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https://youtu.be/Tiq0XY2DSoU

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Maternal Mortality in Ontario – Partnerships for Awareness and Prevention

Public Health Ontario Rounds

May 2025

Obstetrics and Perinatal Death Review Committee (OPDRC):

Ontario

BORN Ontario

Better Outcomes Registry & Network
Registre et Réseau des Bons Résultats dès la naissance

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Objectives:

1. Describe the role of BORN Ontario in mortality surveillance and prevention of mortality

2. Describe the role of the Coroner and the Obstetrical and Perinatal Death Review Committee Coroner in investigating maternal death

3. Review prevention strategies underway in Ontario to support surveillance, prevention and investigation of maternal mortality

4. Outline areas where public health has a role to play in prevention

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Prevention Strategies

BORN	Coroner and Coroner's OPDRC
Step 1 – Awareness – Know the Numbers	
Surveillance activities and reporting - 20 years (2002-2022) of maternal deaths – 485 maternal deaths	Death investigations and reporting • 2013 – 2022: 244 deaths reviewed, 379 recommendations
Step 2 – Further Study and Working Groups on Major Risk Factors	
Examining obstetric hemorrhage	Committees on Substance Abuse, Mental Health, Free birthing
Step 3 – Understanding morbidity preceding death and developing provincial/regional strategies for prevention	
Engaging other groups/networks to develop solutions and best practices	Sharing reports and clinical vignettes with key learning points We Speak for the Dead to Protect the Living: Unrecognized Cardiovascular Complications - JOGC November 2024 – Open Access
Step 4 – Evaluation and continued surveillance	
Both groups want to have better data collection re EDI variables for enhanced reporting	

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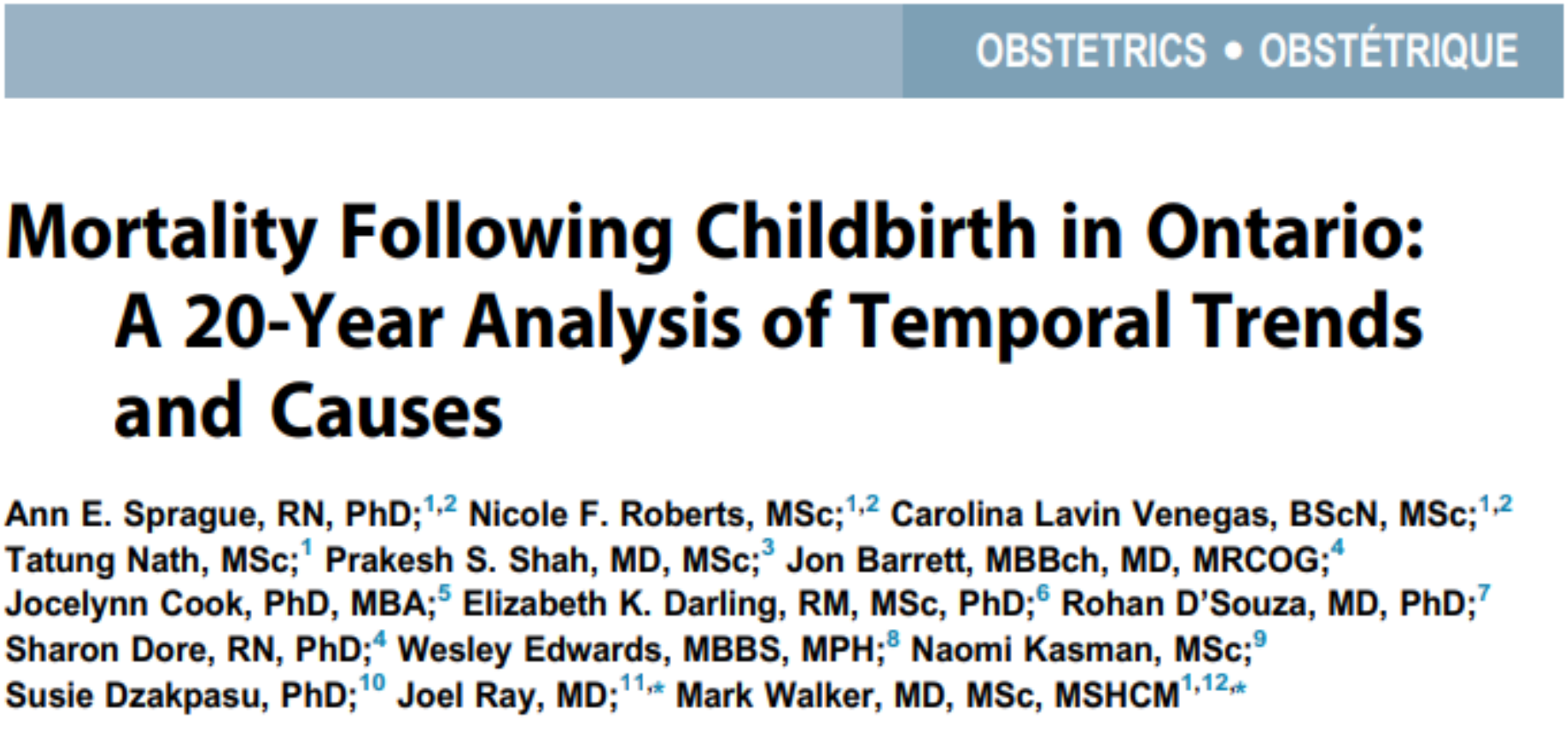
First Manuscript Published



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https://doi.org/10.1016/j.jogc.2024.102689 -
JOGC 45(12), 1-10

Methods

- Retrospective cohort study (2002-2022) of hospital live and stillbirths
- Linkage of BIS, CIHI-DAD (hospitalizations), CIHI NACRS (emergency room) - used deterministic and probabilistic linking methods
- Excluded home births and birth centre births (no link possible to CIHI)
- Excludes deaths in pregnancy where there was no delivery
- Death was ascertained from delivery to 365 days (early vs late)
- Primary cause of death reviewed by at least 3 clinicians and consulted with 3 others when discrepancies occurred

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Review of Key Findings: Maternal Mortality Ratio

Over the 20-years, there were 2,764,214 live and stillbirths resulting in 485 maternal deaths. MMR of **17.5 per 100,000** (95% CI 16.0 to 19.2)

- 222 (45.8%) **early deaths** within 42 days after birth (**MMR of 8.0 per 100,000**; 95% CI 7.0 to 9.1)
- 263 (54.2%) ***late deaths*** from 43-365 days (**MMR of 9.5 per 100,000**; 95% CI of 8.4 to 10.7).

Comment

- ON MMR for **early** deaths is similar to other higher income countries: France (8.0), Italy (8.7), but higher than Denmark (3.4) and Norway (2.7), but… because we know we are under-reporting, it may be higher.
- If we only looked at early deaths, we would miss learning about another 263 deaths: 13 pregnancy-related deaths and 250 late deaths that may have had some association with pregnancy

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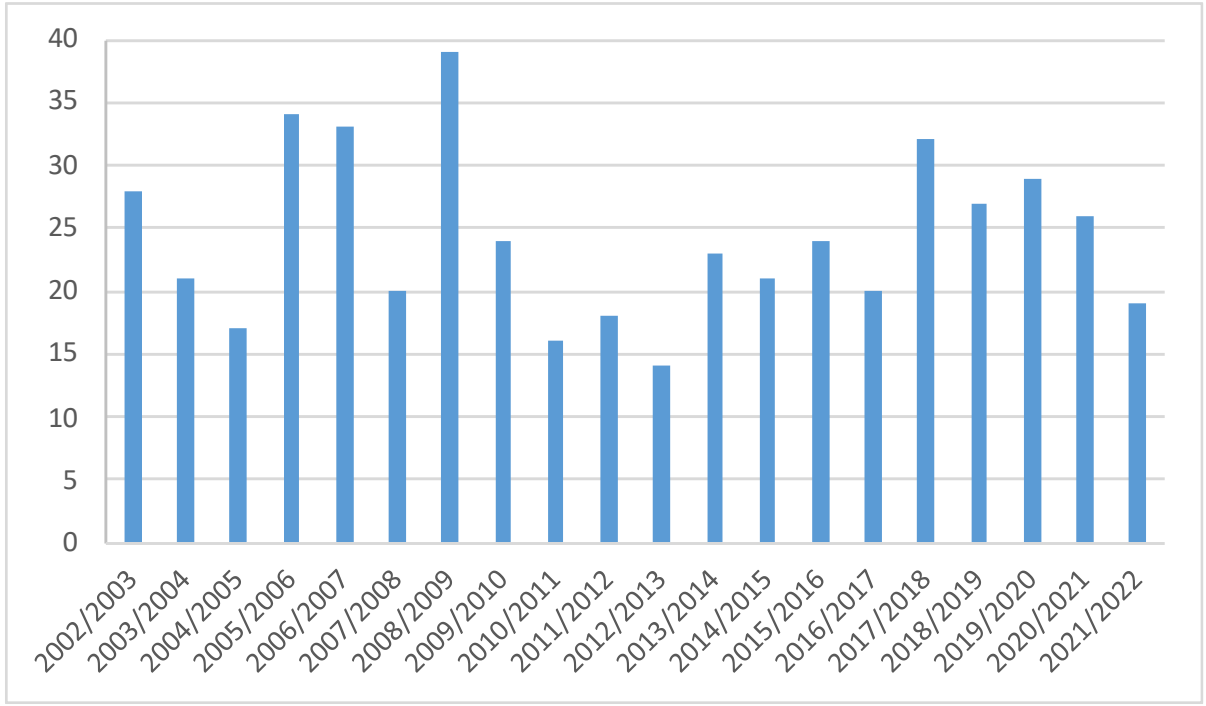
Maternal Deaths by Fiscal Year, ON 2002-2022

Mean # deaths/yr = 24.25



- No change associated with COVID
- Numbers likely higher as this is only hospital-related deaths associated with a delivery
- Higher rates in most materially-deprived neighbourhoods
- 24% and 50.1% of early and late deaths, respectively, reported at least one mental health concern during the pregnancy
- Black individuals over-represented as compared to white and Asians (based on small numbers and needs confirmation) but consistent with other studies
- Likely underestimating even more deaths in rural remote and northern areas where access to care is more difficult

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Figure 3a. Primary Cause of 169 Early and Late Pregnancy-Related Deaths

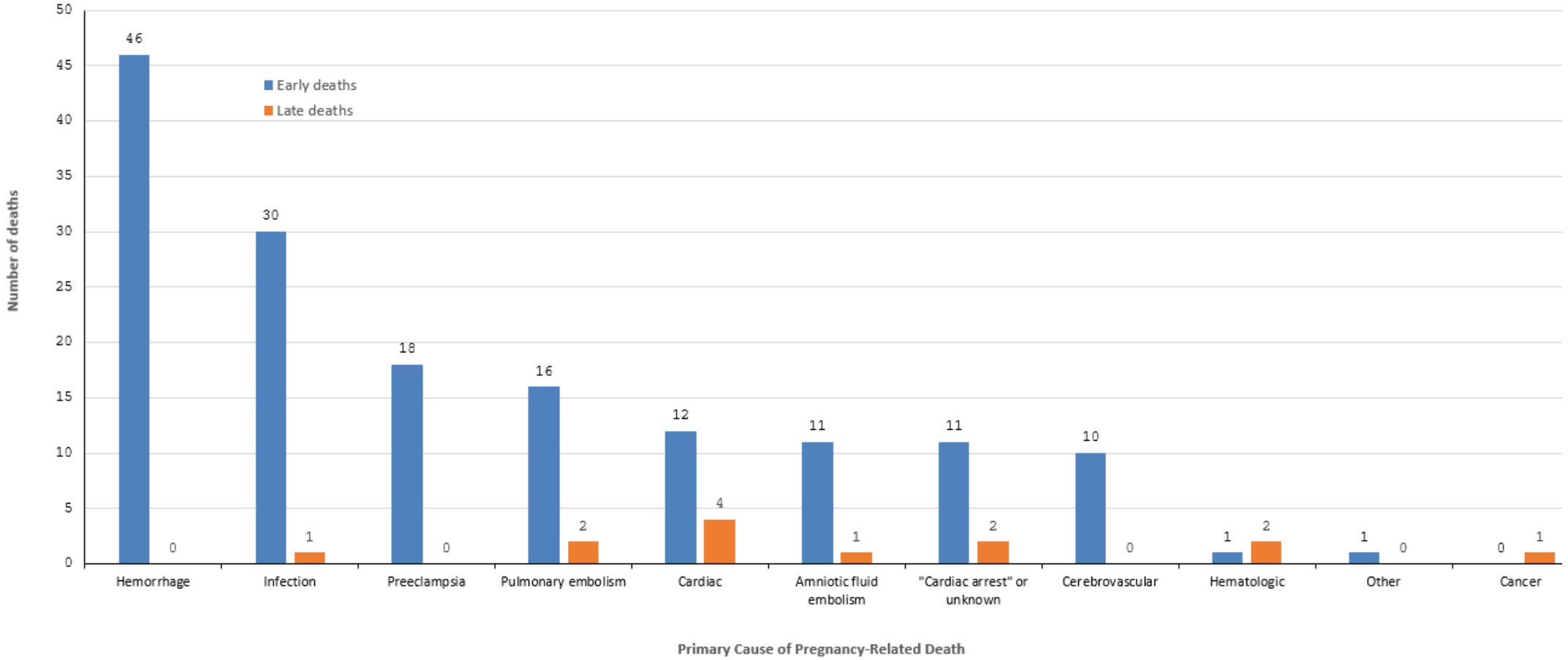


Figure 2. Timing of 458 Maternal Deaths by Weeks Following Birth, Ontario 2002-2022

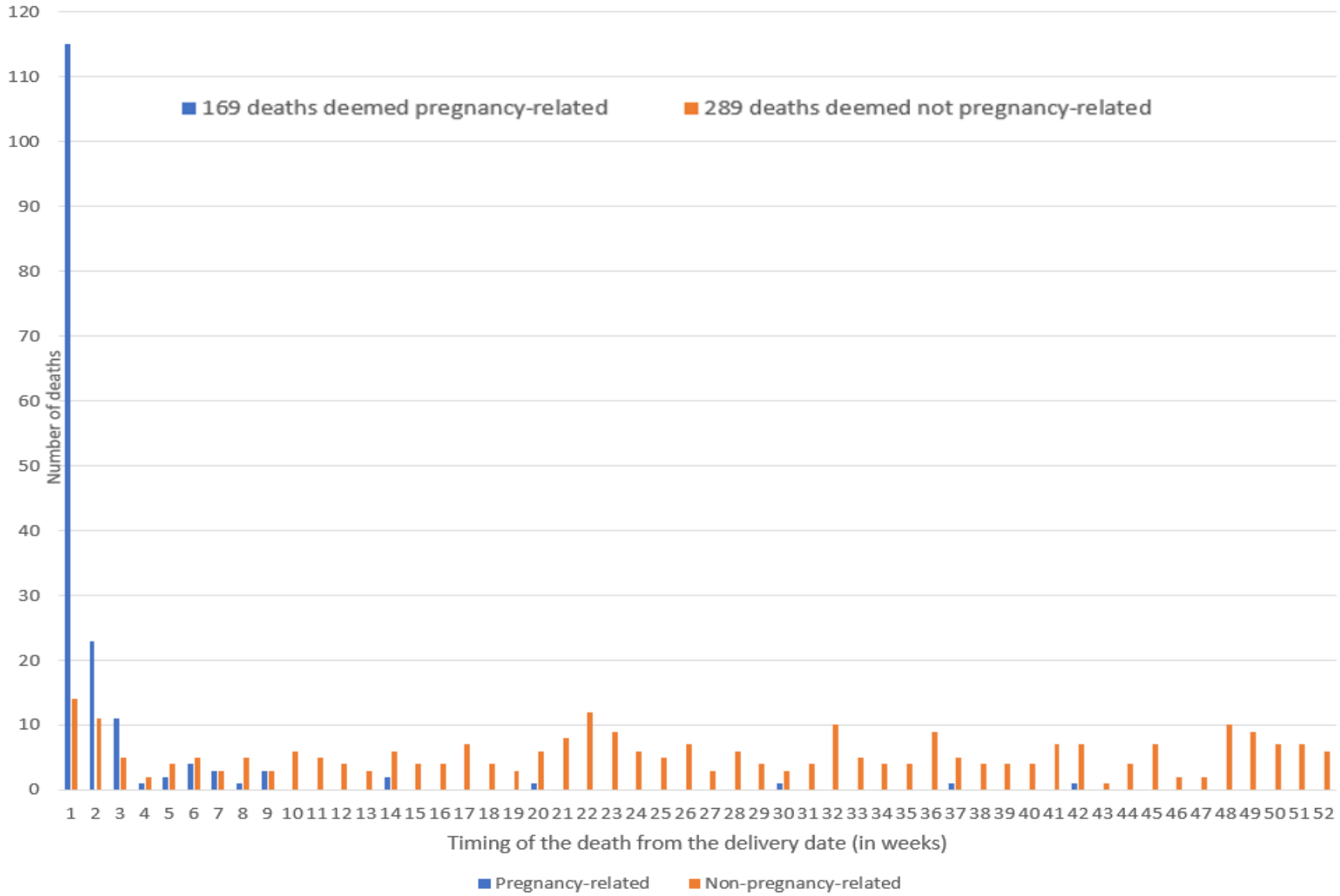
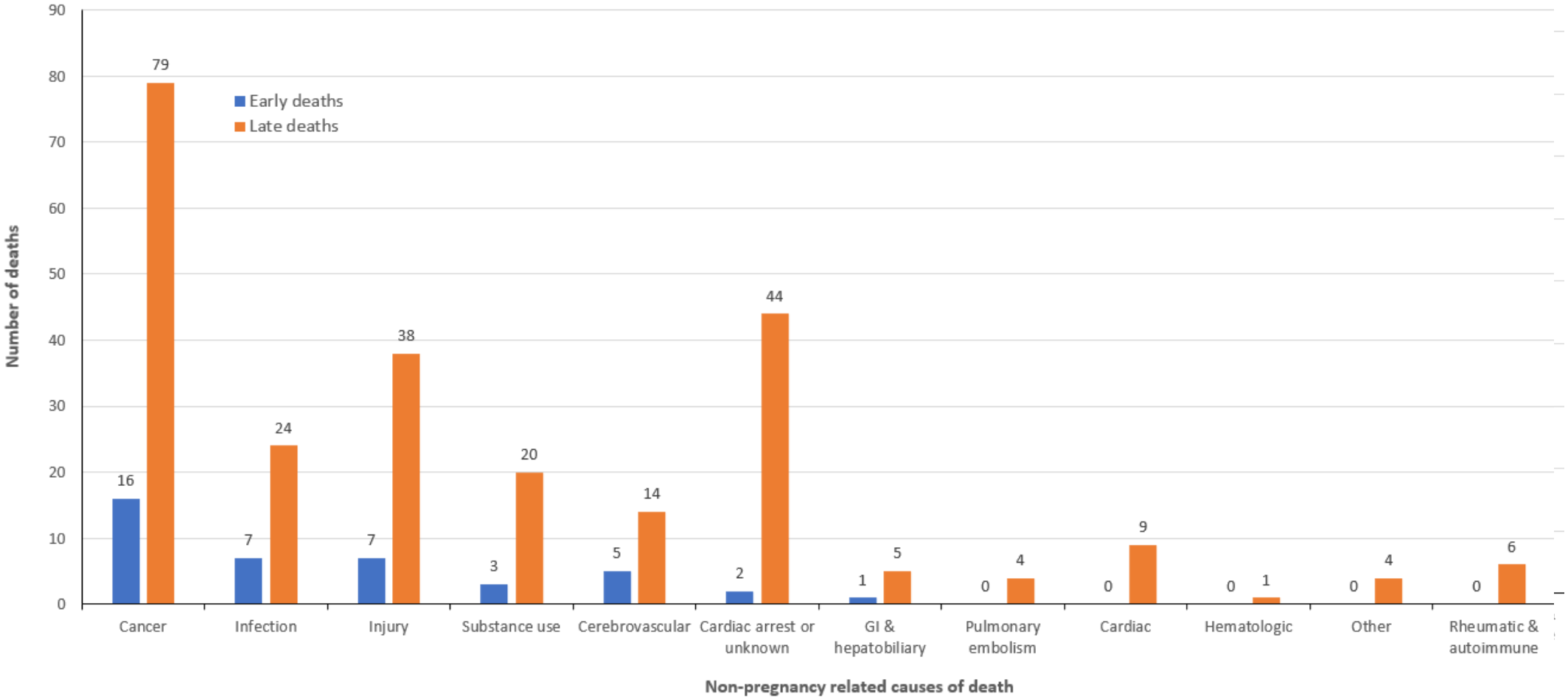


Figure 3b. Primary Cause of 289 Non-Pregnancy Related Early and Late Deaths



Obstetric Hemorrhage

- 9.5% (46/485) deaths associated with obstetric hemorrhage
- Largest contributor to early pregnancy-related deaths: 27% (46/169) of early deaths
- All hemorrhage-related deaths occurred within 12 days postpartum
- Prompt recognition and management is key to prevention of morbidity and mortality
- Multi-pronged approach currently underway in ON. Cascade events always precede death – what can we learn throughout the system to prevent future occurrences of morbidity and mortality?
- Summit taking place next week led by CANOSS to plan prevention efforts.
  https://canoss.ca/canossontario/

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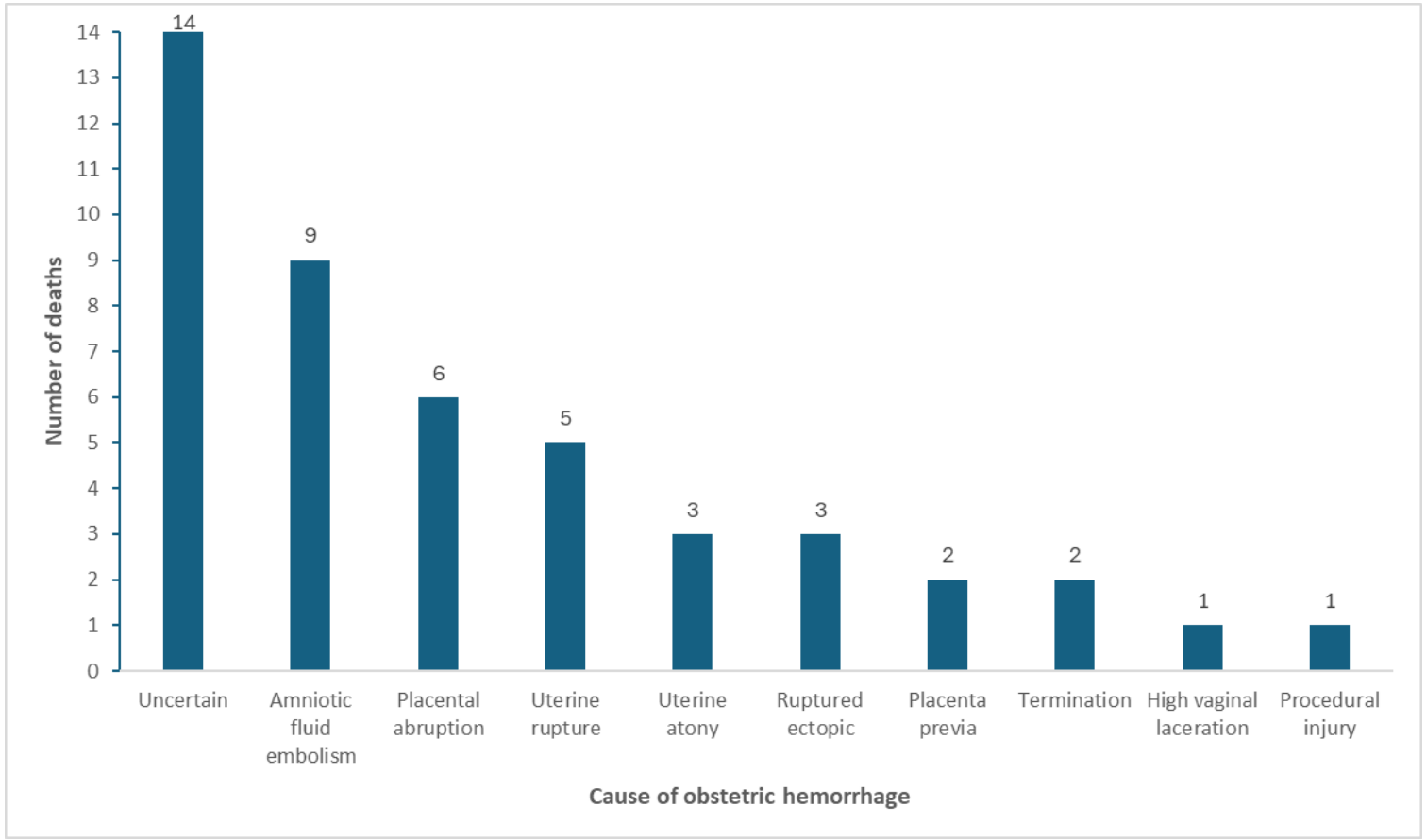
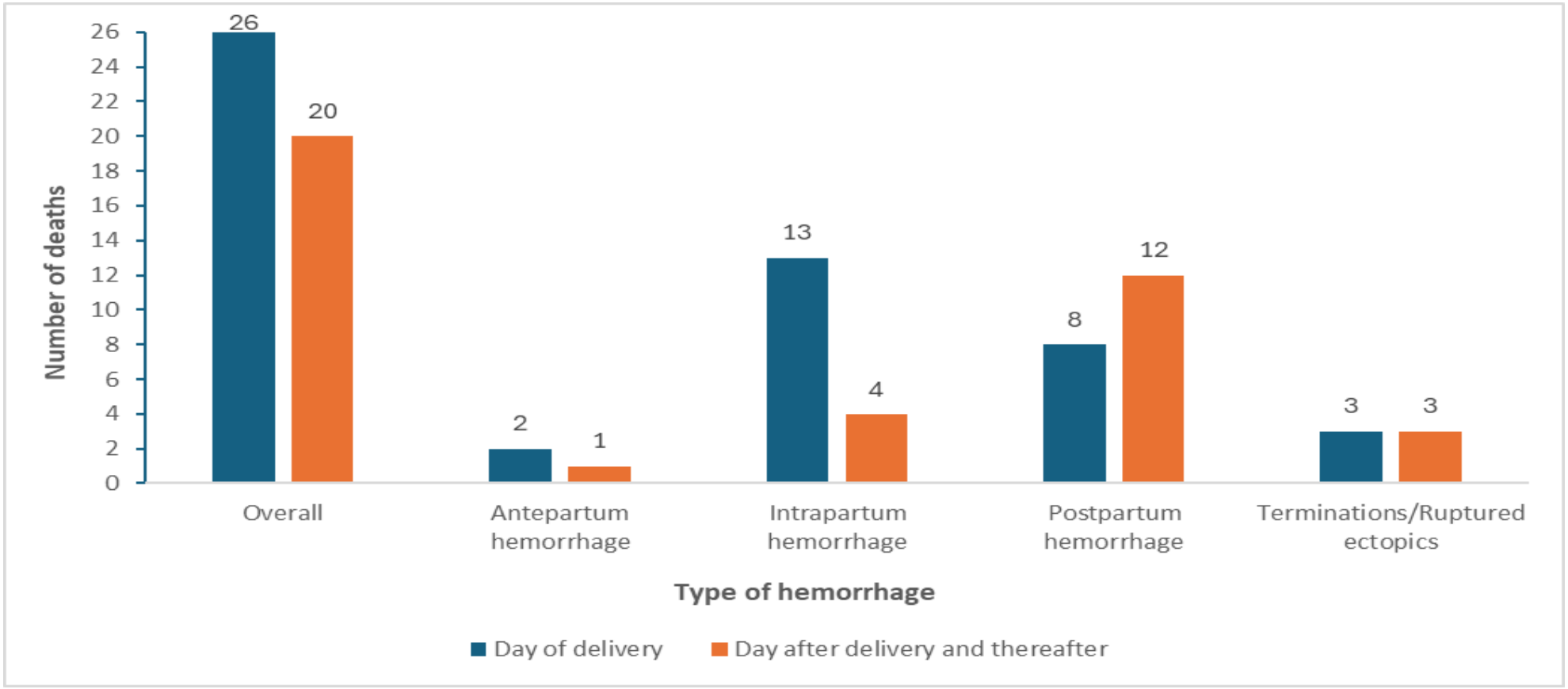
Main Causes of Obstetric Hemorrhage Deaths in ON, 2002-2022



Timing of Death by Type of Obstetric Hemorrhage, ON, 2002-2022



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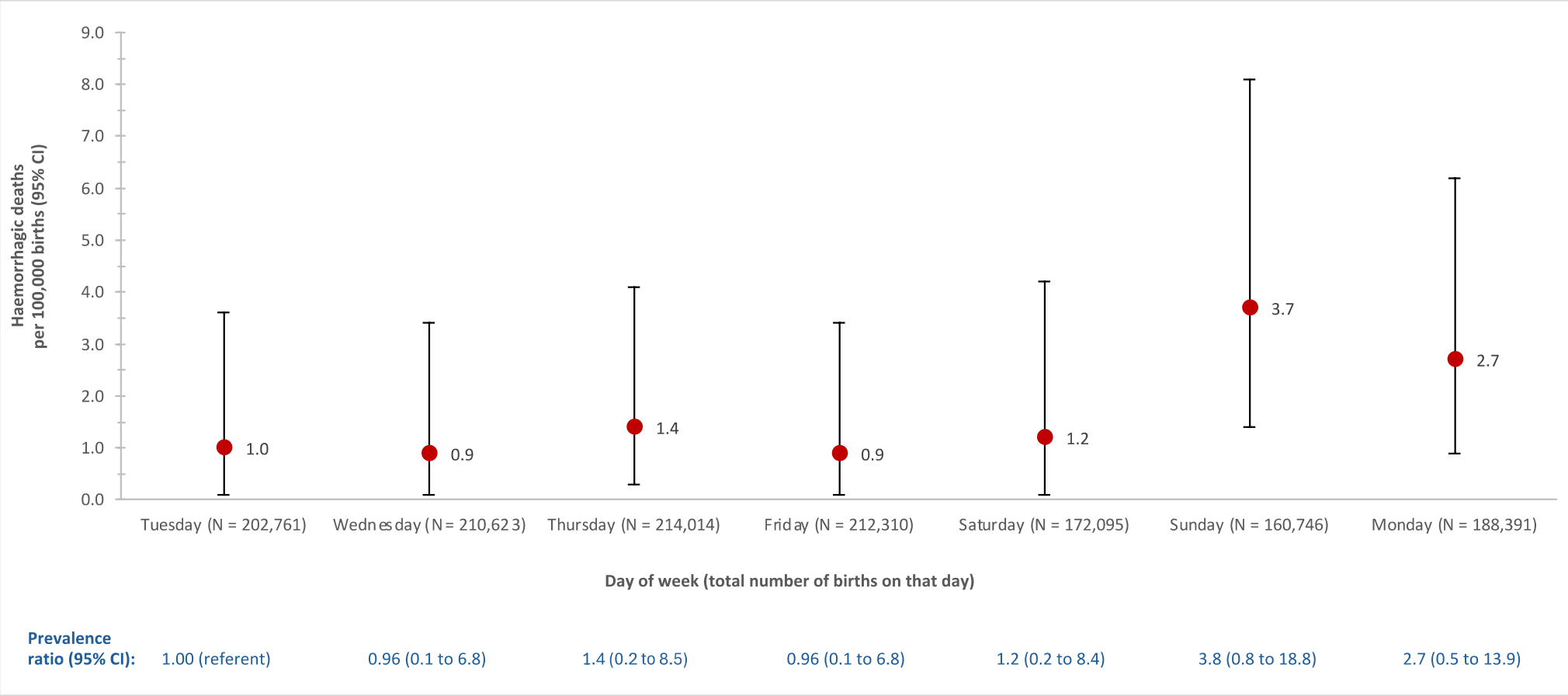
Obstetric hemorrhage deaths in Ontario by delivery day of the week, 2012-2022



Ministry of the Solicitor General

Obstetrics and Perinatal Death Review Committee (OPDRC):

Latest Data
(2013-2022)

For copies of latest report, email:
occ.inquiries@ontario.ca

Ontario

OPDRC – Who Are We?

- Expert committee providing advice to coroner investigations in Ontario (since 1994)
- Goal: preventing death during pregnancy, postpartum period, newborn period.
  - Review/Identify individual or systemic factors that may be changed
  - Make effective recommendations to people/institutions in a position to make change
  - Inform families, healthcare professionals, institutions, governments, public at large about important issues relevant to the health and safety of childbearing persons and newborns.
- 2013 – 2022: 244 deaths reviewed, 379 recommendations

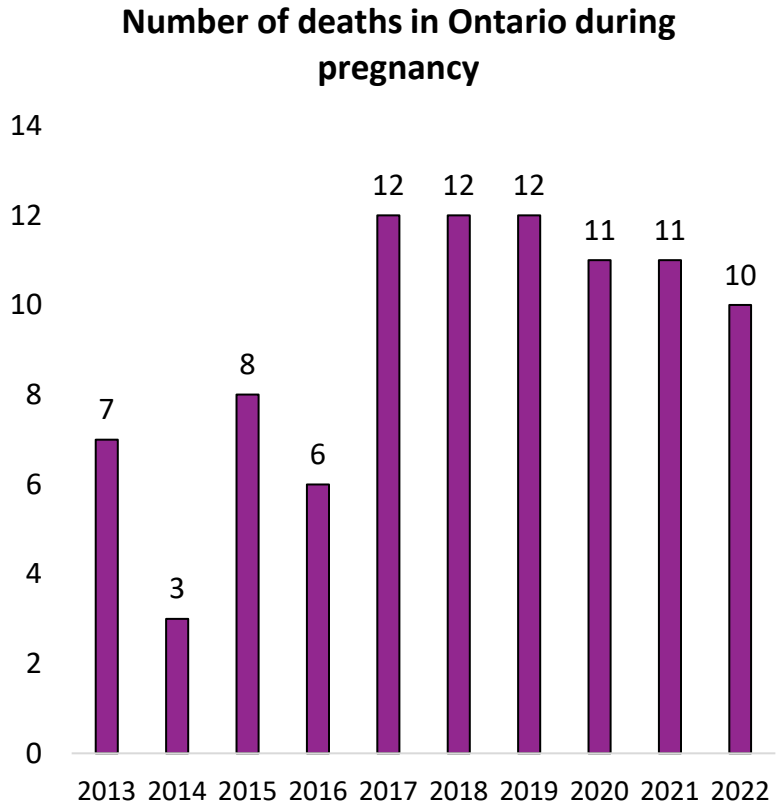
Membership and Partnerships

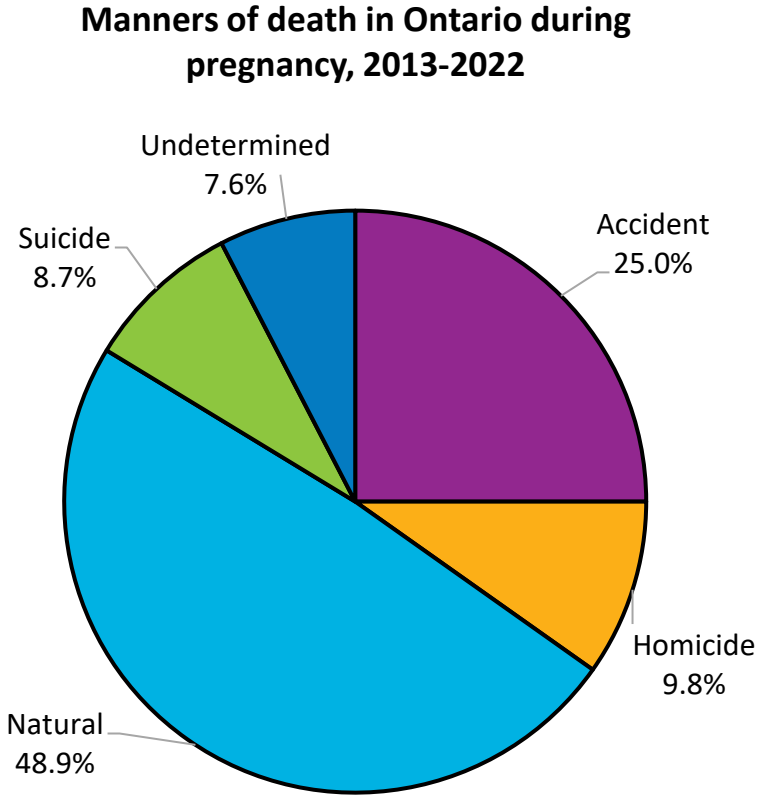
- Membership:
  - Anesthesiology
  - Family medicine
  - Maternal Fetal Medicine
  - Midwifery
  - Neonatology
  - Obstetrics
  - Pathology
  - Perinatal nursing
  - Obstetrical cardiology
  - Intensive care
  - Public health
- Partnerships: BORN, CanOSS, SOGC, PCMCH

Data Review:

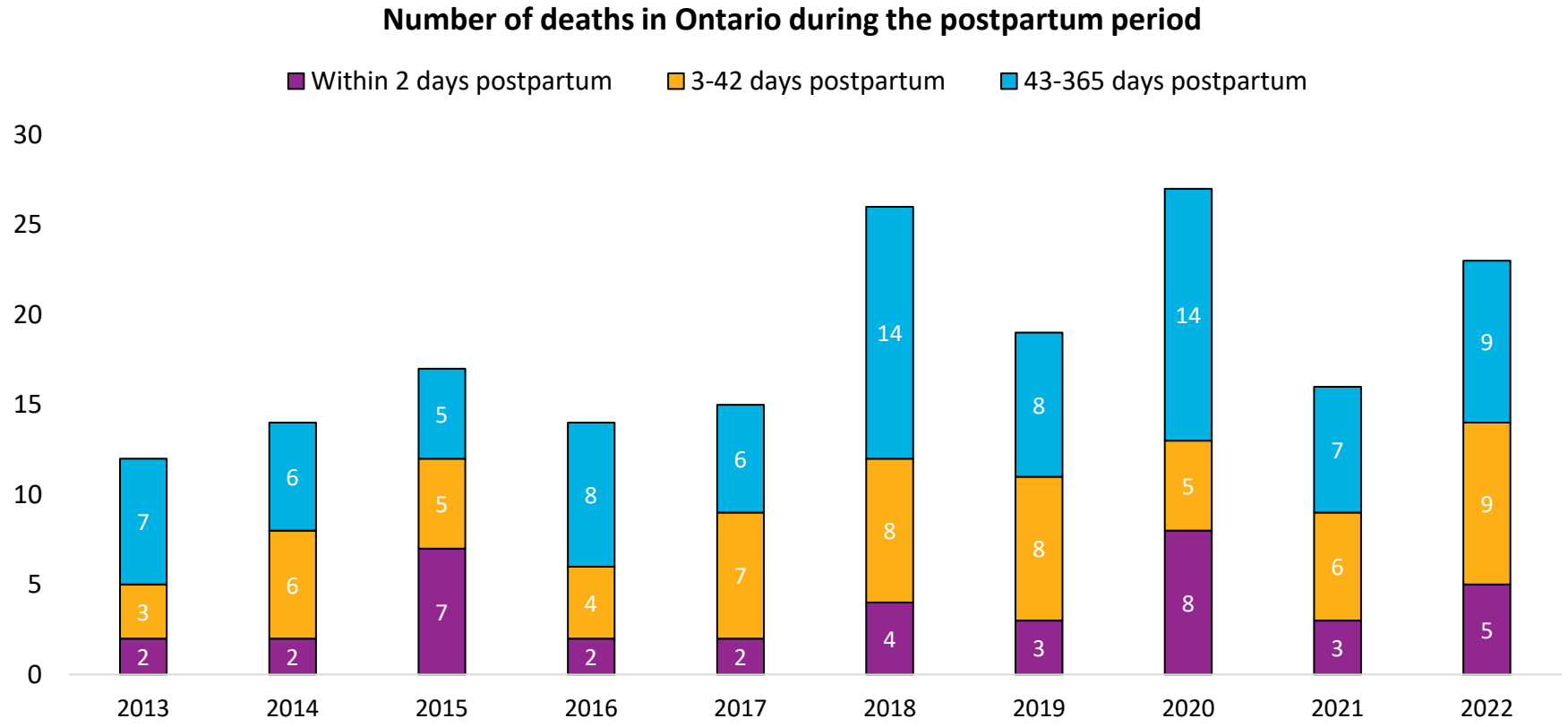
The situation in Ontario

Deaths During Pregnancy



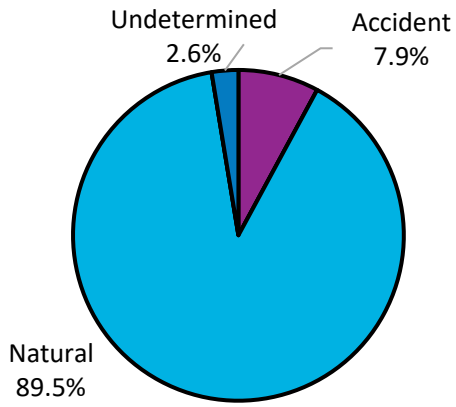


Deaths During the Postpartum Period

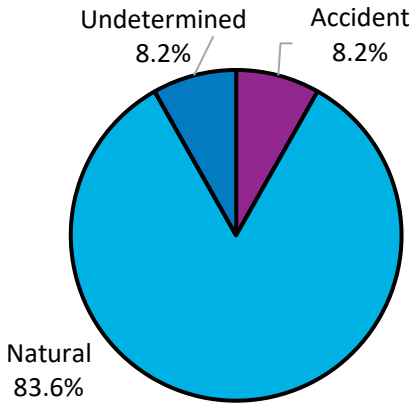


Manners of Death During the Postpartum Period

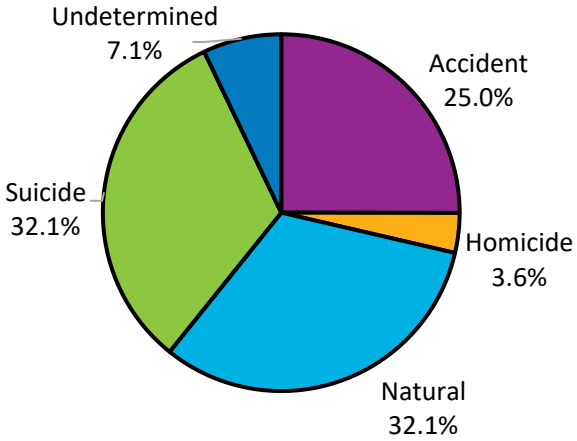
Within 2 days postpartum



3-42 days postpartum



43-365 days postpartum



Factors Related to Deaths During Pregnancy and the Postpartum Period

Factors in deaths between 2013 and 2022	During pregnancy	Within 2 days postpartum	3–42 days postpartum	43–365 days postpartum
Number of deaths	92	38	61	84
Average deaths per year	9	4	6	8
Average age (range) of birthing parent	31 (17–47)	33 (22–45)	33 (19–45)	31 (19–44)
Average length of gestation/ postpartum period	20 weeks gestation	37 weeks gestation	1 month postpartum	7 months postpartum
No prenatal care	6.5%	13.2%	1.6%	1.2%
Rural*	15.9%	5.6%	8.5%	11.7%
Precariously housed	5.4%	2.6%	1.6%	3.6%

Ontario

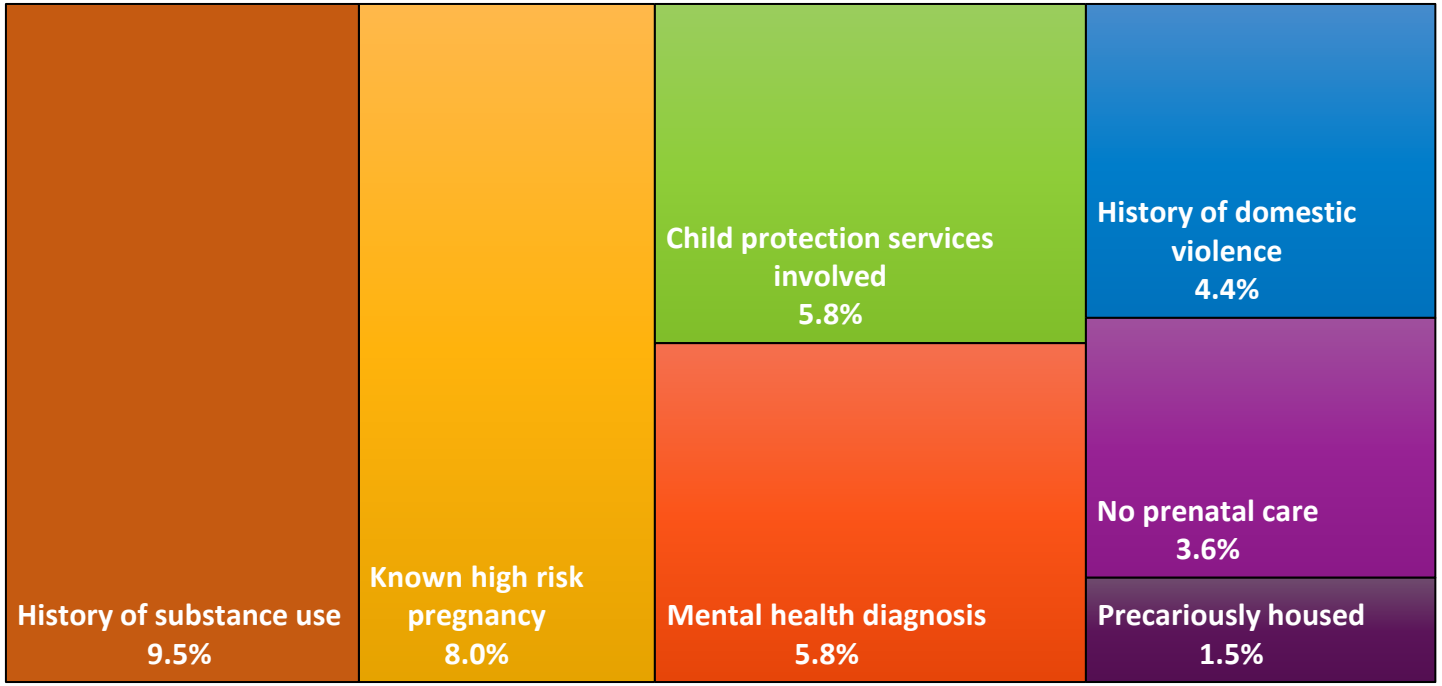
*Based on Statistics Canada's Statistical Area Classification with rural defined as levels 4-7

Data Review:

Cases reviewed by the OPDRC

Common Factors Among Deaths During Pregnancy and the Postpartum Period

Common factors reported in deaths during pregnancy and postpartum reviewed by the OPDRC, 2013-2022



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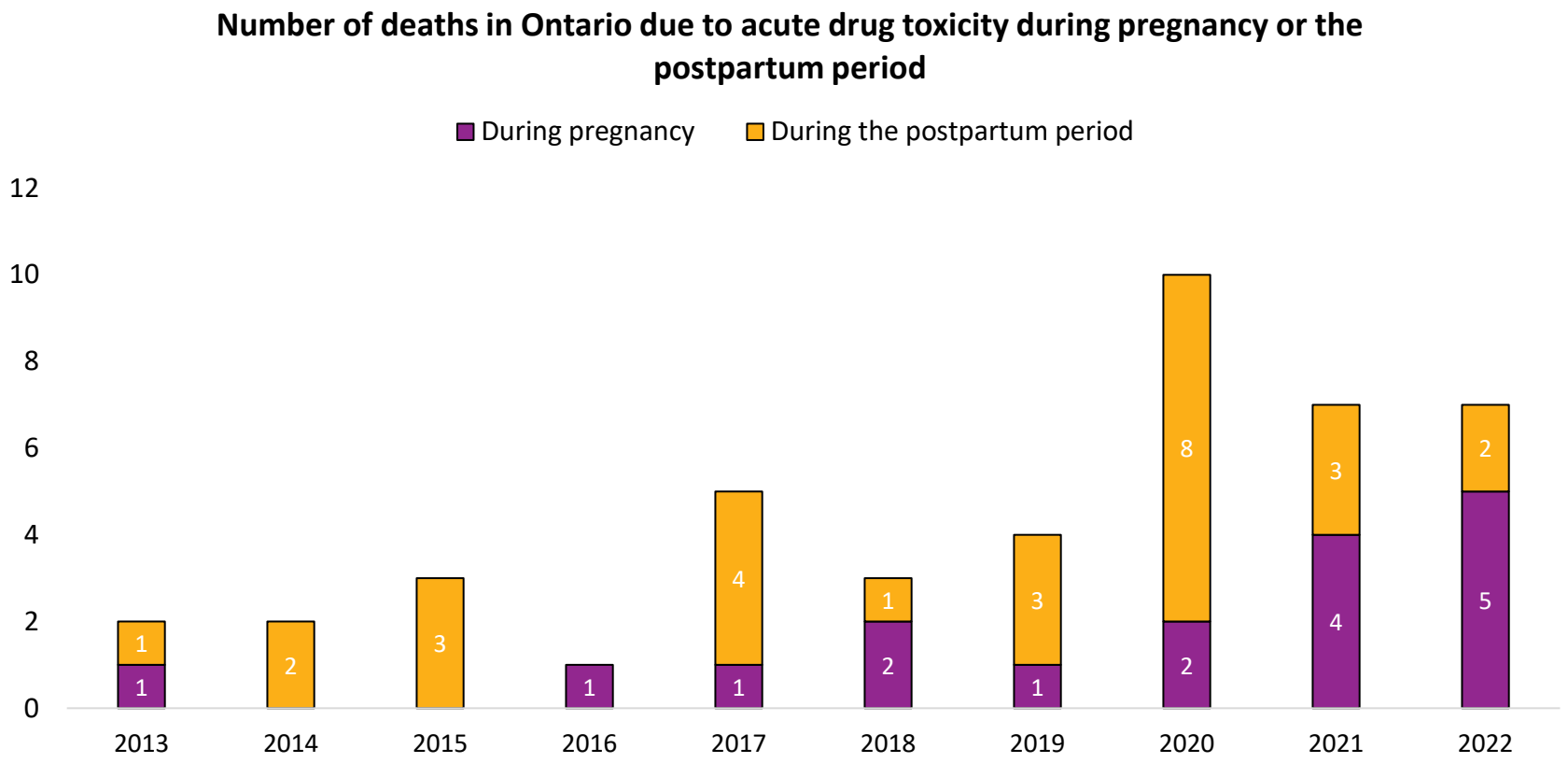
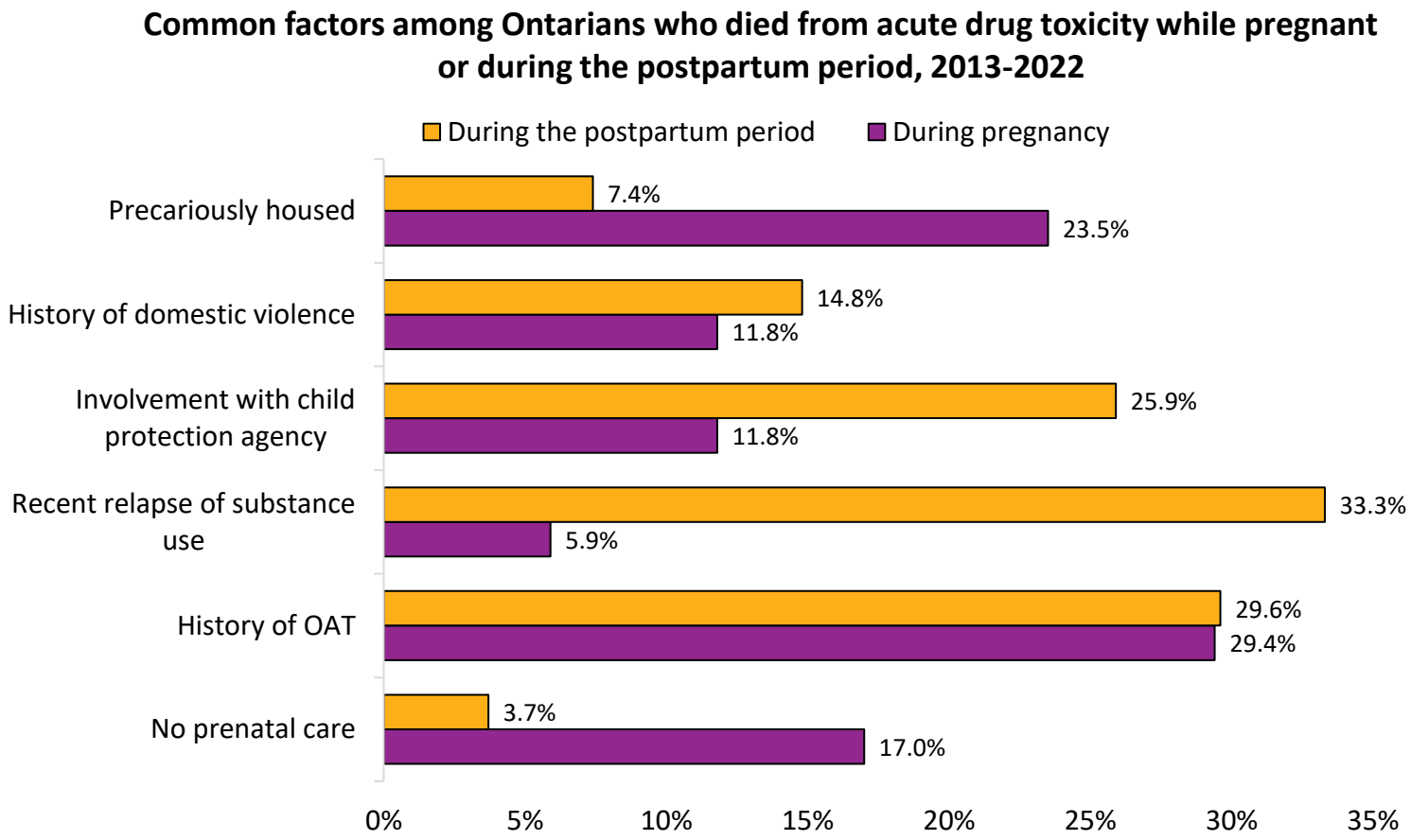
Data Review:

Focused topics

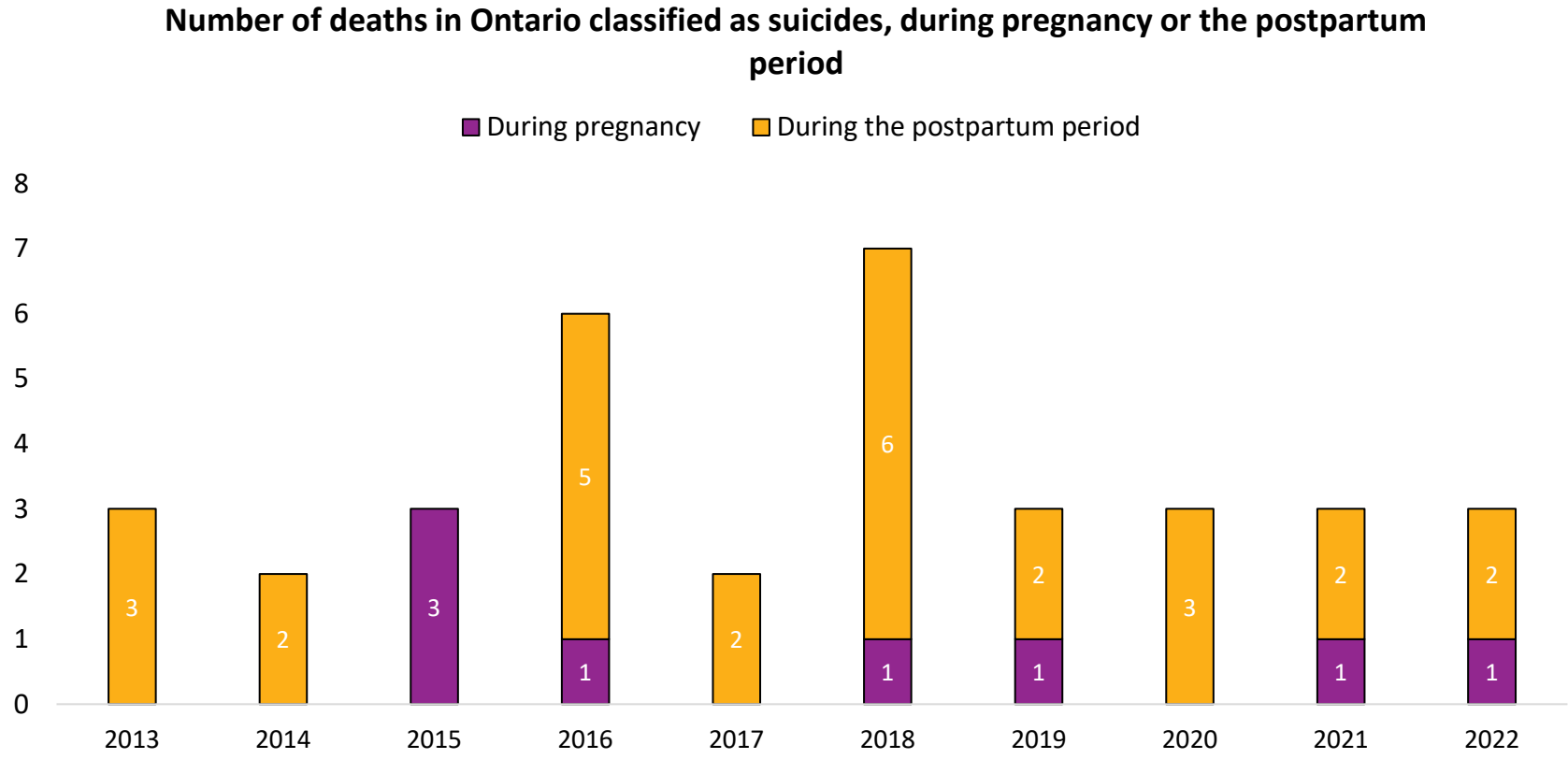
Substance Use – Current State



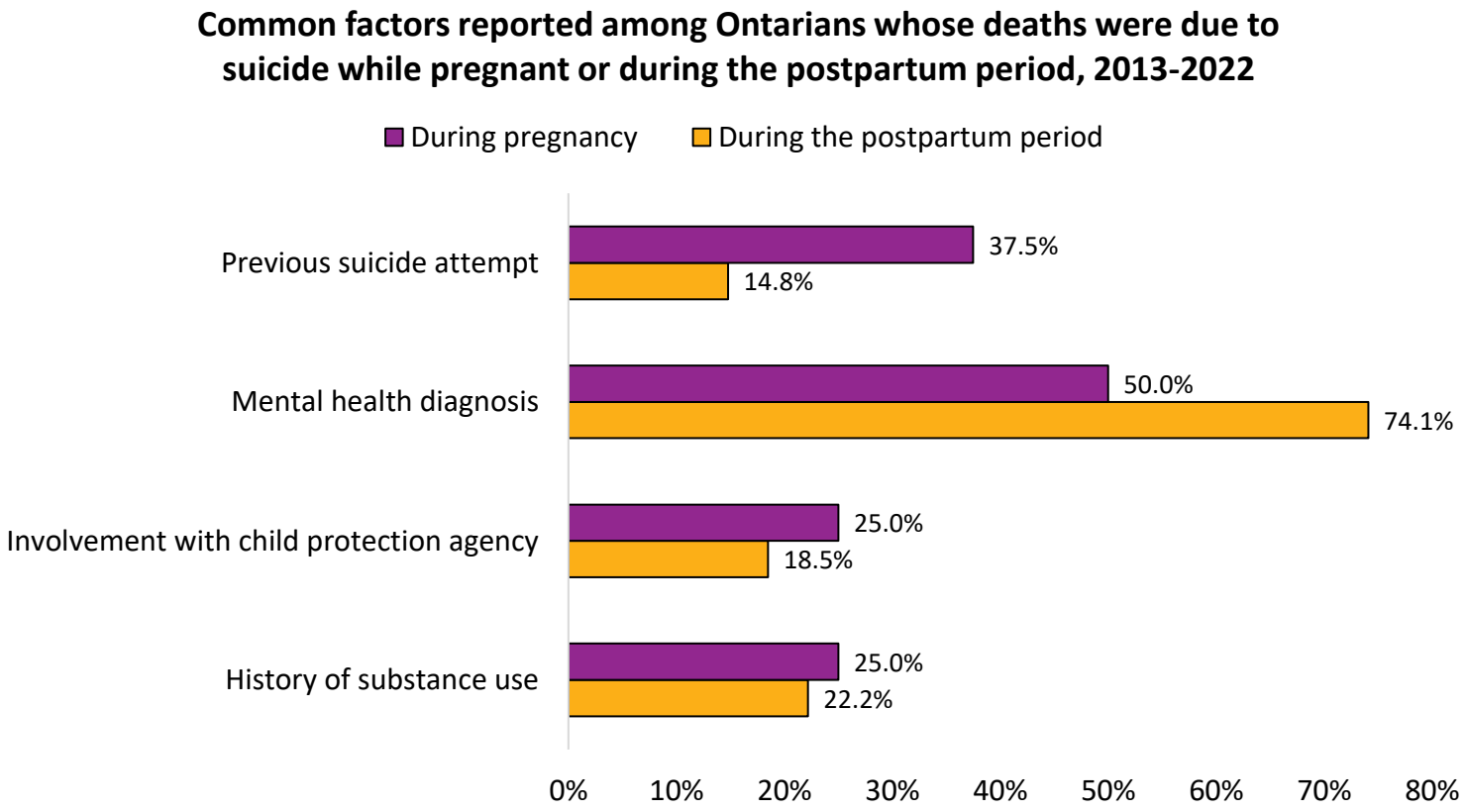
Substance Use



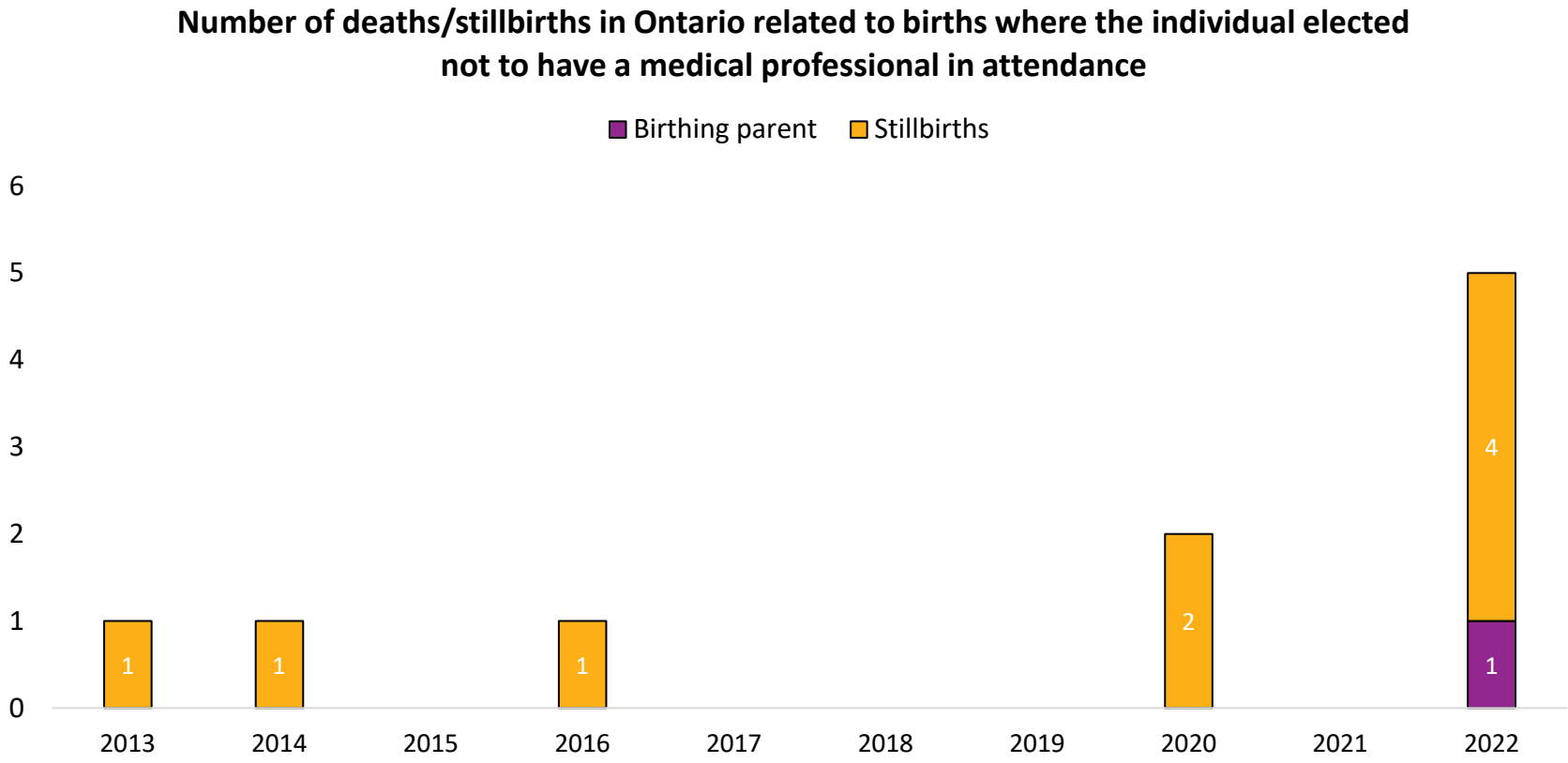
Mental Health – Current State



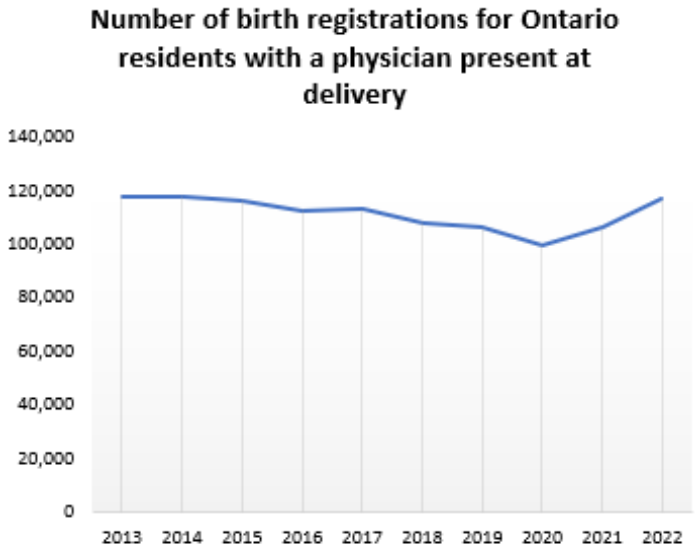
Mental Health

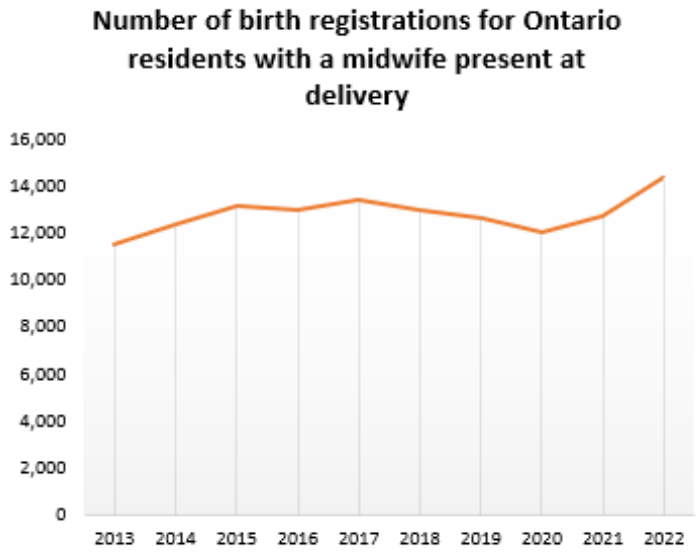


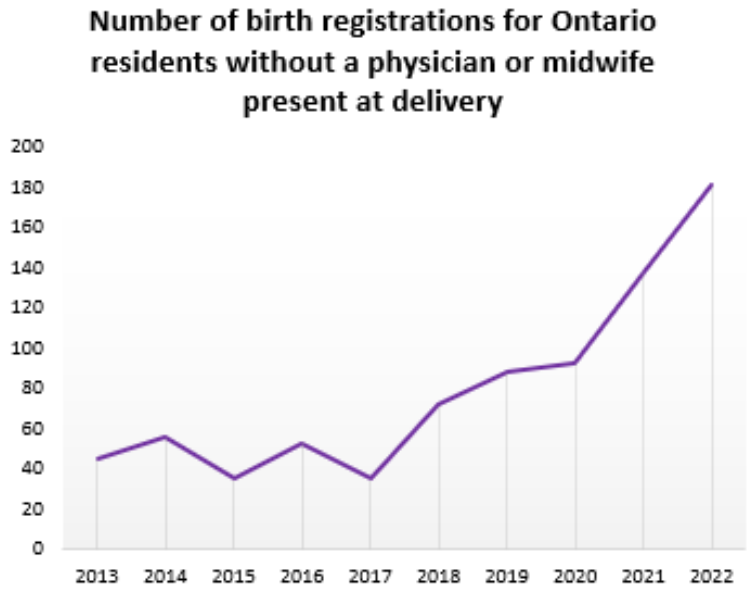
Unattended Births – Current State



Unattended Births

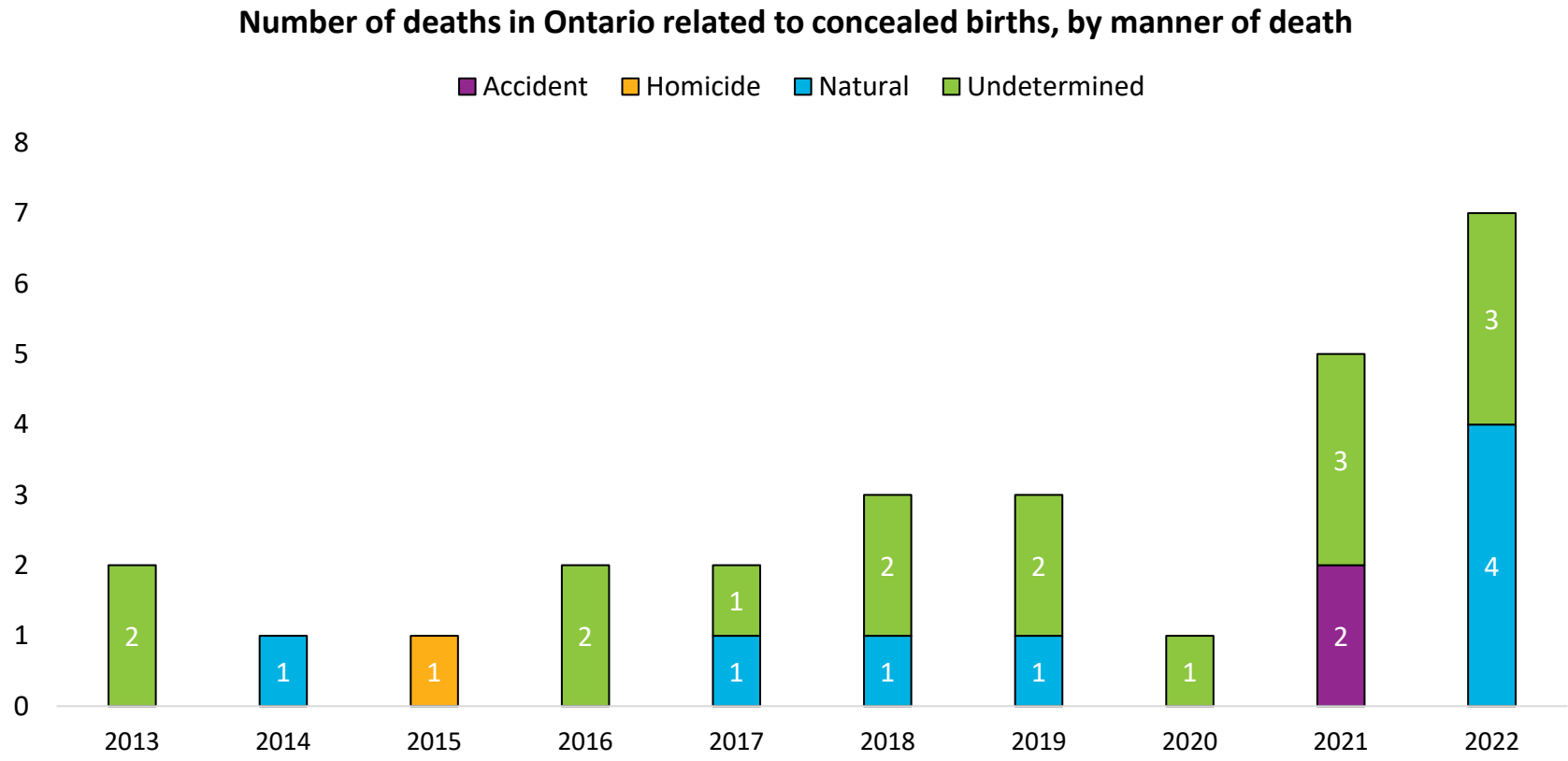






Ontario

Concealed Births – Current State



Factors Related to Concealed Births

Experiences of the birthing parent (2013-2022)	Percent of deaths from concealed births
Aged 20 and under	27.8%
Known history of substance use	33.3%
Resides in an area with high material deprivation	58.3%
Involvement with child protection agency	18.5%
Precariously housed	26.9%
Living with parents	30.8%

Recommendations

Overview of Recommendations

Number and proportion of recommendations by theme, 2021-2022

Themes	Pregnant persons	Neonatal	Stillbirths	Total	% of total
Institutional operations and oversight	7	9	2	18	15%
Policies, procedures, and guidelines	17	12	6	35	29%
Communication/collaboration	13	0	5	18	15%
Persons transfer/transport	0	0	4	4	3%
Education, training, and resources	17	13	5	35	29%
Committee/case specific	6	2	2	10	8%

Summary

Many deaths during pregnancy and the postpartum are preventable

They, along with some stillbirths and neonatal deaths, can provide insights and recommendations to prevent further deaths.

Improved data collection and analytic capacity has helped the OPDRC delve further into social, economic and geographic aspects of the deaths they review.

Relationships between perinatal deaths and rurality, material deprivation, housing instability - a few of the factors now able to be analysed.

New initiatives, such as mandatory collection of race (2023), extensive investigation templates (2024), future analyses will be able to provide greater insight.

Maternal Mortality - Public Health Implications

Substance abuse

- BORN - 23/289 (8%) non-pregnancy related deaths – most between 42 days and 1 yr post birth
- OPDRC – 9.5% of deaths were associated with substance abuse

Mental health

- BORN - 4% and 50.1% of early and late deaths, respectively, reported at least one mental health concern during the pregnancy
- BORN - All suicides occurred in the late death period (median 220 days)
- OPDRC – 5.8% of individuals who died had a preexisting mental health dx, 4.4% had intimate partner violence

Prenatal education

- How do we get this information to those planning pregnancy or in early pregnancy?
- How can we best partner with public health on these initiatives?

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Maternal Death – Fractured Families Left Behind

?

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occ.inquiries@ontario.ca

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asprague@bornontario.ca
clavinvenegas@bornontario.ca

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