Legalization of cannabis: Implications for maternal and infant health in BC and emerging best practice for response

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Legalization of Cannabis in Canada

- Cannabis currently a Schedule II drug under the Controlled Drug and Substances Act.

- Cannabis Act (Bill C-45) introduced in 2017.

- Subject to parliamentary approval, cannabis could be legalized in Canada by July 2018.

- Recommendations for use in pregnancy?

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Trends of cannabis use in Canada

- Canada has one of the highest rates of cannabis use among youth in the world.

- Cannabis use among Canadian women increased from 7.4% in 2013 to 9.7% in 2015.

- Cannabis is the most common illicit drug used by pregnant women.

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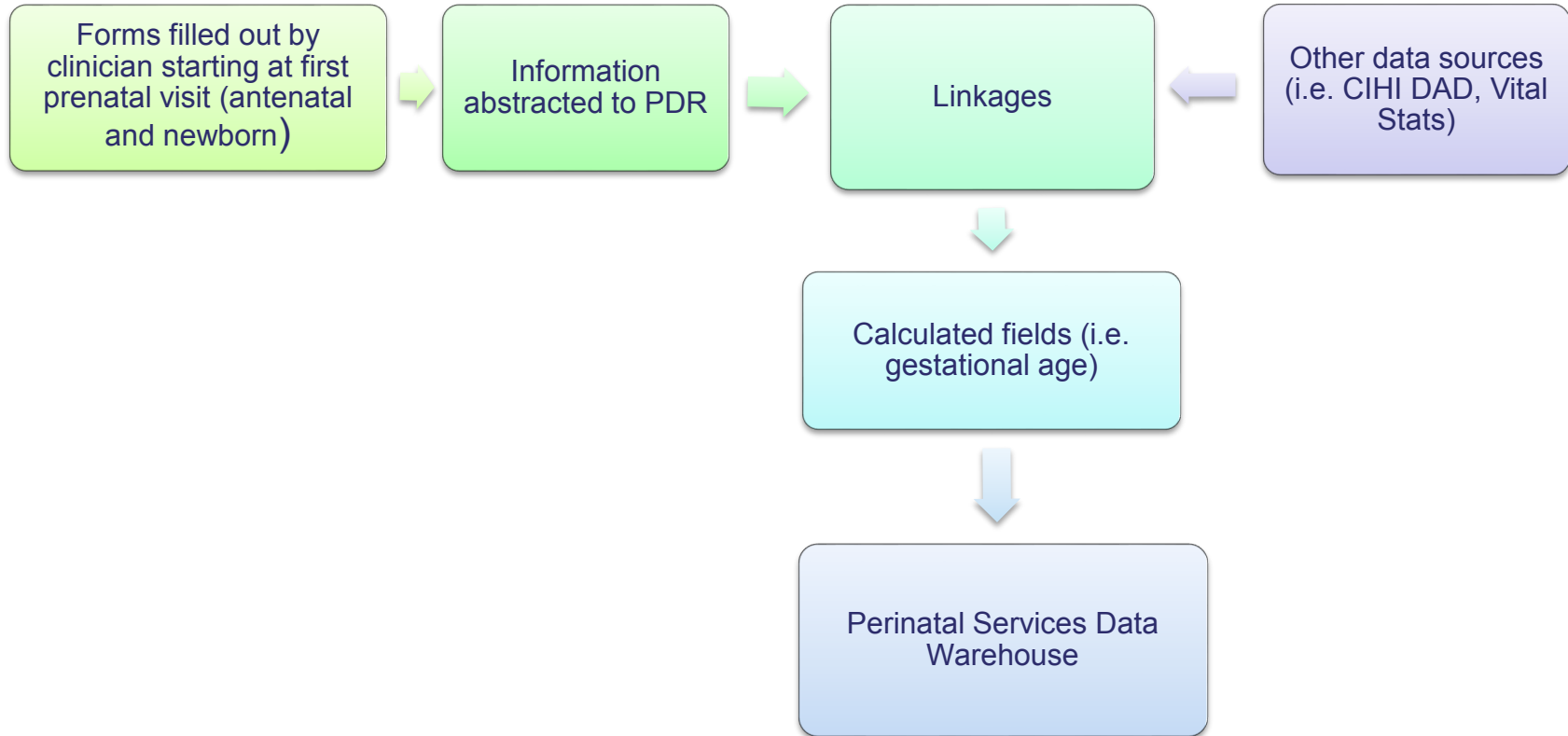
Potential implications

- Nearly half of pregnancies in Canada are unplanned.
- Cannabinoids cross the placenta with greater transfer in early pregnancy.
- Potential for fetal exposure in the first trimester before women know they are pregnant.

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PDR Data Analysis

Objectives

- To examine the trends of cannabis use among pregnant women in BC and related maternal characteristics.

- To determine the association between cannabis use in pregnancy and perinatal outcomes among women in BC including:

  - Stillbirth (antepartum and intrapartum)

  - Spontaneous preterm birth

  - Small-for-gestational age

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Perinatal Data Registry (PDR)

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Forms filled out by clinician starting at first prenatal visit (antenatal and newborn) → Information abstracted to PDR → Linkages ← Other data sources (i.e. CIHI DAD, Vital Stats)
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Linkages → Calculated fields (i.e. gestational age) → Perinatal Services Data Warehouse

Antenatal Form

8. Lifestyle & Social

Discussed		Concerns	Referred

☐ Diet/Food Safety _____ ☐

☐ Folic acid _____

☐ Physical Activity/rest/work _____ ☐

☐ OTC drugs/vitamins _____ ☐

☐ Alcohol ☐ never ☐ quit (DD/MM/YYYY) _____
Drinks/wk: before pregnancy _____ current _____
Binge drinking ☐ No ☐ Yes ☐

☐ TWEAK score _____ (see reverse)

☐ Substance use ☐ No ☐ Yes ☐
   ☐ Heroin   ☐ Cocaine   ☐ Marijuana
   ☐ Methadone ☐ Solvents   ☐ Other
   ☐ Prescription ☐ Unknown   _____

☐ Smoking ☐ never ☐ quit (DD/MM/YYYY) _____
Cig/day: before pregnancy _____ current _____ ☐

☐ Exposure 2nd hand smoke ☐ No ☐ Yes

Methods

- Time period: April 1st, 2008 to March 31st, 2016.
- Excluded records:

    - missing data on outcomes and gestational age

    - gestational ages less than 20 weeks or greater than 44

      weeks.
- Singleton births

Methods

- Trends of cannabis use among pregnant women in BC.

- Chi-square analysis of maternal characteristics and cannabis use.

- Logistic Regression:

    - Association between cannabis use and small-for-gestational age (<10th) and spontaneous preterm birth (<37 weeks).

- Cox Proportional Hazards Model:

    - Cannabis use and stillbirth

    - Ran separate models for overall stillbirth, antepartum and intrapartum

    - Excluded late termination

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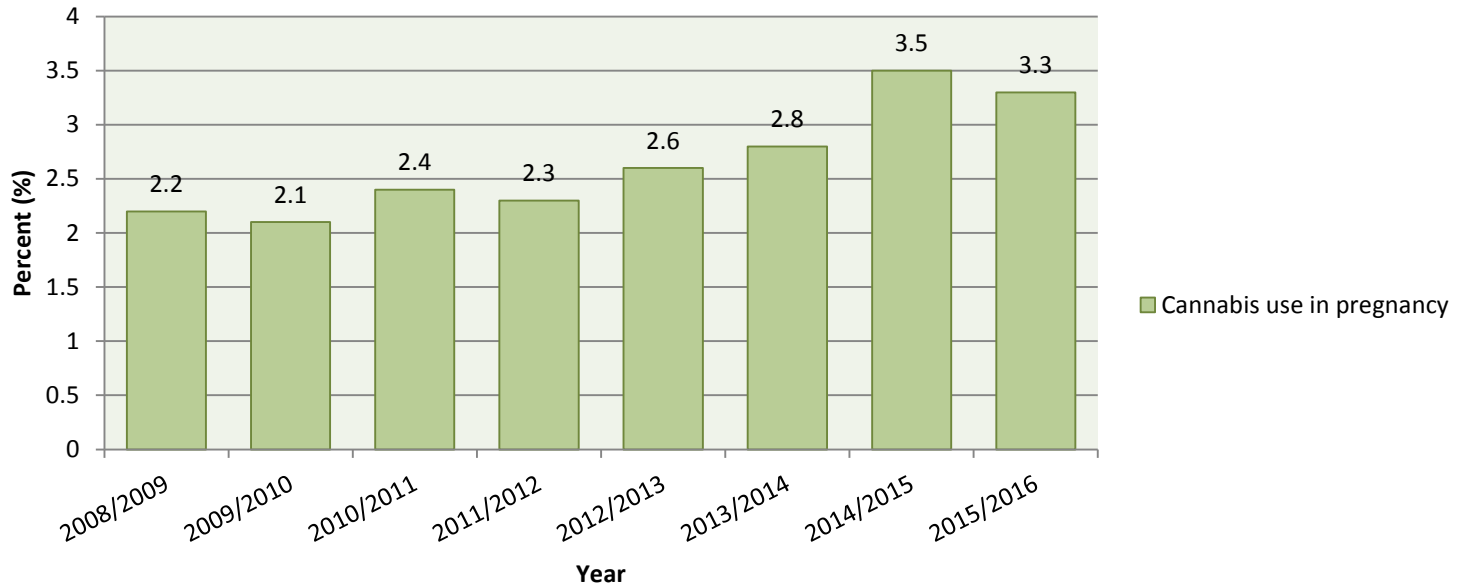An agency of the Provincial Health Services Authority

Methods

- Logistic regressions and Cox proportional hazards models adjusted for:
    - maternal age
    - maternal ethnicity (Nam Pehchan)
    - SES (QAIPPE)
    - pre-pregnancy BMI
    - tobacco use in pregnancy
    - alcohol use in pregnancy
    - illicit substances (cocaine, heroin/opioids, solvents, designer drugs, methadone, hallucinogens, stimulants, prescription medication, non-prescription medication, other unknown drug)
- Cox proportional hazards models also adjusted for any chromosomal or congenital anomalies.

Results: Trends of cannabis use in BC

- Cannabis use among pregnant women in BC has increased over the past decade.

Results: Maternal characteristics and cannabis use

Maternal Characteristics	Cannabis Use N=5801	No Cannabis Use N=237339	p-value
Maternal age			<0.0001
10-24	49.8	14.6	
25-29	25.7	27.9	
30-34	16.8	34.2	
35-39	6.6	19.1	
40+	1.2	4.4	
Neighborhood SES (QAIPPE)			<0.0001
1 - Lowest	34.1	21.0	
2	22.3	21.3	
3	18.0	20.9	
4	15.7	20.5	
5 – Highest	10.0	16.3	
Tobacco use	69.6	16.6	<0.0001
Any alcohol use	12.1	0.9	<0.0001
Other substance use	15.8	0.9	<0.0001
History of anxiety	17.9	6.5	<0.0001
History of depression	28.7	9.6	<0.0001
History mental illness	41.1	15.7	<0.0001

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Results: Perinatal outcomes and cannabis use

Perinatal outcomes	Cannabis Use N=5801	No Cannabis Use N=237339	p-value
Small-for-gestational age (<10th percentile)	10.1	6.5	<0.0001
Large-for-gestational age	10.0	12.7	<0.0001
Spontaneous preterm birth	7.5	4.3	<0.0001
Stillbirth	0.5	0.3	0.0001
Antepartum Stillbirth	0.4	0.2	<0.0001
Intrapartum Stillbirth	0.14	0.02	<0.0001

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Results: Risk for SGA, preterm birth and stillbirth

Association between cannabis use and SGA, any spontaneous preterm birth and stillbirth

Birth Outcome	Cannabis use during pregnancy	
	Unadjusted OR [CI]	Adjusted OR [CI]*
SGA (<10th percentile)	1.63 [1.52-1.75]	1.48 [1.37-1.59]
Spontaneous Preterm Birth (<37 weeks)	1.84 [1.70-2.00]	1.31 [1.20-1.43]
	Unadjusted HR [CI]	Adjusted HR [CI]*
Stillbirth (All)	1.66 [1.19-2.32]	1.38 [0.95-1.99]
Antepartum Stillbirth[a]	1.47 [0.99-2.18]	1.34 [0.88-2.06]
Intrapartum Stillbirth[b]	4.84 [2.33-10.1]	2.84 [1.18-6.82]

*Adjusted for maternal age, pre-pregnancy BMI, tobacco use, alcohol use, other substance use, QAIPPE and ethnicity.

[a] Stillbirth that occurred before the onset of labour.

[b] Stillbirth that occurred after the onset of labour.

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Mechanisms of action

- Fetal oxygen and nutrient deprivation from altered blood supply through changes in placental vasculature.

- Changes in glucose and insulin regulation which restricts fetal growth (through insulin-like growth factors 1 and 2)?

- Similar to the effects of tobacco

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Strength and Limitations

Strengths

- Large dataset that includes >99% of births in BC
- PDR data includes information on tobacco and alcohol use in pregnancy, other illicit substances and prescription medications.

Limitations

- Self-report of cannabis use, tobacco, alcohol and other substances.
- Co-occurrence of cannabis use and tobacco use.
- Alcohol use underreported and difficult to adjust for.
- Ethnicity
- Neighborhood-based index of SES

Conclusions

- Cannabis use in pregnancy and history of mental illness.
- Association between cannabis use and SGA, and spontaneous preterm birth.
- Stillbirth needs further research
- Timing of cannabis exposure, type and frequency.
- Recommendations for cannabis use in pregnancy?

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