	2.5	2.2	2.4	2.4	2.5	2.6
American Indian	2.9	3.1	2.6	2.9	3.1	4.2	2.0	2.6	1.5
Asian/Pacific Islander	2.4	2.2	2.8	2.4	2.5	2.5	2.5	2.2	1.5

Early preterm birth rate is defined as number of births delivered before 34 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

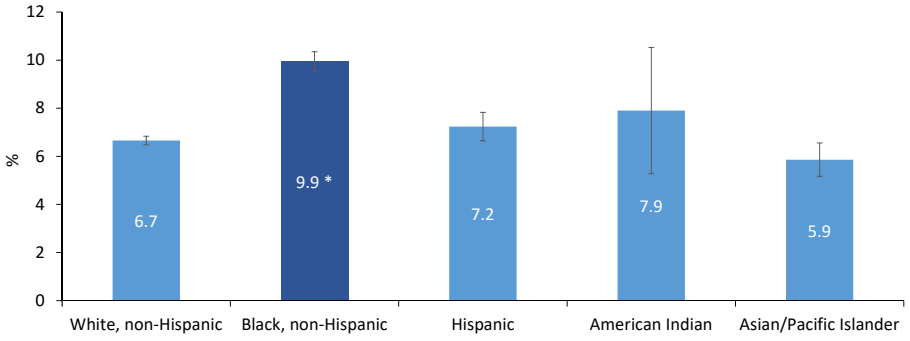
33

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of early preterm birth by maternal race/ethnicity within Michigan from 2010 through 2018. Early preterm birth is defined as a birth of a baby less than 34 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of early preterm birth is calculated as the number of early preterm births divided by the number of live births multiplied by 100. The incidence of early preterm birth among White non-Hispanic, Black non-Hispanic, and Hispanic women has remained relatively stable over the last several years. Due to a small sample size, the incidence of early preterm birth is unstable for Native American women from 2010 to 2018. Black non-Hispanic women have the highest risk of delivering early preterm when compared to other racial/ethnic groups.

Late Preterm Birth, Michigan, 2018

Percent Late Preterm Birth by Maternal Race/Ethnicity, Michigan, 2018



* = significantly higher than White, non-Hispanic, Hispanic, and Asian/Pacific Islander women

Late preterm birth rate is defined as number of births delivered at 34-36 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

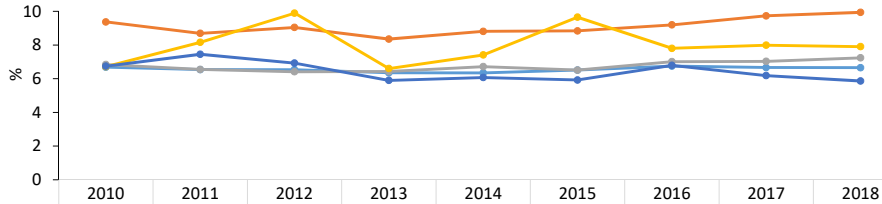
34

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of late preterm birth by maternal race/ethnicity within Michigan in 2018. Late preterm birth is defined as a birth of a baby at 34-36 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of late preterm birth is calculated as the number of late preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of late preterm birth in Michigan was 6.7% among White, non-Hispanic women, 9.9% among Black, non-Hispanics, 7.2% among Hispanics, 7.9% among American Indians, and 5.9% among Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher risk of delivering late preterm when compared to White, non-Hispanics, Hispanics, or Asian/Pacific Islander women.

Late Preterm Birth, Michigan, 2010-2018

Percent Late Preterm Birth (Estimated Gestational Age 34-36 Weeks) by Maternal Race/Ethnicity, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
White, non-Hispanic	6.7	6.5	6.5	6.4	6.3	6.5	6.7	6.7	6.7
Black, non-Hispanic	9.4	8.7	9.0	8.3	8.8	8.8	9.2	9.7	9.9
Hispanic	6.8	6.6	6.4	6.4	6.7	6.5	7.0	7.0	7.2
American Indian	6.7	8.2	9.9	6.6	7.4	9.6	7.8	8.0	7.9
Asian/Pacific Islander	6.7	7.4	6.9	5.9	6.1	5.9	6.8	6.2	5.9

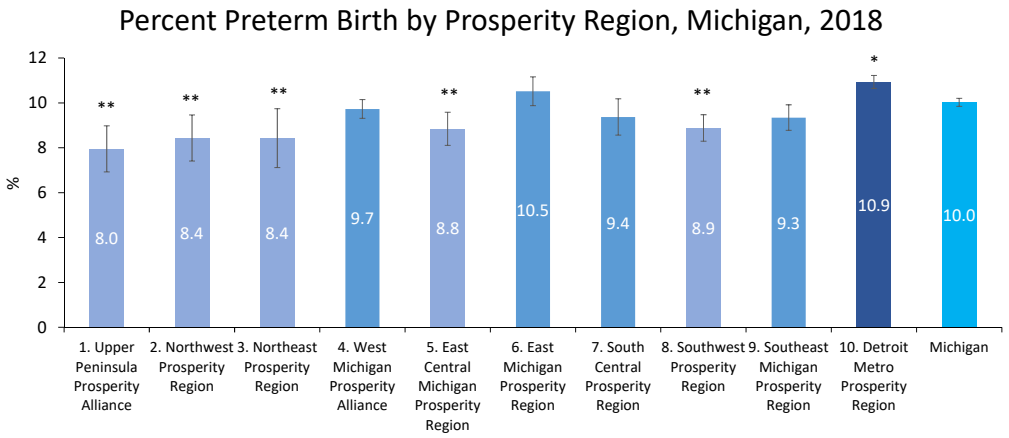
Late preterm birth rate is defined as number of births delivered at 34-36 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

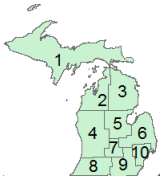
35

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of late preterm birth by maternal race/ethnicity within Michigan from 2010 through 2018. Late preterm birth is defined as a birth of a baby at 34-36 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of late preterm birth is calculated as the number of late preterm births divided by the number of live births multiplied by 100. The incidence of late preterm birth among Black non-Hispanic and Hispanic women has increased slowly over the last few years. Due to a small sample size, the incidence of late preterm birth is unstable for Native American women from 2010 to 2018.

Preterm Birth, Michigan, 2018





* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

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.

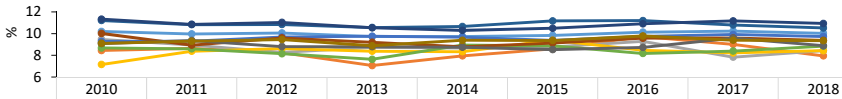
36

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

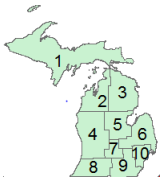
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of preterm birth by prosperity region of residence at birth within Michigan in 2018. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of preterm birth is calculated as the number of preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of preterm birth was the highest in the Detroit Metro prosperity region (10.9%) and the lowest in the Upper Peninsula prosperity alliance (8.0%). The incidence of preterm birth was significantly higher in region 10, and was significantly lower in regions 1, 2, 3, 5, and 8, when compared to the incidence within the State of Michigan.

Preterm Birth, Michigan, 2010-2018

Percent Preterm Birth (Estimated Gestational Age <37 Weeks) by Prosperity Region, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	10.2	10.0	10.1	9.7	9.7	9.8	10.1	10.2	10.0
1	8.4	8.6	8.2	7.1	7.9	8.6	9.7	9.0	8.0
2	9.5	8.9	8.3	8.7	8.7	8.8	9.3	7.8	8.4
3	7.2	8.4	8.6	8.4	8.3	9.4	8.5	8.2	8.4
4	9.3	9.3	9.7	9.8	9.7	9.4	9.7	9.9	9.7
5	8.7	8.6	8.1	7.6	8.9	8.9	8.2	8.4	8.8
6	11.2	10.8	10.8	10.6	10.7	11.2	11.2	10.8	10.5
7	10.0	8.9	9.6	9.2	8.8	9.1	9.6	9.6	9.4
8	9.1	9.4	8.8	8.8	8.7	8.5	8.7	9.6	8.9
9	9.1	9.3	9.4	8.9	9.4	9.4	9.8	9.4	9.3
10	11.3	10.9	11.0	10.5	10.3	10.5	10.9	11.2	10.9



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.

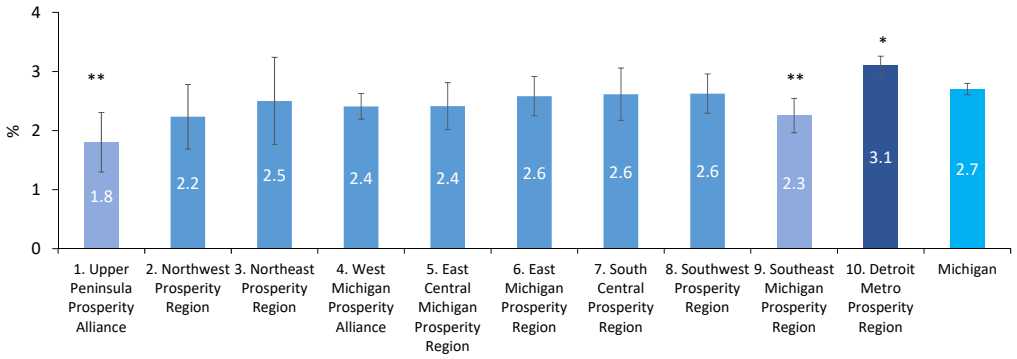
37

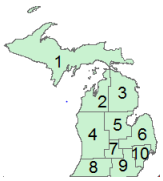
Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of preterm birth by prosperity region of residence at birth within Michigan from 2010 to 2018. Preterm birth is defined as a birth of a baby less than 37 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of preterm birth is calculated as the number of preterm births divided by the number of live births multiplied by 100. The incidence of preterm birth by prosperity region has remained relatively stable over the last several years. From 2010 to 2018, the incidences of preterm birth within prosperity regions 3, 4, 5, and 9 have shown a slow increasing trend, however, the incidences of preterm birth with prosperity regions 1, 2, 6, 7, 8, and 10 have shown a slow decline over the same time period.

Early Preterm Birth, Michigan, 2018

Percent Early Preterm Birth by Prosperity Region, Michigan, 2018





* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

Early preterm birth rate is defined as number of births delivered before 34 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

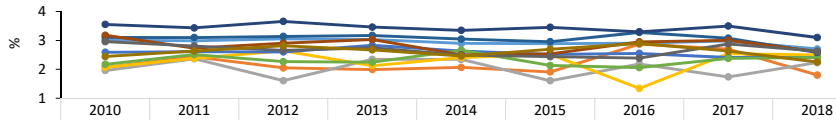
38

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

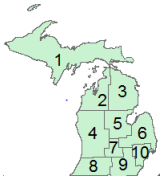
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of early preterm birth by prosperity region of residence at birth within Michigan in 2018. Early preterm birth is defined as a birth of a baby less than 34 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of early preterm birth is calculated as the number of early preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of early preterm birth was the highest in the Detroit Metro prosperity region (3.1%) and the lowest in the Upper Peninsula prosperity alliance (1.8%). The incidence of early preterm birth was significantly higher in region 10, and was significantly lower in regions 1 and 9, when compared to the incidence within the State of Michigan.

Early Preterm Birth, Michigan, 2010-2018

Percent Early Preterm Birth (Estimated Gestational Age <34 Weeks) by Prosperity Region, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	3.0	3.0	3.1	3.0	2.9	2.9	2.9	3.0	2.7
1	2.1	2.4	2.1	2.0	2.1	1.9	2.9	2.7	1.8
2	2.0	2.4	1.6	2.3	2.3	1.6	2.2	1.7	2.2
3	2.1	2.4	2.6	2.1	2.4	2.5	1.3	2.5	2.5
4	2.6	2.6	2.6	2.8	2.6	2.5	2.6	2.4	2.4
5	2.2	2.5	2.3	2.2	2.7	2.1	2.1	2.4	2.4
6	3.1	3.1	3.1	3.2	3.0	3.0	3.3	3.1	2.6
7	3.2	2.7	2.9	3.0	2.5	2.5	2.9	3.0	2.6
8	3.0	2.8	2.7	2.7	2.5	2.4	2.4	2.9	2.6
9	2.4	2.6	2.8	2.7	2.5	2.7	2.9	2.6	2.3
10	3.6	3.4	3.7	3.5	3.3	3.5	3.3	3.5	3.1



Early preterm birth rate is defined as number of births delivered before 34 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

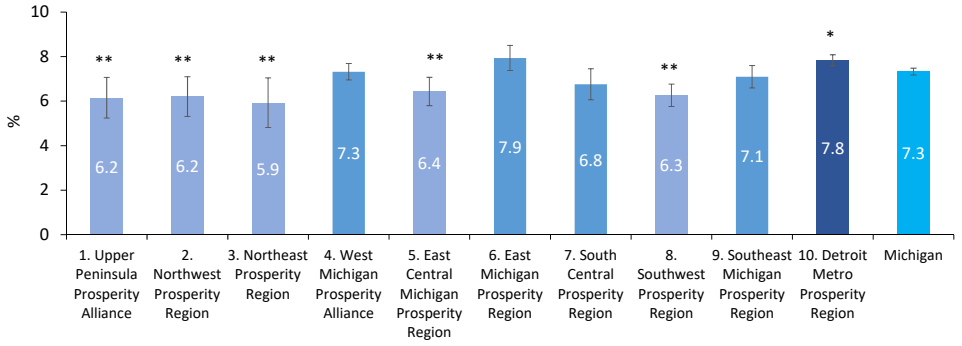
39

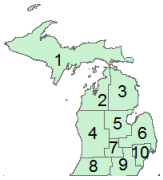
Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of early preterm birth by prosperity region of residence at birth within Michigan from 2010 to 2018. Early preterm birth is defined as a birth of a baby less than 34 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of early preterm birth is calculated as the number of early preterm births divided by the number of live births multiplied by 100. The incidence of early preterm birth by prosperity region has remained relatively stable over the last several years. From 2010 to 2018, the incidences of early preterm birth within prosperity regions 2, 3, and 5 have shown a slow increasing trend, however, the incidences of preterm birth within prosperity regions 1, 4, 6, 7, 8, 9, and 10 have shown a slow decline over the same time period.

Late Preterm Birth, Michigan, 2018

Percent Late Preterm Birth by Prosperity Region, Michigan, 2018





* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

Late preterm birth rate is defined as number of births delivered at 34-36 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

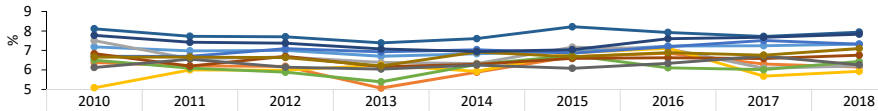
40

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

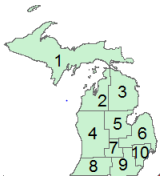
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of late preterm birth by prosperity region of residence at birth within Michigan in 2018. Late preterm birth is defined as a birth of a baby at 34-36 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of late preterm birth is calculated as the number of late preterm births divided by the number of live births multiplied by 100. In 2018, the incidence of late preterm birth was the highest in the Detroit Metro prosperity region (7.8%) and the lowest in the Northeast prosperity region (5.9%). The incidence of late preterm birth was significantly higher in region 10, and was significantly lower in regions 1, 2, 3, 5, and 8, when compared to the incidence within the State of Michigan.

Late Preterm Birth, Michigan, 2010-2018

Percent Late Preterm Birth (Estimated Gestational Age 34-36 Weeks) by Prosperity Region, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	7.2	7.0	7.0	6.7	6.8	6.9	7.2	7.2	7.3
1	6.4	6.2	6.2	5.1	5.9	6.7	6.9	6.3	6.2
2	7.5	6.6	6.7	6.4	6.3	7.2	7.1	6.1	6.2
3	5.1	6.0	6.0	6.3	5.9	6.9	7.1	5.7	5.9
4	6.7	6.7	7.1	6.9	7.0	6.9	7.2	7.5	7.3
5	6.5	6.1	5.9	5.4	6.3	6.7	6.1	6.0	6.4
6	8.1	7.7	7.7	7.4	7.6	8.2	7.9	7.7	7.9
7	6.8	6.2	6.7	6.2	6.3	6.6	6.6	6.6	6.8
8	6.1	6.6	6.1	6.0	6.3	6.1	6.3	6.7	6.3
9	6.7	6.7	6.6	6.2	6.9	6.7	6.9	6.8	7.1
10	7.8	7.4	7.4	7.1	6.9	7.0	7.6	7.7	7.8



Late preterm birth rate is defined as number of births delivered at 34-36 completed weeks of gestation per 100 live births. Gestational age is based on the obstetric estimate of gestation.

41

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of late preterm birth by prosperity region of residence at birth within Michigan from 2010 to 2018. Late preterm birth is defined as a birth of a baby at 34-36 completed weeks of gestation. Gestational age is based on the obstetric estimate of gestation. The incidence of late preterm birth is calculated as the number of late preterm births divided by the number of live births multiplied by 100. The incidence of late preterm birth by prosperity region has remained relatively stable over the last several years. From 2010 to 2018, the incidences of late preterm birth within prosperity regions 3, 4, 8, and 9 have shown a slow increasing trend, however, the incidences of late preterm birth within prosperity regions 1, 2, 5, 6, 7, and 10 have shown a slow decline over the same time period.

Low Birthweight, Michigan, 2010-2018

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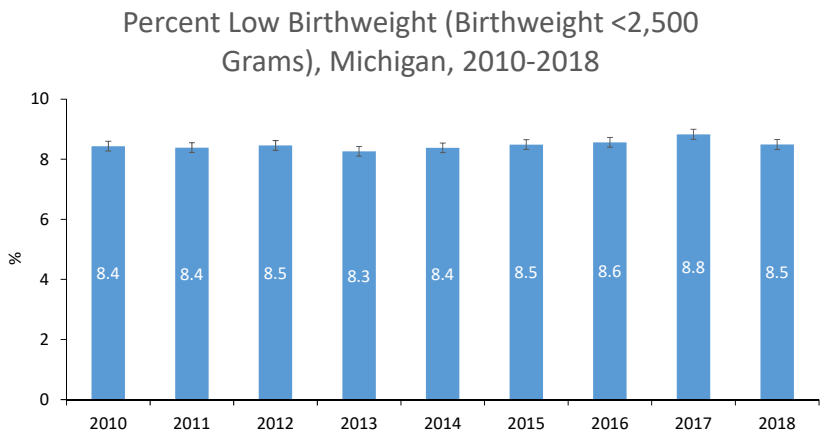
The next several slides contain updated low birthweight statistics for the State of Michigan.

Low Birthweight, Michigan, 2010-2018



Year	# Live Births	# LBW	LBW %
2010	114,717	9,678	8.4
2011	114,159	9,576	8.4
2012	112,708	9,535	8.5
2013	113,732	9,397	8.3
2014	114,460	9,592	8.4
2015	113,211	9,611	8.5
2016	113,374	9,708	8.6
2017	111,507	9,846	8.8
2018	110,093	9,350	8.5

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

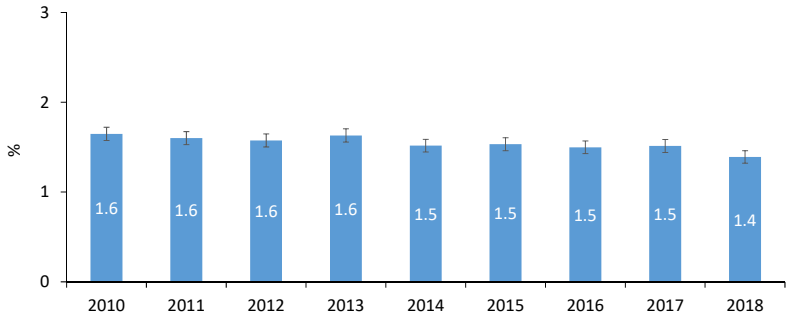
Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

43

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of low birthweight within Michigan from 2010 through 2018. Low birthweight is defined as a birthweight of a baby less than 2,500 grams. The incidence of low birthweight is calculated as the number of low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of low birthweight in Michigan was 8.5%. The incidence of low birthweight within Michigan increased slowly from 2010 to 2017 but decreased significantly in 2018.

Very Low Birthweight, Michigan, 2010-2018

Percent Very Low Birthweight (Birthweight <1,500 Grams), Michigan, 2010-2018



Year	# Live Births	# VLBW	VLBW %
2010	114,717	1,890	1.6
2011	114,159	1,827	1.6
2012	112,708	1,775	1.6
2013	113,732	1,854	1.6
2014	114,460	1,736	1.5
2015	113,211	1,735	1.5
2016	113,374	1,699	1.5
2017	111,507	1,687	1.5
2018	110,093	1,531	1.4

Very low birthweight rate is defined as number of births with baby birthweight <1,500 grams per 100 live births.

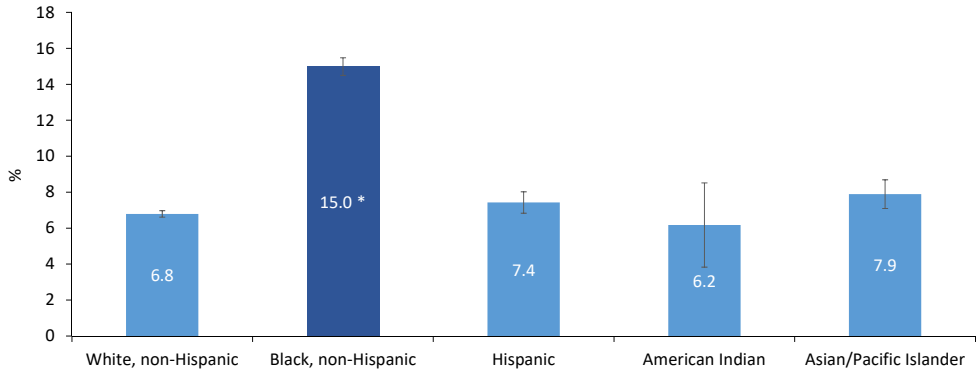
44

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of very low birthweight within Michigan from 2010 through 2018. Very low birthweight is defined as a birthweight of a baby less than 1,500 grams. The incidence of very low birthweight is calculated as the number of very low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of very low birthweight in Michigan was 1.4%. The incidence of very low birthweight within Michigan has been relatively stable over the last nine years.

Low Birthweight, Michigan, 2018

Percent Low Birthweight by Maternal Race/Ethnicity, Michigan, 2018



* = significantly higher than all other racial/ethnic groups

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

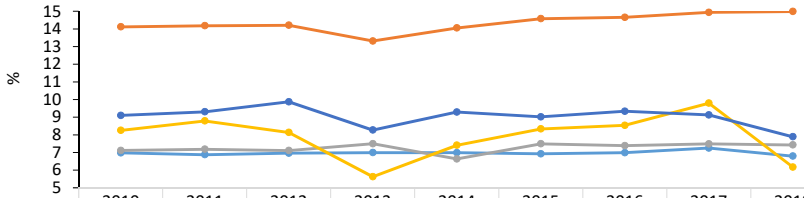
Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

45

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of low birthweight by maternal race/ethnicity within Michigan in 2018. Low birthweight is defined as a birthweight of a baby less than 2,500 grams. The incidence of low birthweight is calculated as the number of low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of low birthweight in Michigan was 6.8% among White, non-Hispanic women, 15.0% among Black, non-Hispanics, 7.4% among Hispanics, 6.2% among American Indians, and 7.9% among Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher risk of delivering low birthweight babies when compared to other racial/ethnic groups.

Low Birthweight, Michigan, 2010-2018

Percent Low Birthweight (Birthweight <2,500 Grams) by Maternal Race/Ethnicity, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
White, non-Hispanic	7.0	6.9	7.0	7.0	7.0	6.9	7.0	7.3	6.8
Black, non-Hispanic	14.1	14.2	14.2	13.3	14.1	14.6	14.7	14.9	15.0
Hispanic	7.1	7.2	7.1	7.5	6.6	7.5	7.4	7.5	7.4
American Indian	8.3	8.8	8.1	5.6	7.4	8.3	8.5	9.8	6.2
Asian/Pacific Islander	9.1	9.3	9.9	8.3	9.3	9.0	9.3	9.1	7.9

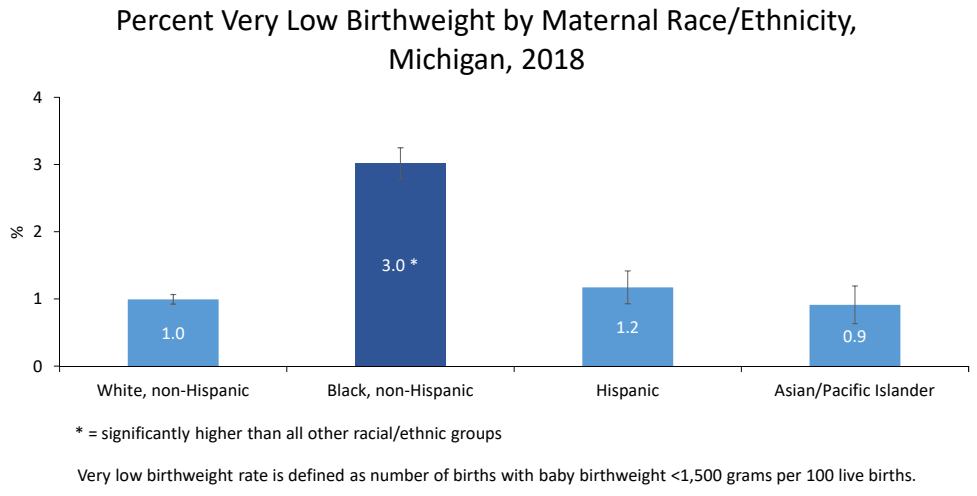
Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.

46

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of low birthweight by maternal race/ethnicity within Michigan from 2010 through 2018. Low birthweight is defined as a birthweight of a baby less than 2,500 grams. The incidence of low birthweight is calculated as the number of low birthweight divided by the number of live births multiplied by 100. The incidence of low birthweight for White non-Hispanic has been relatively stable over the last several years but has increased slowly over the same time period for Black, non-Hispanic women. Due to a small sample size, the incidence of low birthweight was unstable for Native American women from 2010 to 2018. Black non-Hispanic women have the highest risk of delivering low birthweight babies when compared to other racial/ethnic groups.

Very Low Birthweight, Michigan, 2018



* = significantly higher than all other racial/ethnic groups

Very low birthweight rate is defined as number of births with baby birthweight <1,500 grams per 100 live births.

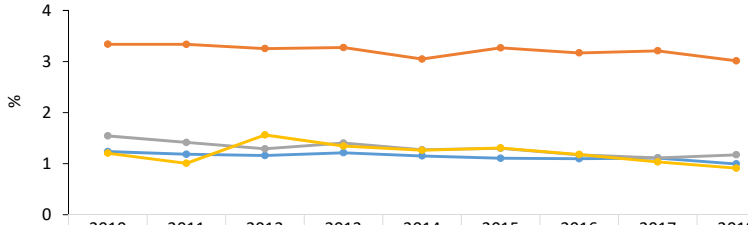
47

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of very low birthweight by maternal race/ethnicity within Michigan in 2018. Very low birthweight is defined as a birthweight of a baby less than 1,500 grams. The incidence of very low birthweight is calculated as the number of very low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of very low birthweight in Michigan was 1.0% among White, non-Hispanic women, 3.0% among Black, non-Hispanics, 1.2% among Hispanics, and 0.9% among Asian/Pacific Islander women. Black non-Hispanic women have a significantly higher risk of delivering very low birthweight babies when compared to other racial/ethnic groups.

Very Low Birthweight, Michigan, 2010-2018

Percent Very Low Birthweight (Birthweight <1,500 Grams)
by Maternal Race/Ethnicity, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
White, non-Hispanic	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.0
Black, non-Hispanic	3.3	3.3	3.3	3.3	3.0	3.3	3.2	3.2	3.0
Hispanic	1.5	1.4	1.3	1.4	1.3	1.3	1.2	1.1	1.2
Asian/Pacific Islander	1.2	1.0	1.6	1.3	1.3	1.3	1.2	1.0	0.9

Very low birthweight rate is defined as number of births with baby birthweight <1,500 grams per 100 live births.

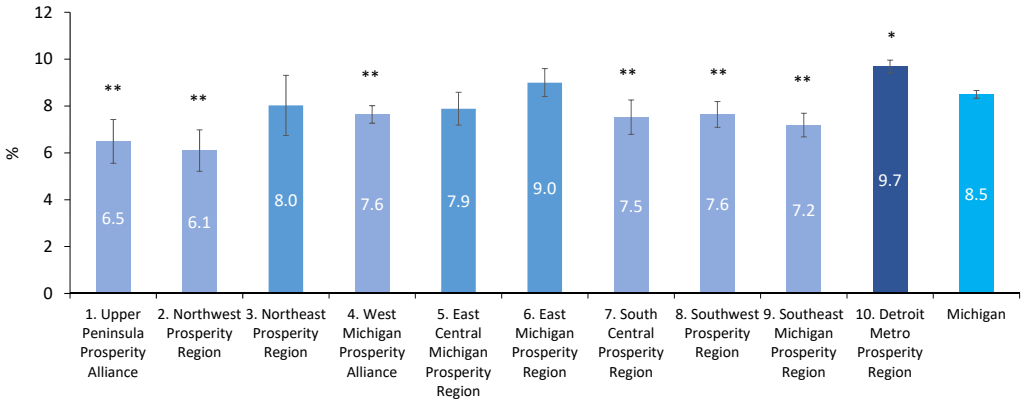
48

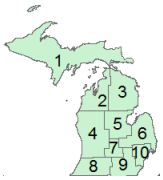
Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of very low birthweight by maternal race/ethnicity within Michigan from 2010 through 2018. Very low birthweight is defined as a birthweight of a baby less than 1,500 grams. The incidence of very low birthweight is calculated as the number of very low birthweight divided by the number of live births multiplied by 100. The incidence of very low birthweight by race/ethnicity has been relatively stable from 2010 to 2018. Due to a small sample size, the incidence of very low birthweight was unstable for Native American women from 2010 to 2018. Black non-Hispanic women have the highest risk of delivering very low birthweight babies when compared to other racial/ethnic groups.

Low Birthweight, Michigan, 2018

Percent Low Birthweight by Prosperity Region, Michigan, 2018





* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

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

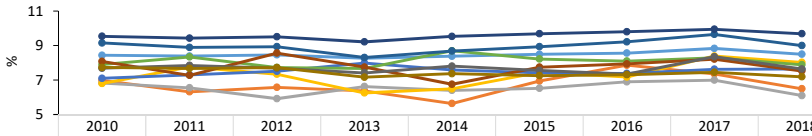
49

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

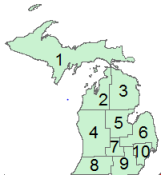
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of low birthweight by prosperity region of residence at birth within Michigan in 2018. Low birthweight is defined as a birthweight of a baby less than 2,500 grams. The incidence of low birthweight is calculated as the number of low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of low birthweight was the highest in the Detroit Metro prosperity region (9.7%) and the lowest in the Northwest prosperity region (6.1%). The incidence of low birthweight was significantly higher in region 10, and was significantly lower in regions 1, 2, 4, 7, 8 and 9, when compared to the incidence within the State of Michigan.

Low Birthweight, Michigan, 2010-2018

Percent Low Birthweight (Birthweight <2,500 Grams) by Prosperity Region, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	8.4	8.4	8.5	8.3	8.4	8.5	8.6	8.8	8.5
1	7.0	6.3	6.6	6.4	5.6	6.9	7.9	7.4	6.5
2	6.8	6.5	5.9	6.6	6.4	6.5	6.9	7.0	6.1
3	6.8	7.8	7.3	6.3	6.5	7.4	7.2	8.4	8.0
4	7.1	7.3	7.5	8.0	7.6	7.4	7.4	7.6	7.6
5	7.9	8.3	7.7	7.7	8.7	8.2	8.1	8.3	7.9
6	9.1	8.9	8.9	8.3	8.7	8.9	9.2	9.6	9.0
7	8.1	7.3	8.6	7.7	6.8	7.7	7.9	8.2	7.5
8	7.7	7.8	7.7	7.4	7.8	7.6	7.3	8.4	7.6
9	7.7	7.7	7.7	7.2	7.4	7.3	7.3	7.4	7.2
10	9.5	9.4	9.5	9.2	9.5	9.7	9.8	9.9	9.7



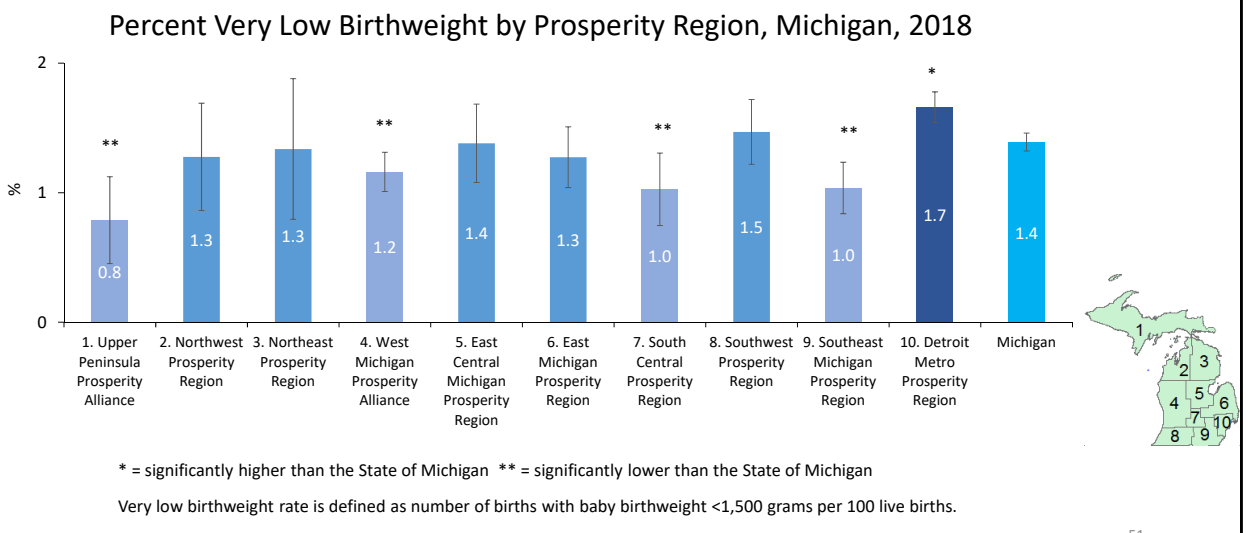
Low birthweight rate is defined as number of births with baby birthweight <2,500 grams per 100 live births.

50

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of low birthweight by prosperity region of residence at birth within Michigan from 2010 to 2018. Low birthweight is defined as a birthweight of a baby less than 2,500 grams. The incidence of low birthweight is calculated as the number of low birthweight divided by the number of live births multiplied by 100. The incidence of low birthweight by prosperity region has remained relatively stable over the last nine years. From 2010 to 2018, the incidences of low birthweight within prosperity regions 3, 4, 5, and 10 have shown a slow increasing trend, however, the incidences of low birthweight within prosperity regions 1, 2, 6, 7, 8, and 9 have shown a slow decline over the same time period.

Very Low Birthweight, Michigan, 2018



* = significantly higher than the State of Michigan ** = significantly lower than the State of Michigan

Very low birthweight rate is defined as number of births with baby birthweight <1,500 grams per 100 live births.

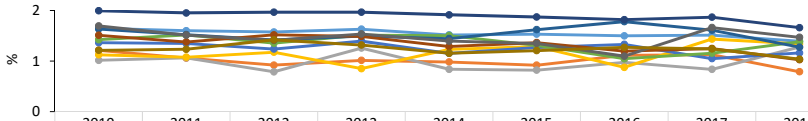
51

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

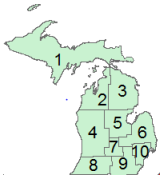
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of very low birthweight by prosperity region of residence at birth within Michigan in 2018. Very low birthweight is defined as a birthweight of a baby less than 1,500 grams. The incidence of very low birthweight is calculated as the number of very low birthweight divided by the number of live births multiplied by 100. In 2018, the incidence of very low birthweight was the highest in the Detroit Metro prosperity region (1.7%) and the lowest in the Upper Peninsula prosperity alliance (0.8%). The incidence of very low birthweight was significantly higher in region 10, and was significantly lower in regions 1, 4, 7, and 9, when compared to the incidence within the State of Michigan.

Very Low Birthweight, Michigan, 2010-2018

Percent Very Low Birthweight (Birthweight <1,500 Grams) by Prosperity Region, Michigan, 2010-2018



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Michigan	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4
1	1.2	1.1	0.9	1.0	1.0	0.9	1.1	1.1	0.8
2	1.0	1.1	0.8	1.3	0.8	0.8	1.0	0.8	1.3
3	1.1	1.1	1.2	0.8	1.2	1.3	0.9	1.4	1.3
4	1.4	1.3	1.2	1.4	1.2	1.3	1.3	1.0	1.2
5	1.4	1.5	1.4	1.5	1.5	1.3	1.0	1.2	1.4
6	1.6	1.5	1.4	1.5	1.4	1.6	1.8	1.6	1.3
7	1.5	1.4	1.5	1.5	1.3	1.4	1.2	1.2	1.0
8	1.7	1.5	1.4	1.5	1.4	1.3	1.1	1.7	1.5
9	1.2	1.2	1.4	1.3	1.2	1.2	1.3	1.2	1.0
10	2.0	2.0	2.0	2.0	1.9	1.9	1.8	1.9	1.7



Very low birthweight rate is defined as number of births with baby birthweight <1,500 grams per 100 live births.

52

Data source: Michigan resident live birth files, Division for Vital Records and Health Statistics, MDHHS

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics, this slide shows the incidence of very low birthweight by prosperity region of residence at birth within Michigan from 2010 to 2018. Very low birthweight is defined as a birthweight of a baby less than 1,500 grams. The incidence of very low birthweight is calculated as the number of very low birthweight divided by the number of live births multiplied by 100. The incidence of very low birthweight by prosperity region has remained relatively stable over the last nine years. From 2010 to 2018, the incidences of very low birthweight within prosperity regions 2 and 3 have shown a slow increasing trend, however, the incidences of very low birthweight within prosperity regions 1, 4, 5, 6, 7, 8, 9, and 10 have shown a slow decline over the same time period.