

Neonatal Abstinence Syndrome

SECTION 1: HEADER

Indicator Type : Core Indicator

Description

This indicator captures the number of newborns who have been hospitalized and diagnosed with neonatal abstinence syndrome. Neonatal abstinence syndrome (NAS) is defined as drug withdrawal symptoms experienced by a neonate (an infant under 28 days of age),^[1] due to maternal drug use during pregnancy. NAS occurs most commonly with maternal opioid use, but can occur with other substances such as cocaine, cannabis, and amphetamines.^[2] Increased attention has been given to monitoring NAS in recent years, due to rising rates of opioid use.^[3]

Related OPHS Topics

This section cross-links the indicator to related Core Indicators products, by referencing the OPHS Alignment tables. List all OPHS topics where this indicator would be used; these will be linked to the appropriate OPHS Standard pages.

EXAMPLE:

Substance Use Prevention and
Harm Reduction

Reproductive Outcomes

SECTION 2: METHOD OF CALCULATION

Method of Calculation

Neonatal abstinence syndrome incidence rate

Number of neonates hospitalized with a
diagnosis of NAS x 1,000

Live births

Recommended Subset Analysis Categories

Use the following sub-heading and bulleted list structure to outline the recommended subsets for disaggregated analysis:

Sex of infant

- Male
- Female

Geography of infant

- All Public Health Units in Ontario
- Municipality

Infant age

- Early neonatal: 0-6 days
- Late neonatal: 7-27 days

Gestational age

- Preterm: <37 weeks
- Full Term: 37 weeks or more

Age of person who gave birth

- Suggested age groups
 - <20; 20 - 24; 25 - 29; 30 - 34; 35 - 39; 40 - 44; ≥45
 - *Note: Health units may choose to merge age categories due to small numbers, or change age categories depending on the specific analysis questions (for example: ≤24, 25-34, and ≥35 years).

SECTION 3: DATA SOURCES

Data Source(s) Table

Numerator	Denominator: Option 1	Denominator: Option 2	Denominator: Option 3
Inpatient Hospitalizations	Hospital Births	Vital Statistics Live Births	BORN Information System
Original Source: Discharge Abstract Database (DAD), Canadian Institute for	Original Source: Discharge Abstract Database (DAD), Canadian Institute for	Original Source: Vital Statistics, Office of Registrar General (ORG), ServiceOntario	Original Source: Better Outcomes Registry Network (BORN) Ontario

Health Information (CIHI)	Health Information (CIHI)		
Distributed by: Ontario Ministry of Health and Long-Term Care (MOHLTC): IntelliHEALTH ONTARIO (IntelliHEALTH)	Distributed by: Ontario Ministry of Health and Long-Term Care (MOHLTC): IntelliHEALTH ONTARIO (IntelliHEALTH)	Distributed by: Ontario Ministry of Health and Long-Term Care (MOHLTC): IntelliHEALTH ONTARIO (IntelliHEALTH)	Distributed by: Better Outcomes Registry Network (BORN) Ontario
Suggested Citation: Inpatient Hospitalizations for Neonatal Abstinence Syndrome [years], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [date].	Suggested Citation: Inpatient Hospitalizations [years], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [date].	Suggested Citation: Ontario Vital Statistics Live Birth Data [years], Ontario Ministry of Health and Long-Term Care, IntelliHEALTH ONTARIO, Date Extracted: [date].	Suggested Citation: BORN Information System [years], Date Extracted: [date].

ICD Codes

ICD-10-CA
P96.1 Neonatal withdrawal symptoms from maternal use of drugs of addiction

SECTION 4: NOTATIONS

Analysis Checklist

General Checklist

- To calculate the numerator, run the report located in IntelliHEALTH > Team content > IH Reports (Shared) > PHU > APHEO Core Indicators Reports > Opioids > Neonatal Abstinence Syndrome. Note this report uses distinct count on the encrypted health card number. If performing subset analyses, be sure to continue using distinct count on the encrypted health card number so that individuals are counted only once, even if they had multiple hospitalizations for NAS within the time period of interest.
- For information on calculating the denominator and selecting among the alternatives available, please see the [Crude Birth Rate core indicator](#)

Indicator Comments

General Comments

- The report for the numerator uses ‘all diagnoses’. This means an individual is considered to have neonatal abstinence syndrome if they have at least one hospitalization in the first 27 days of life (infant age 0-27 days) that was coded with P96.1, whether this was their primary cause of hospitalization or not.
- Query diagnoses have been excluded.
- Cases are assigned to a year based on admission date.

- Cases are counted based on distinct count on the encrypted health card number, meaning that an individual will be counted only once, even if they were hospitalized for neonatal abstinence syndrome more than once in the first 27 days of life.
- The denominator excludes stillbirths, and births outside Ontario.
- The IntelliHEALTH licensing agreement does not require suppression of small cells, but caution should be used when reporting at a level that could identify individuals. Please note that privacy policies may vary by organization. Prior to releasing data, ensure adherence to the privacy policy of your organization.
- Although neonatal abstinence syndrome is the term used most frequently in the literature, neonatal withdrawal is probably a more accurate description of the syndrome, since abstinence implies an intention to abstain, and neonates lack the capacity for such an intention.^[3]
- The long-term neurodevelopmental outcomes of the neonatal abstinence syndrome are more difficult to ascertain than short-term outcomes, given the numerous confounding environmental and social factors associated with substance-using mothers.^[3] Because long-term outcomes are not well-defined, this indicator focuses only on short-term outcomes.

SECTION 5: REFERENCES

Definitions

Neonatal Abstinence Syndrome – Neonatal abstinence syndrome (NAS) is defined as drug withdrawal symptoms experienced by a neonate, due to maternal drug use during pregnancy. NAS occurs most commonly with maternal opioid use, but can occur with other substances such as cocaine, cannabis, and amphetamines.^[2] The clinical manifestations of the syndrome range from mild tremors and irritability to fever, excessive weight loss, and seizures, and symptoms typically develop within the first few days after birth.^[3]

Live birth – the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life such as heartbeat, umbilical cord pulsation, or definite movement of voluntary muscles, whether the umbilical cord has been cut or the placenta is attached. A live birth is not necessarily a viable birth.

Neonatal – the period between a live birth and the 28th day of life.

Early neonatal – the period between the 1st and 6th day of life.

Late neonatal – the period between the 7th and 27th day of life.

Gestational age – calculated as the interval between the date of delivery of the fetus or newborn and the first day of the mother's last normal menstrual period. Full-term pregnancies average about 40 weeks (37 completed weeks to 42 completed weeks).

Preterm birth – a live birth that occurs at less than 37 completed weeks (i.e., <259 days) of gestation.^[4]

Postterm birth – a live birth that occurs at 42 or more completed weeks (i.e., ≥ 294 days) of gestation.
[4]

Cited References

1. Barfield and Committee on Fetus and Newborn. Standard Terminology for Fetal, Infant, and Perinatal Deaths. *Pediatrics*. 2016;137(5). Available from: <https://publications.aap.org/pediatrics/article/137/5/e20160551/52158/Standard-Terminology-for-Fetal-Infant-and?autologincheck=redirected>
2. Wells and Loshak. Treatment of Neonatal Abstinence Syndrome due to Crystal Methamphetamine: A Review of Clinical Effectiveness and Guidelines. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2019. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK546254/>
3. McQueen and Murphy-Oikonen. Neonatal Abstinence Syndrome. *The New England Journal of Medicine*. 2016;375:2468-2479.
4. Public Health Agency of Canada. An Overview of Perinatal Health in Canada in Canadian Perinatal Health Report, 2008 Edition. Ottawa, 2008. Available from: <http://www.phac-aspc.gc.ca/publicat/2008/cphr-rspc/pdf/cphr-rspc08-eng.pdf>

SECTION 6: CREDITS

Acknowledgements

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Revision History

Complete the standard text, and link it to the subgroup webpage:

This Core Indicator Product webpage is maintained by the [Subgroup Name] Subgroup.

Use the following table structure to document changes made to the indicator over time, and by whom:

Date	Review Type	Author	Changes	PDF
Feb. 11, 2020	New Indicator	Shelby Huffman & Kristen	➤ Create indicator document	[Insert PD

		Wheeler		 F Symbol]
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