

# Neonatal Abstinence Syndrome, Michigan, 2010 – 2018

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Michigan Department of Health and Human Services (MDHHS)  
Data source: Michigan Resident Live Birth Files Linked with Michigan Hospital Discharge Data (3/3/2020),  
Division for Vital Records and Health Statistics, MDHHS  
March 2020



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4/23/2020

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This presentation provides information about the neonatal abstinence syndrome in the State of Michigan, 2010-2018.

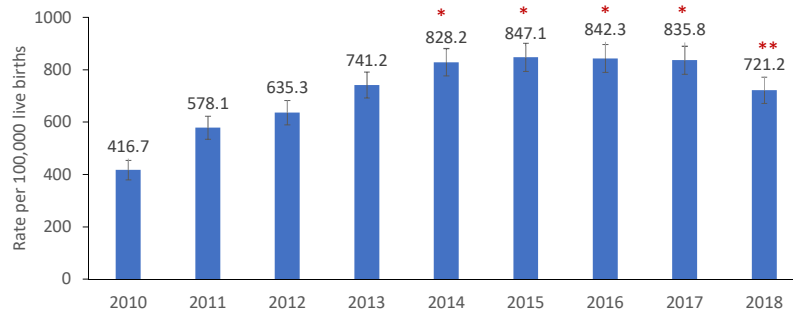
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Data source: Michigan Resident Live Birth Files Linked with Michigan Hospital Discharge Data (3/3/2020), Division for Vital Records and Health Statistics, MDHHS

Revised: March 2020

# Neonatal Abstinence Syndrome (NAS) Michigan, 2010-2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births), Michigan, 2010-2018



| Year | # Live Births | # NAS | NAS Rate |
|------|---------------|-------|----------|
| 2010 | 114,717       | 478   | 416.7    |
| 2011 | 114,159       | 660   | 578.1    |
| 2012 | 112,708       | 716   | 635.3    |
| 2013 | 113,732       | 843   | 741.2    |
| 2014 | 114,460       | 948   | 828.2    |
| 2015 | 113,211       | 959   | 847.1    |
| 2016 | 113,374       | 955   | 842.3    |
| 2017 | 111,507       | 932   | 835.8    |
| 2018 | 110,093       | 794   | 721.2    |

\* = significantly higher than the incidence in 2018      \*\* = Increase in untreated NAS cases in 2018 (potentially due to use of Eat, Sleep, Console model)

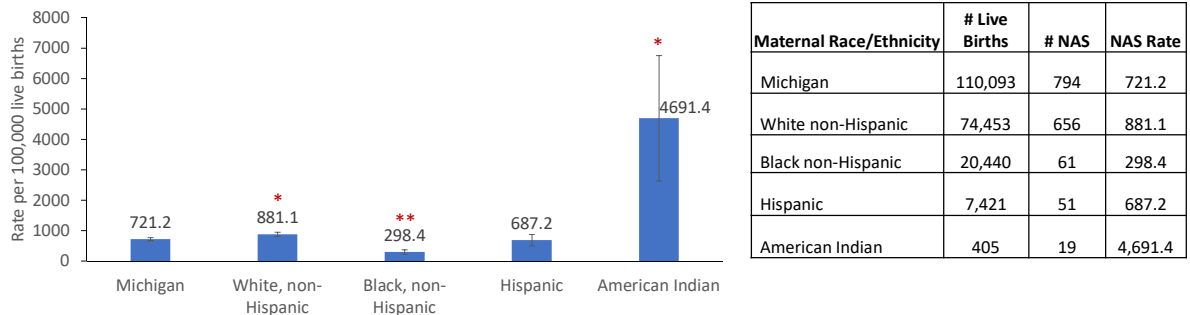
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within the State of Michigan from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Michigan was 721.2 per 100,000 live births. The incidence of neonatal abstinence syndrome within Michigan decreased significantly from 2017 to 2018. Over the past few years, there has been an increase in the number of untreated NAS cases that were reported in Michigan. In 2018, the number of untreated NAS cases increased to a level that caused the treated NAS rate to decrease significantly. This transition from treated to untreated NAS cases could potentially be a result of the implementation of the eat, sleep, console model within Michigan.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome by Maternal Race/Ethnicity, Michigan, 2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births) by Maternal Race/Ethnicity,  
Michigan, 2018



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

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

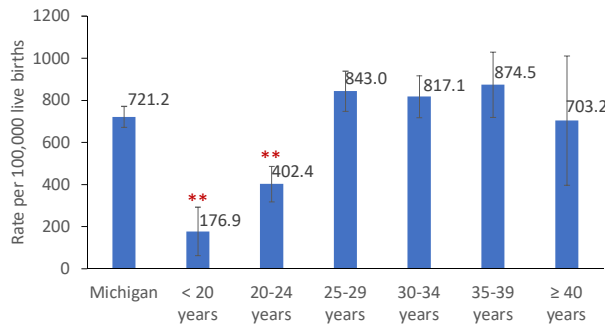
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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the average incidence of neonatal abstinence syndrome (NAS) by maternal race/ethnicity within the State of Michigan in 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2018, there were some differences in the incidence of neonatal abstinence syndrome by maternal race/ethnicity, from a high of 4,691.4 per 100,000 live births for American Indian women to a low of 298.4 for Black non-Hispanic women. The incidence of neonatal abstinence syndrome was significantly higher among American Indian women (4,691.4 per 100,000 live births) and White non-Hispanic women (881.1 per 100,000 live births), and was significantly lower among Black non-Hispanic women (298.4 per 100,000 live births), when compared to the incidence within the State of Michigan (721.2 per 100,000 live births).

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome by Maternal Age, Michigan, 2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births)  
by Maternal Age, Michigan, 2018



| Maternal Age | # Live Births | # NAS | NAS Rate |
|--------------|---------------|-------|----------|
| Michigan     | 110,093       | 794   | 721.2    |
| < 20 years   | 5,087         | 9     | 176.9    |
| 20-24 years  | 21,621        | 87    | 402.4    |
| 25-29 years  | 35,232        | 297   | 843.0    |
| 30-34 years  | 31,452        | 257   | 817.1    |
| 35-39 years  | 13,837        | 121   | 874.5    |
| ≥ 40 years   | 2,844         | 20    | 703.2    |

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

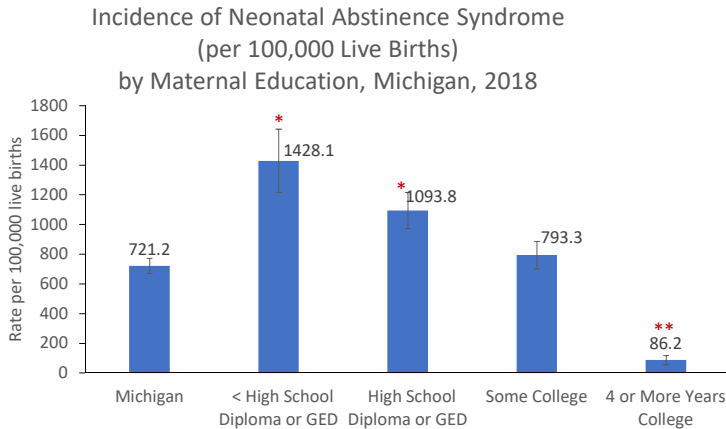
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the average incidence of neonatal abstinence syndrome (NAS) by maternal age within the State of Michigan in 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2018, there were some differences in the incidence of neonatal abstinence syndrome by maternal age, from a high of 874.5 per 100,000 live births for women aged 35-39 years to a low of 176.9 per 100,000 live births for women aged less than 20 years. The incidence of neonatal abstinence syndrome was significantly lower among women aged less than 20 years (176.9 per 100,000 live births) and women aged 20-24 years (402.4 per 100,000 live births), when compared to the incidence within the State of Michigan (721.2 per 100,000 live births).

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome by Maternal Education, Michigan, 2018



| Maternal Education           | # Live Births | # NAS | NAS Rate |
|------------------------------|---------------|-------|----------|
| Michigan                     | 110,093       | 794   | 721.2    |
| < High School Diploma or GED | 11,904        | 170   | 1,428.1  |
| High School Diploma or GED   | 27,792        | 304   | 1,093.8  |
| Some College                 | 34,538        | 274   | 793.3    |
| 4 or More Years College      | 34,795        | 30    | 86.2     |

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

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

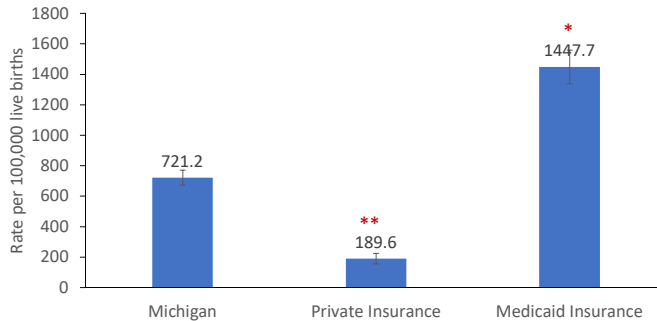
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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the average incidence of neonatal abstinence syndrome (NAS) by maternal education within the State of Michigan in 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2018, there were some differences in the incidence of neonatal abstinence syndrome by maternal education, from a high of 1,428.1 per 100,000 live births for women who did not finish high school to a low of 86.2 per 100,000 live births for women who had four or more years college. The incidence of neonatal abstinence syndrome was significantly lower among women who had four or more years college (86.2 per 100,000 live births), and significantly higher among women who had high school education or GED (1,093.8 per 100,000 live births) and women who did not finish high school (1,428.1 per 100,000 live births), when compared to the incidence within the State of Michigan (721.2 per 100,000 live births).

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome by Payment Source, Michigan, 2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births)  
by Payment Source, Michigan, 2018



| Payment Source     | # Live Births | # NAS | NAS Rate |
|--------------------|---------------|-------|----------|
| Michigan           | 110,093       | 794   | 721.2    |
| Private Insurance  | 62,220        | 118   | 189.6    |
| Medicaid Insurance | 45,382        | 657   | 1,447.7  |

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

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

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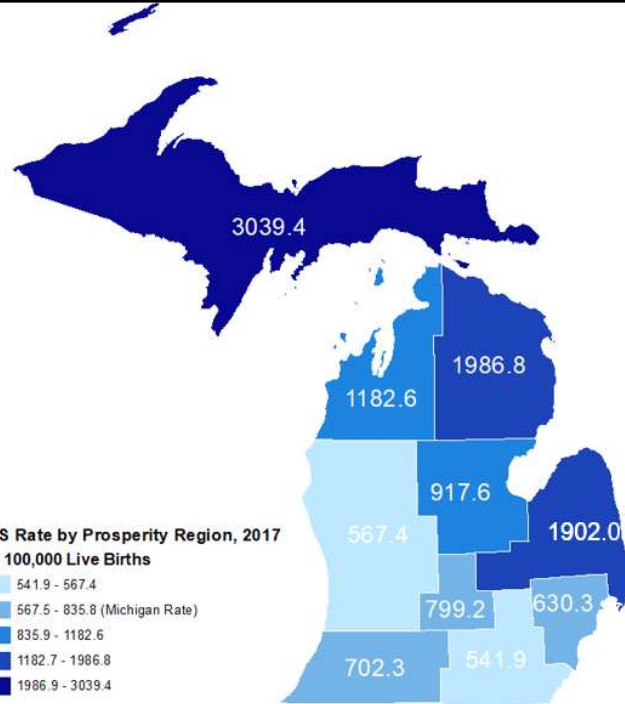
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the average incidence of neonatal abstinence syndrome (NAS) by payment source within the State of Michigan in 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2018, there were some differences in the incidence of neonatal abstinence syndrome by payment source, from a high of 1,447.7 per 100,000 live births for women who intended to use Medicaid as payment source at delivery to a low of 189.6 per 100,000 live births for women who intended to use private insurance as payment source at delivery. The incidence of neonatal abstinence syndrome was significantly lower among women who intended to use private insurance as payment source at delivery (189.6 per 100,000 live births), and significantly higher among women who intended to use Medicaid as payment source at delivery (1,447.7 per 100,000 live births), when compared to the incidence within the State of Michigan (721.2 per 100,000 live births).

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) by Prosperity Region, Michigan, 2017

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

**NAS Rate by Prosperity Region, 2017  
Per 100,000 Live Births**



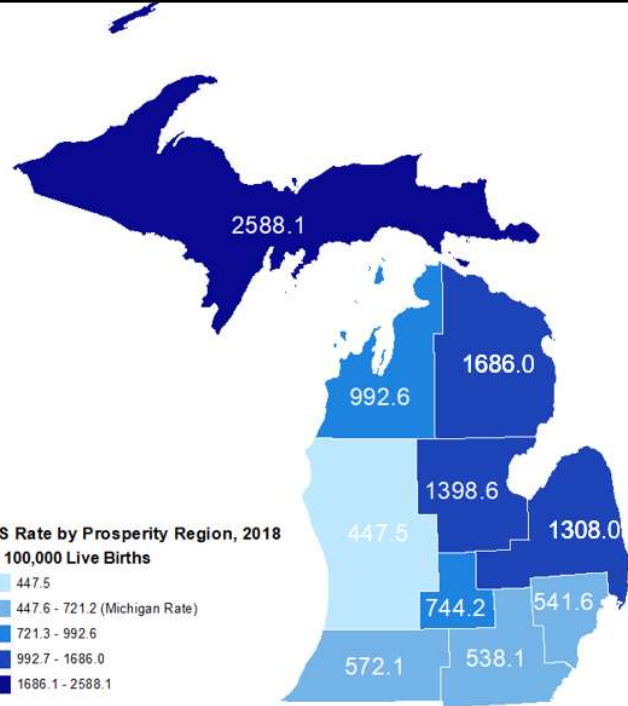
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) by prosperity region within the State of Michigan in 2017. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2017, there were some differences in the incidence of neonatal abstinence syndrome by prosperity region, from a high of 3039.4 per 100,000 live births for prosperity region 1 to a low of 541.9 for prosperity region 9. The incidence of neonatal abstinence syndrome was significantly higher in regions 1, 3 and 6, and was significantly lower in regions 4, 9 and 10, when compared to the incidence within the State of Michigan (835.8 per 100,000 live births).

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) by Prosperity Region, Michigan, 2018

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**NAS Rate by Prosperity Region, 2018**  
Per 100,000 Live Births



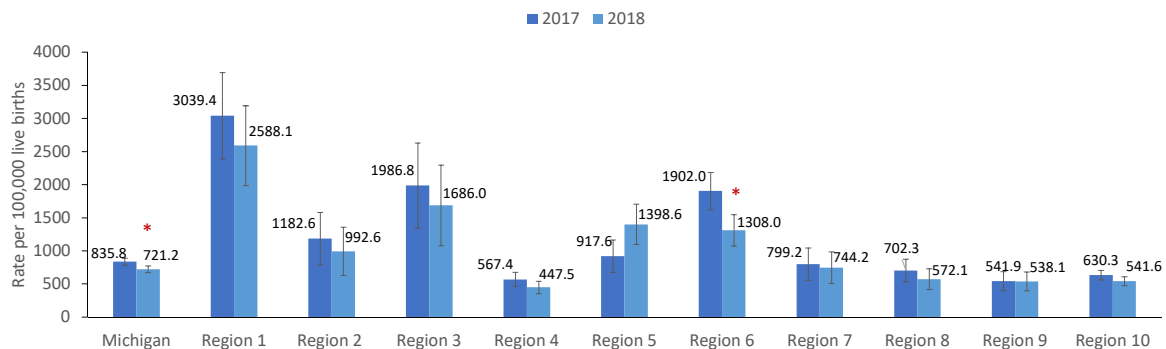
Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) by prosperity region within the State of Michigan in 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2018, there were some differences in the incidence of neonatal abstinence syndrome by prosperity region, from a high of 2588.1 per 100,000 live births for prosperity region 1 to a low of 447.5 for prosperity region 4. The incidence of neonatal abstinence syndrome was significantly higher in regions 1, 3, 5, and 6, and was significantly lower in regions 4 and 9, when compared to the incidence within the State of Michigan (721.2 per 100,000 live births).

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# Neonatal Abstinence Syndrome (NAS) by Prosperity Region, Michigan, 2017 & 2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births) by Prosperity Region, Michigan, 2017 & 2018



\* = significantly lower than the incidence in 2017.

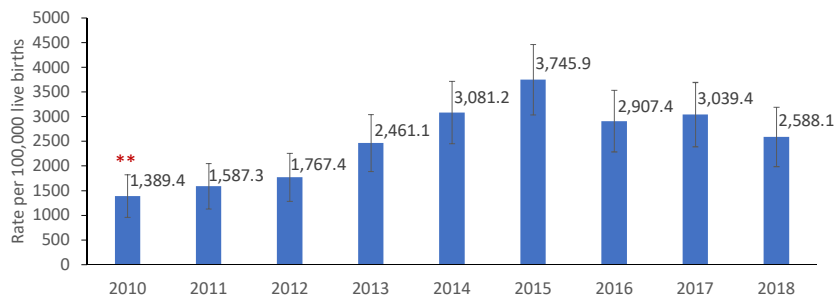
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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) by prosperity region within the State of Michigan in 2017 and 2018. Infants with NAS were identified by any report of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction). In 2017, the incidence of neonatal abstinence syndrome in Michigan was the highest in the Upper Peninsula Prosperity Alliance (3,039.4 per 100,000 live births) and the lowest in the Southeast Michigan Prosperity Region (541.9 per 100,000 live births). The incidence of neonatal abstinence syndrome was significantly higher in regions 1, 3 and 6, and was significantly lower in regions 4, 9 and 10, when compared to the incidence within the State of Michigan (835.8 per 100,000 live births). In 2018, the incidence of neonatal abstinence syndrome in Michigan was the highest in the Upper Peninsula Prosperity Alliance (2,588.1 per 100,000 live births) and the lowest in the West Michigan Prosperity Alliance (447.5 per 100,000 live births). The incidence of neonatal abstinence syndrome was significantly higher in regions 1, 3, 5, and 6, and was significantly lower in regions 4 and 9, when compared to the incidence within the State of Michigan (721.2 per 100,000 live births). The incidence of neonatal abstinence syndrome in 2018 was significantly lower than the incidence in 2017 in the State of Michigan and prosperity region 6 (East Michigan Prosperity Region).

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## Neonatal Abstinence Syndrome (NAS) Prosperity Region 1, 2010-2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births),  
Prosperity Region 1, 2010-2018



| Year | # Live Births | # NAS | NAS Rate |
|------|---------------|-------|----------|
| 2010 | 2,807         | 39    | 1,389.4  |
| 2011 | 2,835         | 45    | 1,587.3  |
| 2012 | 2,829         | 50    | 1,767.4  |
| 2013 | 2,763         | 68    | 2,461.1  |
| 2014 | 2,856         | 88    | 3,081.2  |
| 2015 | 2,723         | 102   | 3,745.9  |
| 2016 | 2,786         | 81    | 2,907.4  |
| 2017 | 2,665         | 81    | 3,039.4  |
| 2018 | 2,666         | 69    | 2,588.1  |

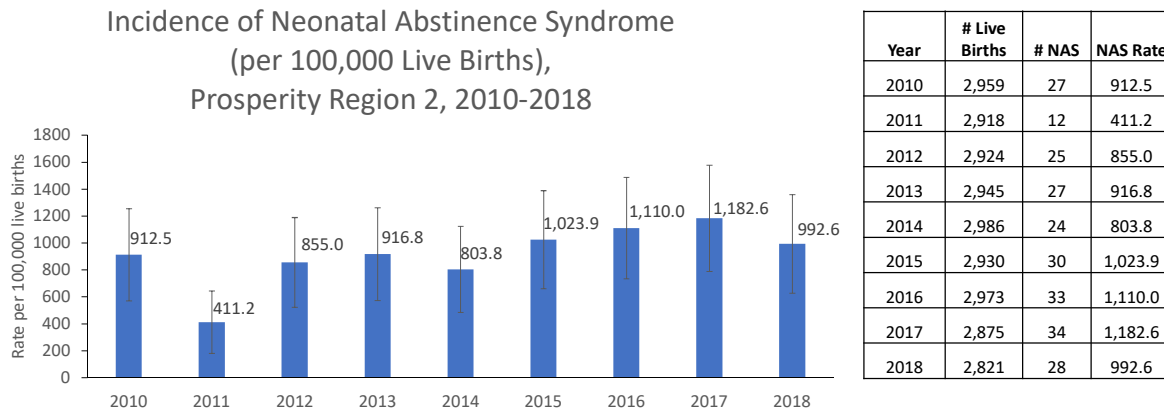
\*\* = significantly lower than the incidence in 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan's Prosperity Region 1 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 1 was 2,588.1 per 100,000 live births. The incidence of neonatal abstinence syndrome within Prosperity Region 1 significantly increased from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) Prosperity Region 2, 2010-2018

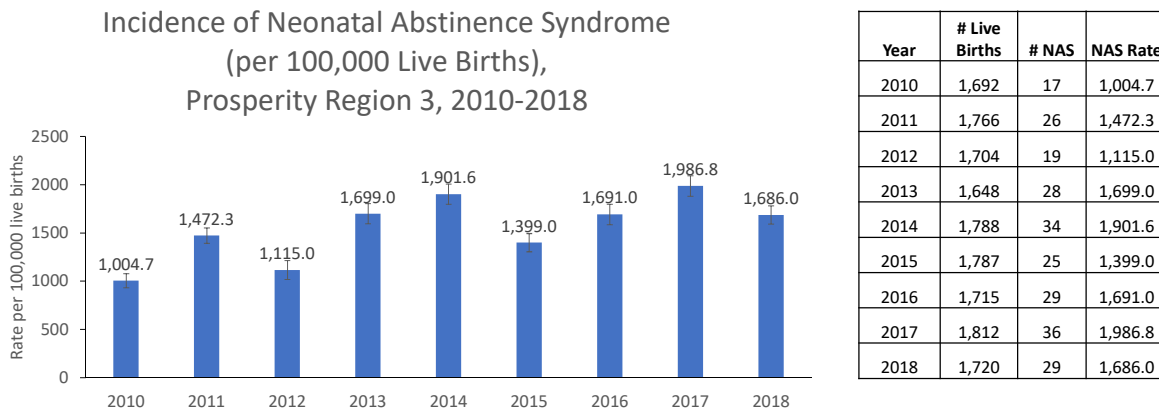


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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 2 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 2 was 992.6 per 100,000 live births. No significant changes were observed for the incidence of neonatal abstinence syndrome within Prosperity Region 2 from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) Prosperity Region 3, 2010-2018

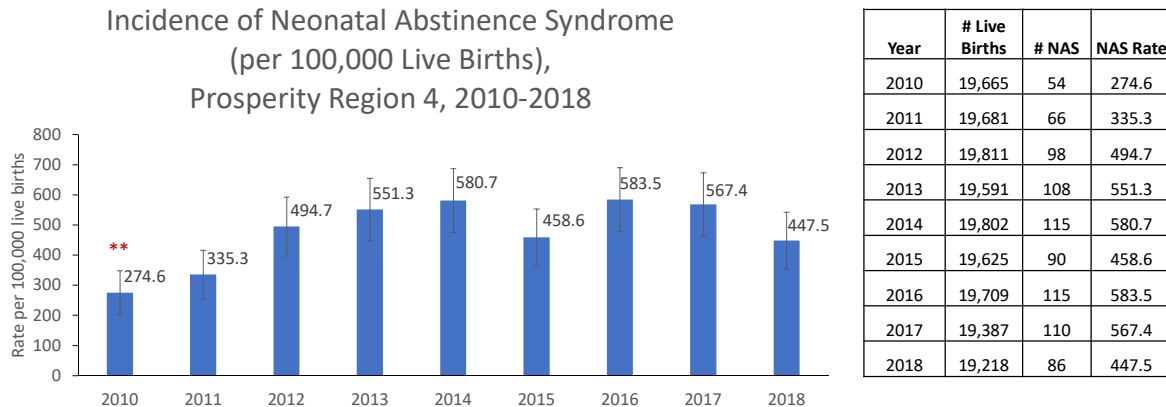


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Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan's Prosperity Region 3 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 3 was 1,686.0 per 100,000 live births. No significant changes were observed for the incidence of neonatal abstinence syndrome within Prosperity Region 3 from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) Prosperity Region 4, 2010-2018



\*\* = significantly lower than the incidence in 2018.

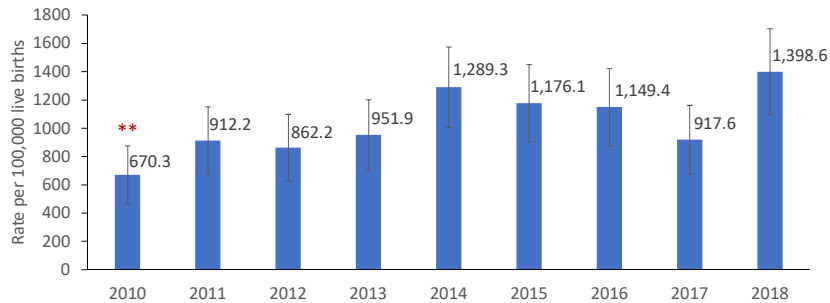
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 4 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 4 was 447.5 per 100,000 live births. The incidence of neonatal abstinence syndrome within Prosperity Region 4 significantly increased from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome (NAS) Prosperity Region 5, 2010-2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births),  
Prosperity Region 5, 2010-2018



| Year | # Live Births | # NAS | NAS Rate |
|------|---------------|-------|----------|
| 2010 | 6,117         | 41    | 670.3    |
| 2011 | 6,139         | 56    | 912.2    |
| 2012 | 5,915         | 51    | 862.2    |
| 2013 | 5,883         | 56    | 951.9    |
| 2014 | 6,050         | 78    | 1,289.3  |
| 2015 | 5,952         | 70    | 1,176.1  |
| 2016 | 5,829         | 67    | 1,149.4  |
| 2017 | 5,885         | 54    | 917.6    |
| 2018 | 5,720         | 80    | 1,398.6  |

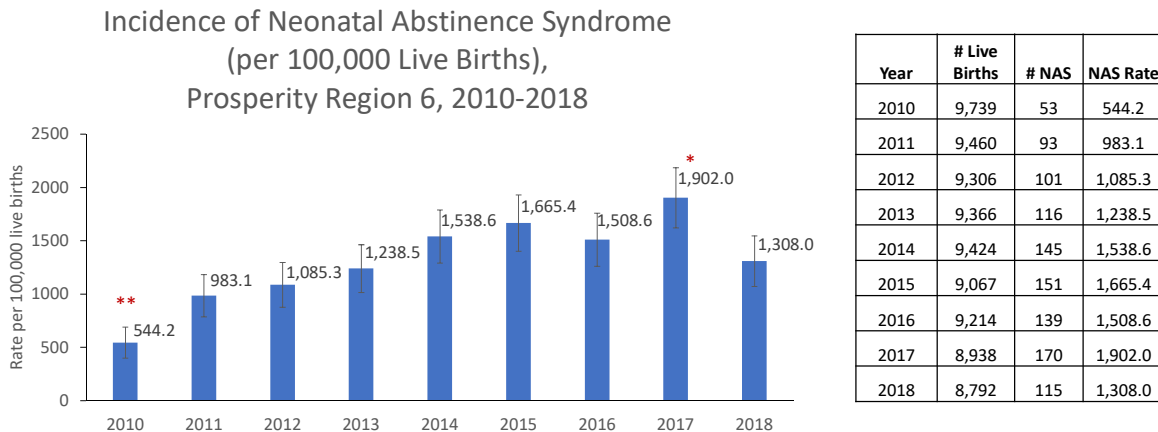
\*\* = significantly lower than the incidence in 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan's Prosperity Region 5 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 5 was 1,398.6 per 100,000 live births. The incidence of neonatal abstinence syndrome within Prosperity Region 5 significantly increased from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) Prosperity Region 6, 2010-2018



\* = significantly higher than the incidence in 2018 \*\* = significantly lower than the incidence in 2018.

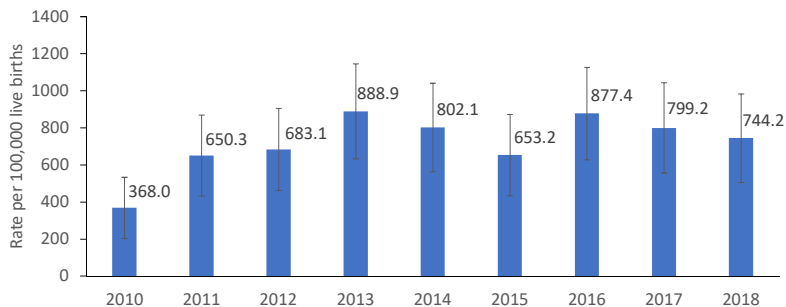
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan's Prosperity Region 6 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 6 was 1,308.0 per 100,000 live births. The incidence of neonatal abstinence syndrome within Prosperity Region 6 significantly increased from 2010 to 2018. However, a significant decrease was observed for the incidence of neonatal abstinence syndrome within Prosperity Region 6 from 2017 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

## Neonatal Abstinence Syndrome (NAS) Prosperity Region 7, 2010-2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births),  
Prosperity Region 7, 2010-2018



| Year | # Live Births | # NAS | NAS Rate |
|------|---------------|-------|----------|
| 2010 | 5,163         | 19    | 368.0    |
| 2011 | 5,228         | 34    | 650.3    |
| 2012 | 5,270         | 36    | 683.1    |
| 2013 | 5,175         | 46    | 888.9    |
| 2014 | 5,361         | 43    | 802.1    |
| 2015 | 5,205         | 34    | 653.2    |
| 2016 | 5,357         | 47    | 877.4    |
| 2017 | 5,130         | 41    | 799.2    |
| 2018 | 4,972         | 37    | 744.2    |

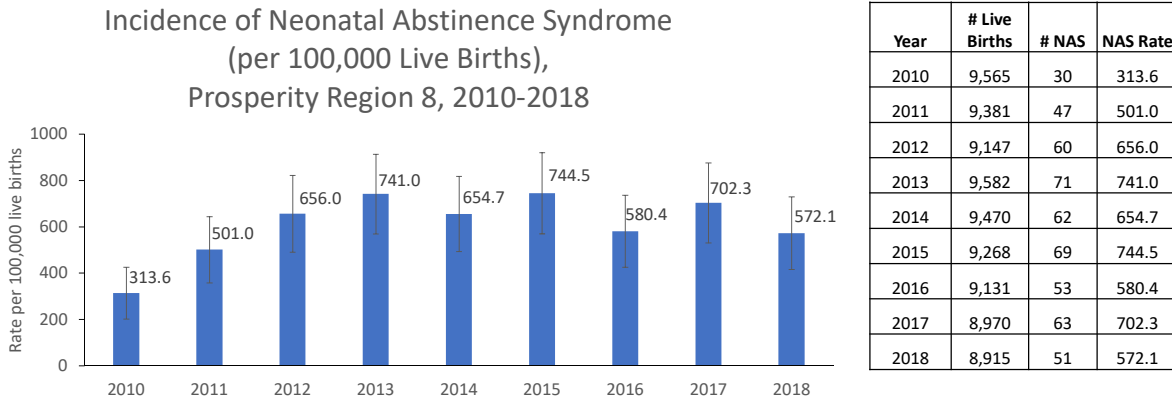
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 7 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 7 was 744.2 per 100,000 live births. No significant changes were observed for the incidence of neonatal abstinence syndrome within Prosperity Region 7 from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.



## Neonatal Abstinence Syndrome (NAS) Prosperity Region 8, 2010-2018

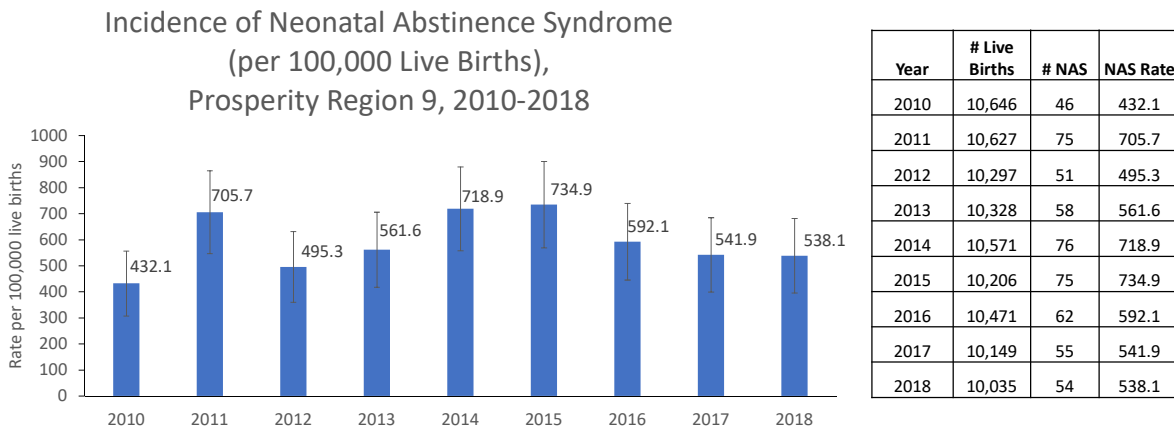


Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 8 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 8 was 572.1 per 100,000 live births. No significant changes were observed for the incidence of neonatal abstinence syndrome within Prosperity Region 8 from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome (NAS) Prosperity Region 9, 2010-2018



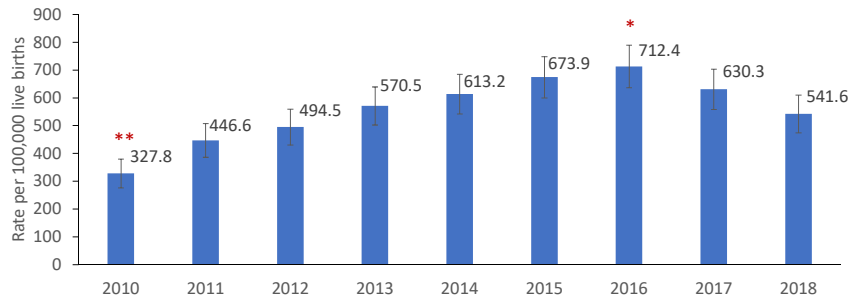
Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 9 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 9 was 538.1 per 100,000 live births. No significant changes were observed for the incidence of neonatal abstinence syndrome within Prosperity Region 9 from 2010 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

# Neonatal Abstinence Syndrome (NAS) Prosperity Region 10, 2010-2018

Incidence of Neonatal Abstinence Syndrome  
(per 100,000 Live Births),  
Prosperity Region 10, 2010-2018



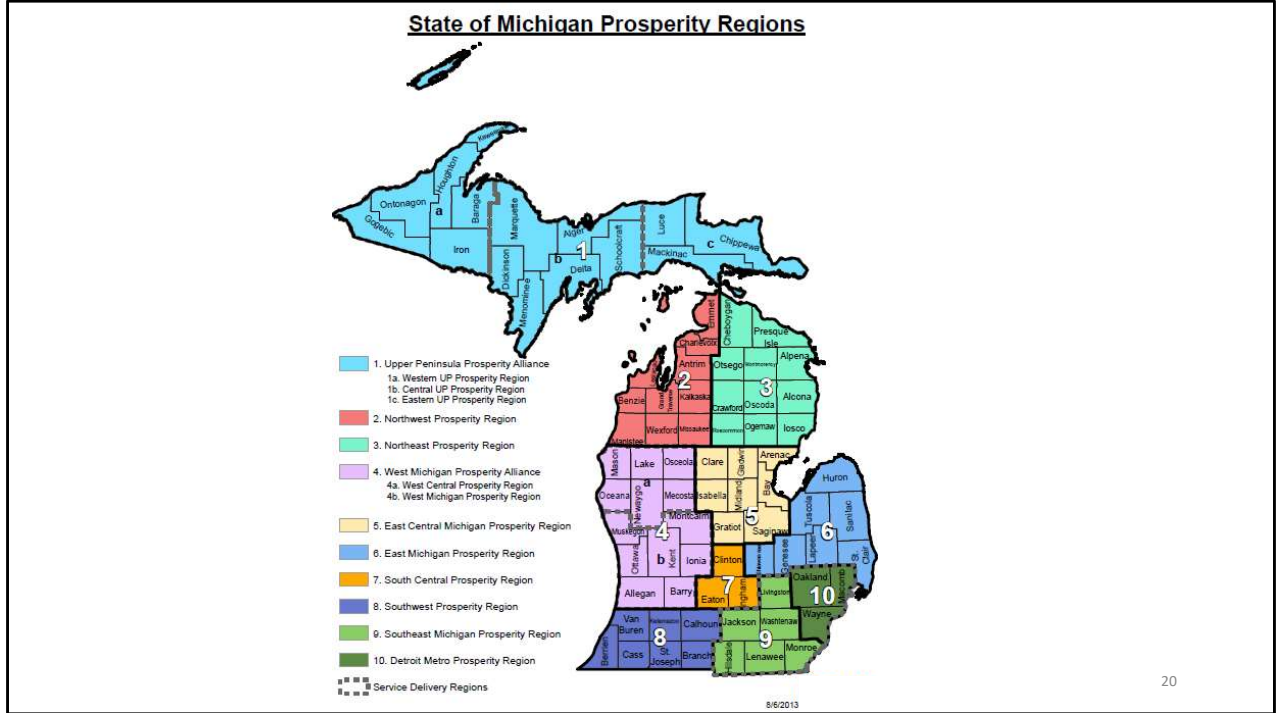
| Year | # Live Births | # NAS | NAS Rate |
|------|---------------|-------|----------|
| 2010 | 46,364        | 152   | 327.8    |
| 2011 | 46,124        | 206   | 446.6    |
| 2012 | 45,505        | 225   | 494.5    |
| 2013 | 46,451        | 265   | 570.5    |
| 2014 | 46,152        | 283   | 613.2    |
| 2015 | 46,444        | 313   | 673.9    |
| 2016 | 46,185        | 329   | 712.4    |
| 2017 | 45,693        | 288   | 630.3    |
| 2018 | 45,233        | 245   | 541.6    |

\* = significantly higher than the incidence in 2018 \*\* = significantly lower than the incidence in 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.

Using data from the Michigan Department of Health and Human Services, Division for Vital Records and Health Statistics and the Michigan Inpatient Database, this slide shows the incidence of neonatal abstinence syndrome (NAS) within Michigan’s Prosperity Region 10 from 2010 through 2018. Infants with NAS were identified by any diagnosis of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 779.5 (drug withdrawal syndrome in newborn) through September 2015 or Tenth Revision (ICD-10-CM) diagnosis code of P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction) starting in October 2015. In 2018, the incidence of neonatal abstinence syndrome in Prosperity Region 10 was 541.6 per 100,000 live births. The incidence of neonatal abstinence syndrome within Prosperity Region 10 significantly increased from 2010 to 2018. However, a significant decrease was observed for the incidence of neonatal abstinence syndrome within Prosperity Region 10 from 2016 to 2018.

Data source: Michigan Resident Inpatient Files created by the Division for Vital Records and Health Statistics, Bureau of Epidemiology and Population Health, Michigan Department of Health and Human Services, using data from the Michigan Inpatient Database obtained with permission from the Michigan Health and Hospital Association Service Corporation (MHASC). All data analyses were conducted by the Michigan Department of Health and Human Services, Maternal and Child Health Epidemiology Section.



This slide shows identifies the prosperity regions/counties within the State of Michigan.