Cannabis and Pregnancy:
Getting Ahead of Policy

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Thunder Bay District Health Unit

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Thunder Bay District Health Unit Staff:

Stephanie Commisso
Jeremy Landon
Jennifer McFarlane
Janice Piper-Wilson
Eryn Pleson
Erica Sawula
Lyne Soramaki
Sophia Wenzel

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Alannah Dart, BScN Student

Rachael Shaffer, Master of Public Health Student

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For more information please contact:

Lyne Soramaki, RN, HBScN

Family Health Program

Thunder Bay District Health Unit

(807) 625-8823

lyne.soramaki@tbdhu.com

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Project Summary

Although cannabis is being legalized in 2018, evidence has shown that cannabis is not as safe as public perception would believe (Forray & Foster, 2015). When considering the use of cannabis during pregnancy, there is no known safe amount (Department of Public Health and Environment, 2017). According to the research, cannabis use during preconception and pregnancy "…can adversely affect the growth and development of the baby, and lead to long-term learning and behavioural consequences…Pregnancy is a critical time for the brain development of the baby and the adverse effects caused by cannabis exposure can be life-long" (The Society of Obstetricians and Gynaecologists of Canada [SOGC], 2017).

Thus, following the Government of Canada's 2016 announcement to legalize cannabis in 2018, the Thunder Bay District Health Unit's (TBDHU) Family Health program completed a cannabis and pregnancy research project aimed to obtain pre-legalization information on cannabis and pregnancy that will assist with program planning at the Thunder Bay District Health Unit. For the purpose of this document the term "cannabis" is used consistently throughout the document, and refers to all forms and preparations of cannabis (eg: marijuana, hashish, hash oil) (see appendix 1).

The following report "Cannabis and Pregnancy: Getting Ahead of Policy" is the first of 3 reports that will be produced as part of the Cannabis and Pregnancy project (see appendix 2). This report discusses cannabis in the context of it being an illicit drug as the Cannabis Act Bill C-45 (2018) legislation had not yet passed (pre-legalization). Phase 1 timelines were revised to take into consideration the new cannabis legislation date of Oct 17, 2018 (see appendix 2).

Environmental Scan

From January 2017 to March 2017, the Thunder Bay District Health Unit's Family Health team completed an environmental scan to identify pre-legislation promotion, prevention, intervention and screening practices aimed to reduce and/or prevent cannabis exposed pregnancies. It also aimed to gain an understanding of service provider - perceived barriers and education needs. This will better enable TBDHU to provide programming, screening, and interventions to reduce and/or prevent cannabis exposed pregnancies.

Three surveys were administered simultaneously: one at the local level targeting service providers (SP) and the TBDHU staff; another at the local level targeting primary health care providers (PHCPs); and one at the provincial level targeting public health units within Ontario (OPHU) (for more information on the methodology please see appendix 3). The response rate from those who were sent the surveys were 90% of TBDHU staff, 50% of Provincial Health Unit staff (21 of 35 unique health units), 21% of local service providers, and 18% of Primary Health Care Providers.

Literature Review

From May 2017 to August 2017 a literature review was completed to obtain baseline information related to cannabis and pregnancy. The following research question was explored: "What are effective interventions and strategies during preconception and pregnancy to reduce and/or prevent cannabis-exposed pregnancies? Exclusion=after pregnancy" (see appendix 4 for literature review methodology).

Seven themes emerged from the literature reviewed:

1. Surveillance
2. Attitudes/Beliefs
3. Raising Awareness
4. Education for Health Care Providers
5. Screening/Interventions
6. Policy/Regulations
7. Research

Subthemes were identified within each of the emerging themes. Themes identified are integrated which confirms the need to work on a comprehensive multi-pronged approach.

Social Determinants of Health

The social determinants of health (SDOH) were an underlying theme among the seven emergent themes. Findings support addressing the SDOH and taking a holistic approach to help reduce and prevent substance use prior to pregnancy for women (Passey, Sanson-Fisher, D'Este & Stirling, 2013). There are significant demographic, health determinants and factors associated with cannabis use in pregnancy, which may also influence the effects on the fetus (Marroun, et al., 2008). A survey respondent shared the following: "Social problems that lead to drug use and dependence are not being effectively addressed like domestic violence, childhood trauma, inter-generational trauma, poverty, access to education and resources." There is supporting evidence to suggest that the SDOH are associated with cannabis use in pregnancy highlighting the need to identify risk factors and barriers in vulnerable women (Tzilos, Hess, Kao & Zlotnick, 2013).

Relationship to Ontario Public Health Standards (2008 and 2018)

The emergent themes were further examined to determine their relationship to the "Ontario Public Health Standards 2008" (OPHS 2008) under the Reproductive Health (RH) program standard and the "Ontario Public Health Standards 2018" (OPHS 2018) under the Healthy Growth & Development program standard (HG&D) (see table 1) (Ministry of Health and Long-Term Care [MOHLTC], 2008; 2018). At the time of this research project the OPHS 2018 standards were not implemented therefore there will be reference to both the 2008 and 2018 standards throughout this report. It is important to note that additional program standards such as the SDOH, Injury Prevention, Chronic Disease and Mental Health relate to, or complement the HG&D program standard (MOHLTC, 2018).

Table 1- Emerging Themes and Ontario Public Health Standards

THEME	OPHS 2008 RH	OPHS 2018 HG&D
1. Surveillance	RH #1	HG&D #1
2. Attitudes / Beliefs	RH #2, #3	HG&D #2
3. Raising Awareness	RH #3	HG&D #1, #2
4. Education for Health Care Providers	RH #2	HG&D #2
5. Screening / Interventions	RH #4, #5, #6	HG&D #1, #2
6. Policy / Regulations	RH #2	HG&D #2
7. Research	RH #1, #2	HG&D #1, #2

Limited Studies/Low Levels of Evidence

It is important to keep in mind that when reading this report that the interventions and strategies discussed in this paper are within the overall context of very limited studies (mainly from the United States (U.S.) and very few Canadian studies) and low levels of evidence.

SUMMARY OF FINDINGS

Ontario Public Health Standards (OPHS 2008): Reproductive Health Requirements: #1, 2, 3, 4, 5 & 6
Ontario Public Health Standards (2018): Healthy Growth and Development Requirements: #1 & 2

SOCIAL DETERMINANTS OF HEALTH (SDOH)

SDOH are the conditions in which people are born, grow, live, work and age that can create health inequities (WHO, 2018). SDOH emerged as an overarching theme, intertwined within the 7 themes that arose regarding strategies and interventions to reduce/prevent cannabis exposed pregnancies.

7 Emerging Themes from Research Required to Help Meet the OPHS (2008 & 2018) Requirements

Surveillance	Attitudes Beliefs	Raise Awareness	HCP Education	Screening Interventions	Policy Regulations	Research
Monitoring and surveillance Prevalence of pregnancy outcomes as cannabis use increases PHU need to track unbiased information	Belief that cannabis is safe and natural Lack of disclosure by client Need to understand perceptions, beliefs and attitudes of women and hcp	Women want more info as unclear about effects of cannabis use in pregnancy. Need for consistent universal message Target women of repro age, pregnant women, primary health care providers (PHCP) and public	PHCP's play a vital role in providing unbiased information Need for more provider education and training Capacity building in intervention and screening	Need for effective screening tools Need for early ID of cannabis use Need for effective interventions	Need for clinical practice guidelines Need for institutional policies Need to understand how policies impact perceptions, beliefs and attitudes	No Randomized controlled trials exist on cannabis use and pregnancy Need for higher levels of evidence Need more Canadian research

Environmental Scan Supports 7 Emerging Themes from Literature Search Findings

NEXT STEPS

Collaboration using a multi-pronged approach addressing all 7 identified areas of need: **Surveillance; Attitudes/ Beliefs; Raise Awareness; HCP Education; Screening/Interventions; Policy/Regulations; Research** is required to prevent and/or reduce cannabis-exposed pregnancies

Research Findings

The following is a summary of the research and local and provincial scan categorized by the seven themes and linked to the OPHS.

OPHS (2008) RH Requirement #1:

"The board of health shall conduct epidemiological analysis of surveillance data, including monitoring trends over time, emerging trends, and priority populations, in accordance with the Population Health Assessment and Surveillance Protocol, 2008 (or current) in the areas of: preconception health, healthy pregnancies, reproductive health outcomes and preparation for parenting."
(p.37)

OPHS (2018) HG&D Requirement #1:

"The board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development and report and disseminate the data and information in accordance with the Population Health Assessment and Surveillance Protocol, 2018 (or as current)."
(p.36-37)

1. SURVEILLANCE

Cannabis is the most commonly used illicit drug in pregnancy in Canada and many other Western Countries (Forray & Foster, 2015; Holland, et al., 2016a; Gerardin, Victorri-Vigneau, Louvigne, Rivoal & Jolliett, 2011; Jarlenski, Tarr, Holland, Farrell & Chang, 2016; SOGC, 2017; Volkow, Han & Compton, 2017). During the period this research was undertaken Canadian data on prevalence rates was limited. Within the district of Thunder Bay, 6% of pregnant women self-reported marijuana use during pregnancy which is four times the provincial statistics (1.5%) and also is the most commonly used substance during pregnancy over alcohol, opioids, and cocaine (Better Outcomes Registry & Network [BORN], 2016).

Local survey respondents commented on "the large discrepancy in our local data about reported use by adults (male and female) and use during pregnancy." Another respondent said "since my patients deny use in pregnancy for the most part I am worried to hear what the real world numbers are." When respondents were asked in our local /provincial scan "To the best of your knowledge, what percentage of your organization's pregnant clients use cannabis?" the answers varied by survey type. Our Local/provincial scan revealed over 60% of TBDHU respondents,

38% of OPHU respondents and 80% of primary health care providers perceived cannabis to be used by up to half of their pregnant clients. Of service provider respondents, 8% perceived between half to three quarters of pregnant clients using cannabis and 23% of service providers perceived up to one quarter of pregnant clients using cannabis. TBDHU (33.3%), Service Providers (53.8%), Ontario Public Health units (47.6%) and PHCP (18.2%) indicated that it was unknown to them the percentage of pregnant clients that use cannabis noting that between 14-15% of SP and OPHU respondents indicated that they provide services to preconception age women, however, they did not provide services to pregnant women (see table 2).

Table 2 - Perceived Cannabis Use by Pregnant Clients

Perceived Cannabis Use by Pregnant Clients	TBDHU	SP	OPHU	PHCP
Less than 25%	16.7%	23.1%	28.6%	63.7%
25%-50%	50.0%	0%	9.5%	18.2%
51%-75%	0%	7.7%	0%	0%
Greater than 75%	0%	0%	0%	0%
Unknown	33.3%	53.8%	47.6%	18.2%
I do not provide services to pregnant women	0%	15.4%	14.3%	0%

The American College of Obstetricians and Gynecologists (ACOG, 2015) reported prevalence rates of cannabis use anywhere from 2-5% and as high as 15-28% in pregnant women. Cannabis' perceived safety likely contributes to the high prevalence of its use in pregnancy (Metz & Stickrath, 2015). Prevalence of cannabis use was found to be higher in the first trimester and lower in the second and third, highlighting the importance of early and frequent screening (Jaques, et al., 2014; Volkow et al., 2017). US prevalence of perinatal cannabis use has been reported up to 16% daily use (Ko, Farr, Tong, Creanga & Callaghan, 2015). The same study found 10.9% of pregnant women and 14% of non-pregnant women (of reproductive age) used cannabis in the past year, with 3.9% of pregnant women and 7.6% of non-pregnant women reporting past month use between 2007-2012. Of the mentioned statistics, 18.1% of pregnant women met criteria for cannabis use, with 11.4% of non-pregnant women meeting the same measures (Ko et al., 2015). Substance abuse treatment admissions among pregnant women who use cannabis in a US study reported: 29% in 1993 & 43% in 2012 (Martin, Longinaker, Mark, Chisolm & Terplan, 2015). Data also indicates cannabis prevalence is higher among women who smoke cigarettes (Gaalema, Higgins, Pepin, Heil & Bernstein, 2012; Jaques et al, 2014; Madgula, Groshkova & Mayet, 2011). Prevalence may be similar among cannabis and tobacco, suggesting a significant need to research co-morbid use (Beatty, Svikis & Ondersma, 2012). The positive link between cannabis, tobacco and alcohol was prominently discussed among the reviewed documents (Burns, Coleman-Cowger & Breen, 2016; Gaalema et al., 2012; Hotham, White, Ali & Robinson, 2012; Madgula et al., 2011).

It is important to note that prevalence of cannabis use in women of childbearing age and pregnant women is often inaccurate/underestimated due to: unreliable self-reporting results; stigma, barriers, legal consequences, recall bias and psychiatric disorders; inability of self-reporting to allow determination of THC quantity (as dose varies depending on the form); and inaccuracies among clinical testing methods such as urine, hair, and meconium (Beatty et al., 2012; Bessa, Mitsuhiro, Chalem, Barros, Guinsburg & Laranjeira, 2010; Chang, Holland, Tarr, Rubio, Rodriguez, Kraemer, Day & Arnold, 2015; Tzilos et al., 2013; Holland et al, 2016a; Metz & Stickrath, 2015).

RECOMMENDATIONS

Chasnoff (2017) recommends, "Randomized Control Trial Studies of the effectiveness of marijuana as a medication need to include women, and rates of marijuana use in pregnancy before and after new medical marijuana legislation" (p.29). Differences in prevalence should be surveyed with a changing political environment related to legalization (Metz & Stickrath, 2015). National and state trends require ongoing monitoring and surveillance (Ko et al., 2015). As a result of potential price decrease and increased legal availability, Ko et al. (2015) point out that surveillance will be necessary to look at prevalence of pregnancy outcomes, as cannabis use increases.

Public health has the opportunity to play a vital role in tracking unbiased information (Jarlenski, Zank, Tarr & Chang, 2017). Barriers to self-reporting cannabis use in pregnancy require assessment, as well as clinical testing methods. Given the association of cannabis, tobacco, and alcohol, it is recommended that further comparison studies be conducted and funding be allocated, to clarify information to improve care with comorbid users (Hotham et al., 2012).

2. ATTITUDES/BELIEFS

OPHS (2008) RH Requirement #2:

"The board of health shall work with community partners using a comprehensive health promotion approach, to influence the development and implementation of healthy policies and the creation or enhancement of supportive environments to address preconception health, healthy pregnancies and preparation for parenting."
(p.37)

OPHS (2008) RH Requirement #3:

"The board of health shall increase public awareness of preconception health, healthy pregnancies and preparation for parenting by adapting and/or supplementing national and provincial health communications strategies; and/or developing and implementing regional/local communication strategies."
(p.37-38)

OPHS (2018) HG&D Requirement #2:

"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

The belief that marijuana is harmful has decreased over the past decade (Day, Goldschmidt, Day, Larkby & Richardson, 2015; Forray & Foster, 2015). Among the documents consulted, there was recurrent emphasis that both the public and providers perceive cannabis as harmless (Forray & Foster, 2015; Holland et al., 2016a; Hotham, Ali, & White, 2016; Jarlenski et al., 2016). There is widespread societal and community acceptance of cannabis use recreationally, increasing tenacious use in pregnancy (Jaques et al., 2014).

Women's Perception, "Lack of Harms"

According to Jarlenski et al. (2016), women often believe cannabis to be a natural substance, and therefore natural for consumption. Their study discussed pregnant women's perceived lack of harms to fetus in relation to the lack of educational campaigns and information available on cannabis as compared to tobacco. A U.S. study on perceptions of post-partum women revealed that when participants were asked regarding a substance most likely to harm a baby: "70% chose alcohol, 26% chose tobacco & 2% chose marijuana" (Beatty et al., 2012, p.6). A respondent from one of our scans comments that "we have focused on Fetal Alcohol Spectrum (FAS) but for some reason our patients think cannabis is not too concerning for the fetus." A U.S. study reported almost 70% of pregnant and non-pregnant women (of reproductive age) perceived little to no risk of using cannabis once monthly or once or twice weekly (Ko et al., 2015).

Obstetricians' Perception of Risk of Cannabis Use in Pregnancy

Some of the themes that emerged from interviews in a study by Holland et al. (2016a) related to Obstetric providers attitudes and counseling strategies regarding perinatal cannabis use identified that "they like their patients, believed marijuana to be less harmful or dangerous than other substances used during pregnancy. They also perceived that patients did not view marijuana to be a drug" (p. 1449). According to a study done by Gerardin et al. (2011) "the perception of risk varies according to the practitioner's experience." It means that those professionals who have already consulted pregnant cannabis users and/or who perform childbirth are more aware of the effects of cannabis" (p.471) although these professionals do not typically see these women until closer to the end of pregnancy.

Under Reporting/Lack of Disclosure

Many women also under report cannabis use to their health care providers. A participant in a study by Hotham et al. (2016) stated: "The doctors and midwives respect that my cannabis use helps with my depression (and do not express concern). However, I underestimate my use to them, I say half instead of a full bad" (p.185). Subjects also tend to report cannabis use occurred earlier than suggested by a toxicology screen (Yonkers, Howell, Gotman & Rounsaville, 2011). Although obstetric providers are asking patients about illicit drug use, the majority of patients are not disclosing (Chang et al., 2015). Admitting illegal substance use in pregnancy is very difficult for women (Bessa et al., 2010). Many women do not discuss or disclose illicit drug use with their care provider and/or physician for many reasons including stigma, guilt and legal implications (Alharbi & El-Guebaly, 2014; Chang et al., 2015). One of the respondents from our scan indicated that "patients do not come to the office for pre-pregnancy visits usually after. Patients do not disclose marijuana use either due to perceived judgement, or they do not believe it to be potentially harmful." While another respondent indicated another reason that, "For the most part, I am often not told if they are using cannabis. Yet they are more likely to tell me and ask for help if using other drugs I believe a lot of people still think cannabis is safe."

Discomfort /Frustration of Health Care Providers with Cannabis Topic

In one study when pregnant women did disclose cannabis use during their first obstetrical visit, there was a high rate of absent and insufficient health care provider responses (Holland, et al., 2016b). In many cases the woman's health care provider did not acknowledge the disclosure of women's cannabis use nor did they offer any education or counselling (Harris & Okorie, 2017). In a study by Holland et al. (2016a) looking at obstetric provider attitudes and counseling strategies related to perinatal cannabis use the following was noted: A lack of understanding of medical consequences of perinatal cannabis use leads to limited counseling; A lack of knowledge leads to a reliance on legal or social services consequences to motivate patient cessation prior to delivery. An additional study by the same author (Holland et al., 2016b) found that lack of counseling may have also been related to lack of knowledge and/or information regarding risk of perinatal cannabis use. When respondents were asked about whether they felt reducing or preventing cannabis–exposed pregnancies is important, it was unanimously agreed. One of the

frustrations expressed by respondents in our scan was that "people argue with me that cannabis is good and the 'government' is trying to take it away from them. I really feel like I am in a losing battle when I talk to people about not using."

RECOMMENDATIONS

Increased Understanding of Women's Attitudes and Beliefs

There is a need to understand women's perceptions and beliefs on cannabis use in pregnancy in order to tailor interventions and individualize open-ended discussions for providers, while also shifting focus to specific populations (Holland et al., 2016a). The importance of women's perceived risk, attitudes and beliefs of cannabis use during both the preconception and prenatal period requires further investigation and research including settings with increased legalization (Metz & Stickrath, 2015).

Increased Understanding of Health Care Provider Attitudes and How They Counsel

Future studies should research changes in providers' attitudes as more states consider the legalization of cannabis (Holland et al., 2016a). There is a need for better understanding of how providers counsel patients using illicit drugs and how providers' responses affect pregnant women using substances (Chang et al., 2015). Identifying cannabis use in pregnant women should prompt investigation into other substances (Jaques et al., 2014). Clinicians should be alert to the possibility of current drug use, even among patients who claimed their last use of cannabis or cocaine was several weeks prior (Yonkers et al., 2011).

3. RAISING AWARENESS

OPHS (2008) RH Requirement #3:

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(p.36-37)

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"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

The impacts of policy and the media have on public beliefs and attitudes toward perinatal cannabis use are a barrier to raising awareness (Jarlenski et al., 2017). There are many pro-cannabis advocacy groups promoting cannabis as harmless or healthy influencing public opinion, while acting as a barrier to awareness (Beatty et al, 2012; Warner, Roussos-Ross & Behnke, 2014).

Public Health Messaging Campaigns

A systematic content analysis conducted by Jarlenski et al. (2017) found only 10 public health agencies and one federal agency published communications regarding perinatal cannabis use out of a sample of 50 states, the District of Columbia and five federal public agencies. Few campaigns and public health messaging exist to aid preventing cannabis use in pregnancy & preconception. There is an overall lack of messaging and campaigns to communicate accurate information to society (Alharbi & El-Guebaly, 2014). Statewide funds were allocated for the purpose of a mass media campaign to raise awareness among Colorado citizens (Brooks-Russell, Levinson, Roppolo & Bull, 2017). The "Good to Know" Colorado campaign, with its easily accessible website was evaluated by authors who conducted a prospective cohort design, with the objective to evaluate the first mass media campaign to increase knowledge of recreational cannabis use laws among adults in Colorado (Brooks-Russell et al., 2017). The results of the study proved the mass media campaign reached all demographics with increased cognizance among younger adults, and a significant increase in knowledge among cannabis non-users compared to users (Brooks-Russell et al., 2017).

Public Programming

Women often obtain their information from social media and from family and friends (Jarlenski et al., 2016). Offering public programs that are inclusive of friends, family and woman's partner is an important aspect in creating awareness and providing support. Around 50% of all respondents in our survey indicated that that their program/organization provides promotional, preventative, or intervention activities to reduce and/or prevent cannabis exposed pregnancies. Of those that do provide activities most include the woman's partner some of the

time. Examples of activities where cannabis is discussed include: incorporating information about cannabis into prenatal classes and existing resources; distributing fact sheets; facilitating educational groups with at risk youth and women which includes cannabis conversations; online prenatal program with key messages around substance use; healthy pregnancy webpage; information on websites; one-on-one health teaching; visor information cards; home visiting programs and social media outlets like blogs, Facebook© and Twitter©. Of those respondents that did not provide promotional, preventative or intervention activities to reduce and/or prevent cannabis exposed pregnancies, the reasons were primarily related to a lack of awareness and referring clients to other organizations.

Lack of Awareness by Women

Women often feel unclear regarding messages around cannabis use in pregnancy, and report they want information on the effects of this use (Jarlenski et al., 2016). A survey respondent indicated that "Cannabis is seen as natural and harmless substance. Many clients do not identify it as a problem substance." Pregnant women do not know the health risks of using cannabis in pregnancy and the effects the substance will pose on their children's wellbeing (Alharbi & El-Guebaly, 2014). One respondent from our surveys indicated that "Knowledge and awareness are severely lacking in this area. Also the age of the woman definitely sets the stage as to the awareness. Most of the young moms, 18 and under have no idea of the harm that cannabis or other drugs can cause." Knowledge about prevention and management of cannabis use and abuse among women of childbearing age remains limited (Alharby & El-Guebaly, 2014). The "Good to Know" campaign in the United States will be expanded to include specific campaigns with a focus on cannabis use in pregnancy and breastfeeding (Brooks-Russell, 2017).

RECOMMENDATIONS

Target Public

Public health marketing campaigns and strategies have a positive impact on influencing public attitudes (Jarlenski et al., 2016). Public health has an important role to raise awareness and communicate accurate emerging evidence on cannabis use in pregnancy (Jarlenski et al., 2016; Jarlenski et al., 2017; Sonon, Richardson, Cornelius, Kim & Day, 2016). Comprehensive public health campaigns detailing the negative effects of cannabis use in pregnancy are urgently required (Alharbi & El-Guebaly, 2014; Marroun et al., 2008). From a public health perspective, "state departments of health, in collaboration with state licensing boards, should take several steps to educate and inform the public and professionals on the possible impact of marijuana's use during pregnancy and discourage" (Chasnoff, 2017, p.29). With legalization, there is a significant need for media content, presentations and noticeable messaging of cannabis use in pregnancy (Jarlenski et al., 2016; Sonon et al., 2016). Clear and informative public health messages are needed (Beatty et al., 2012; Jarlenski et al., 2016).

Target Health Care Providers

Evidence based information from public health agencies and health care providers may be important due to over promotion of cannabis use (Jarlenski et al., 2016). Authors from Jarlenski et al. (2017) emphasize the importance of targeting providers with this information as pregnant women who use substances are frequently engaged with their providers during this vulnerable period. Additionally, physicians may lack awareness regarding effects (Ko et al., 2015). Public health communications targeted to health care providers may serve an important role in summarizing emerging evidence with regards to health effects of perinatal cannabis use, screening and best practices for treatment (Jarlenski et al., 2017).

Target Women

Public health messaging should target women of reproductive age prior to pregnancy, given over half of pregnancies are unplanned in North America (ACOG, 2015). One survey respondent indicated that "Clients are often unaware of the consequences. Public Health has a responsibility to address this. Perhaps some clients would stop using cannabis if they had this knowledge and those who find it difficult to stop would seek help." There is a need for greater attention to educating women of the potential risks of prenatal cannabis use to counteract some broader misinformed messages that cannabis is safe or even healthy for pregnant women (Beatty et al., 2012; Jarlenski et al., 2016). Nationwide education efforts are needed to change the perception that women have about using cannabis while pregnant and to increase awareness surrounding the harms it may have on the fetus. Similar mass media channeling resembling the State of Colorado's "Good to Know" campaign targeting preconception and pregnant women to advise on the risks of cannabis use is an important strategy (Warner et al., 2014). The Society of Obstetricians and Gynaecologists of Canada (2017) issued a position statement in 2017 discussing the risk legalization has in strengthening cannabis' reputation as a harmless or safe drug for use in pregnancy. Legalized recreational cannabis in Canada may prove to be harmful if society does not raise awareness on the risk of cannabis use in pregnancy. In addition, the SOGC (2017) warns pregnant women not to use cannabis for medical purposes in pregnancy and try a safer alternative. This concern was underscored by a respondent who stated: "pregnant women experiencing nausea and vomiting find relief with marijuana, Diclectin is expensive if women are not on a drug plan that covers it. Pregnant women with a trauma history and/or mental health issues and/or toxic stress find symptom relief using marijuana."

4. EDUCATION FOR HEALTH CARE PROVIDERS

OPHS (2008) RH Requirement #2:

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(p.37)

OPHS (2018) HG&D Requirement #2:

"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

Increased Education for Health Care Providers

While women often seek information regarding cannabis use/effects in pregnancy from social media platforms and anecdotally from family and friends, health care providers have the opportunity to educate women and change misconceptions (Jarlenski et al., 2016). Health care providers are often the first contact for prenatal patients presenting an opportunity for change (Tzilos et al., 2013). However, health care providers do not feel they know enough about the effects of cannabis use during pregnancy. Nearly 7 out of 10 health care professionals did not feel informed enough about the risks of cannabis in pregnancy (Gerardin et al., 2011). A survey participant from our environmental scan indicated that "Information I find on internet is vague and does not say exactly what pot does to the unborn foetus at different stage of development." Few pregnant women found health care providers or social workers to be helpful in providing information on cannabis use in pregnancy and/or obtaining resources on where to go for help if they want to stop other than being provided information on the legal consequence of cannabis use in pregnancy (Jarlenski et al., 2016). It is important for health care providers to discuss other areas related to cannabis use in pregnancy such as the misuse of medical cannabis to alleviate morning sickness

which is a returning trend today (Alharbi & El Guebaly, 2014; Volkow et al., 2014; Westfall, Janssen, Lucas & Capler, 2006). Harris & Okorie (2017) found that a lack of patient resources is a barrier to health care provider screening for substance use and a lack of training in managing positive screen results is a barrier to health care provider screening. Health care providers' lack of screening or lack of response to screening questions may be due to discomfort with the screening process (Alharbi & El-Guebaly, 2014; Harris & Okorie, 2017; Hotham et al., 2016). Findings from our environmental scan highly suggest there is a need for more education for all professionals surrounding the topic of cannabis use during pregnancy as 80% to 100% of respondents indicated they did not feel they had enough knowledge about the effect of cannabis exposed pregnancies (TBDHU & SP 100%, OPHU 82.6% and PHCP 81.8%).

Type of Primary Health Care Provider Education Needed

Providers and social workers want clear information on the effects of cannabis use to inform their practice (Jarlenski, 2016). One survey respondent indicated she "could always use more information on how to approach prenatal patients who use cannabis." Providers interviewed in Holland et al. (2016b) discuss the need for information, resources, additional training and guidance in responding properly (counseling) to clients who use cannabis in pregnancy. Those who did not feel they had enough knowledge in our survey expressed a need for information; access to evidence-based research; training via webinars, workshops and lunch and learns; more resources available, especially materials that are culturally appropriate for the large Indigenous population locally; and information on where to refer clients.

RECOMMENDATIONS

Although raising public awareness is needed, clinicians urgently require education, training and resources on the risks and effects of cannabis use in pregnancy (Chasnoff, 2017; Gerardin et al., 2011; Ko et al., 2015). Health care providers play a vital role in counseling patients and providing public health messaging (ACOG, 2015). They need to be educated on the importance of early detection of cannabis use among patients to prevent insufficient care (Gerardin et al, 2011; Sonon et al., 2016). Providers should be informing these patients to abstain and not prescribe cannabis in the preconception or pregnancy stage as there is no known safe amount (ACOG, 2015; Bessa et al., 2010; Sonon et al., 2016). The SOGC (2017) recommended public funding for education that is easily accessible so unbiased messages to abstain from cannabis for those in the preconception and prenatal stage is promoted. Physicians need information about prevalence and use of cannabis during pregnancy (Ko et al., 2015). Counseling guidelines, information on how to care for pregnant women who use cannabis and tools for practitioners' use is necessary (Ko et al., 2015). Mandatory staff training related to cannabis use in pregnancy should be implemented (Jaques et al., 2014). PHCPs need to educate themselves by continuing education or consultation with experts in the field (Harris & Okorie, 2017). Additional training was a prominent suggestion in the reviewed literature and recommendations of integrating this into the medical curriculum and developing curricula for obstetric providers may be promising ideas (Gerardin et al., 2011; Harris & Okorie, 2017; Holland et al., 2016a). Physicians should be required to take specific training such as Continual Medical Education (CME) credits in order to prescribe cannabis or have patients sign a declaration, rather than a prescription, to prevent endorsing cannabis for therapeutic use (Chasnoff, 2017; Kahan & Spithoff, 2013). Knowledge and access of a referral network for providers would also assist in caring for this vulnerable population of patients (Gerardin et al., 2011; Warner et al., 2014). Nevertheless, all PHCP should keep informed on the changing policy and legal landscape related to cannabis (Holland et al., 2016a).

5. SCREENING / INTERVENTIONS

OPHS (2008) RH Requirement #4:

"The board of health shall provide, in collaboration with community partners, prenatal programs and services on the following topics: preconception health, healthy pregnancies and preparation for parenting."
(p.38)

OPHS (2008) RH Requirement #5:

"The board of health shall provide advice and information to link people to community programs and services on the following topics: preconception health, healthy pregnancies and preparation for parenting."
(p.38)

OPHS (2008) RH Requirement #6:

"The board of health shall provide, in collaboration with community partners, outreach to community priority populations to link them to information, programs and services."(p.38)

OPHS (2018) HG&D Requirement #1:

"The board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development and report and disseminate the data and information in accordance with the Population Health Assessment and Surveillance Protocol, 2018 (or as current)."
(p.36-37)

OPHS (2018) HG&D Requirement #2:

"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

Health care providers play a vital role in counseling reproductive age women prior to pregnancy and there is a need to increase and promote early detection (ACOG, 2015; Gerardin et al., 2011). There is a lack of interventions, strategies and promising practices to prevent cannabis use in pregnancy. The literature review did not reveal any specific clinical strategies/interventions validated for practice on pregnant women to prevent cannabis use.

Screening

Time constraints are a barrier to physicians screening patients, signifying a demand for an easy to administer tool (Harris & Okorie, 2017). A screening tool is a measure of a point in time, and should be administered multiple times throughout pregnancy (Jaques et al., 2014). In the Gerardin et al. (2011) study, only half of health care professionals asked their pregnant patients about illicit drug use. The majority of respondents that provide services to pregnant women and/or women of preconception age indicated that they ask their clients about cannabis use at "some visits" ranging from 50%-60% of TBDHU professionals and local service providers, 57.1% of Ontario Public Health professionals to 83.3% of primary health care providers. Less than 1/5 of all professionals in public health units, local service provider organizations as well as primary health care providers asked clients at "every visit" about cannabis use. Despite efforts directed to the development of a cannabis specific screening tool there is not a present tool that has emerged for pregnant women (Hotham et al., 2012; Hotham et al., 2016). Respondents from all 4 surveys were asked: Is your organization using any type of screening tool to identify potential cannabis exposed pregnancies? (see table 3). Respondents also shared the type of screening tool used in table 4 below. People who use cannabis often have a high frequency of polysubstance use, thus a screening tool for multiple substances may also be indicative with comprehensive treatment programs (Ko et al., 2015; Tzilos et al., 2013).

Table 3- Number of Health Care Professionals Using Screening Tools

% of professionals using any type of screening tools to identify potential cannabis-exposed pregnancies	TBDHU	SP	OPHU	PHCP
No	0%	84.6%	38.1%	58.3%
Not Sure / Unknown	33.3%	x	x	0%
Yes (Please Specify)	66.7%	15.4%	61.9%	41.7%

Table 4- Types of Screening Tools used by Health Care Professionals

	Screening Tools Used
TBDHU	- Part of question involving alcohol and drugs - Healthy Babies Healthy Children screening tool asks about substance use in pregnancy including cannabis
SP	Substance Misuse Prevention program does not see clients, we just provide information to our nurses who do see the clients
OPHU	Healthy Babies Healthy Children and Sexual Health programs have questions within initial assessment
PHCP	- Antenatal record has a question on it regarding illicit drug use - Adopt the Cut. Annoyed, Guilty, Eye opener (CAGE) assessment tool (Ewing, 1984) - Check list of risk factors

Interventions

Identification of prenatal exposure to drugs (cocaine, cannabis) is critical for implementation of an appropriate medical and psychosocial intervention for the mothers and children before and after birth (Bessa et al., 2010). Although Cognitive Behavioural (CBT) Therapy, Motivational Interviewing (MI), Motivational Management Therapy (MM), and Cognitive Management (CM) were found in some documents as being successful for women and suggestions that CM therapy may improve prenatal care, none of the above suggested management/treatment options have been validated for use or studied in the pregnant population (Alharbi & El-Guebaly, 2014; Forray & Foster, 2015; Minnes, Lang & Singer, 2011; Whicher, Schirmer, Davis & Abou-Saleh, 2012). Overall, psychosocial and psychological management therapies appeared throughout the literature as promising practice to mitigate cannabis use before and during pregnancy (Alharbi & El-Guebaly, 2014; Forray & Foster, 2015; Jarlenski et al., 2016). Continued tobacco smoking is a potential useful indicator of possible other drug use in pregnancy (Passey et al., 2013). Gaalema et al. (2012) found that in a sample of pregnant women enrolled in a smoking cessation treatment, illicit drug use, especially cannabis was common. However, many smoking interventions for pregnant women focus solely on cigarette smoking therefore don't address the issue of other drug use and high risk behaviours (Gaalema et al., 2012). This may be an opportunity missed especially when women are receptive to health care providers' cannabis cessation recommendations when information is clear, helpful, and evidence based and speaks of risks to fetus (Harris & Okorie, 2017).

RECOMMENDATIONS

Interventions and strategies are urgently required to raise awareness and prevent cannabis use in preconception and pregnant women (Ko et al., 2015). The SOGC (2017) recommends health care professionals discuss the negative effects with both pregnant women and those contemplating a pregnancy and encourage abstinence from cannabis. Providers should be informing prenatal patients to abstain and not prescribe cannabis in the preconception or prenatal period as there is no known safe amount (ACOG, 2015; Bessa et al., 2010; Kahan & Spithoff, 2013; Sonon et al., 2016). Universal screening of women of childbearing age and pregnant women to identify cannabis risk and promote early identification of cannabis use is needed (ACOG, 2015; Forray & Foster, 2015). Easy to administer screening tools and non-judgemental approaches are required for women using cannabis in pregnancy (Jaques et al., 2014). Specific interventions should target young women who are at a higher risk for unplanned pregnancy and cannabis use (Bessa, Mitsuhiro, Chalem, Barros, Guinsburg & Laranjeira, 2009). Related psychosocial interventions tested and validated for smoking cessation were recommended as promising practice for cannabis management in pregnancy as well (Huizink, 2015; Jarlenski et al.,2016). Those providing smoking cessation therapy should be prepared to assist pregnant women with obtaining services related to other drugs as well (Gaalema et al., 2012). Interventions should focus on cessation rather than temporary abstinence to prevent postpartum substance abuse relapse (Minnes et al., 2011). Counseling should address strategies to assist the pregnant patient in quitting (Holland et al., 2016b). When cessation is not an option, a harm reduction approach to at least cut down on cannabis consumption should be encouraged in pregnancy (Jaques et al., 2014).

6. POLICY/ REGULATIONS

OPHS (2008) RH Requirement #2:

"The board of health shall work with community partners using a comprehensive health promotion approach, to influence the development and implementation of healthy policies and the creation or enhancement of supportive environments to address preconception health, healthy pregnancies and preparation for parenting."
(p.37)

OPHS (2018) HG&D Requirement #2:

"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

Lack of Policy/Regulations

There is a general lack of policy, guidelines, tools, regulations and universal standards surrounding cannabis use in pregnancy (ACOG, 2015; Beatty et al., 2012; Chasnoff, 2017; Holland et al., 2016). In addition, the public often lacks accurate knowledge surrounding new laws and regulations relating to cannabis use, resulting in negative public health consequences (Jarlenski et al., 2017). The documents reviewed reveal the repeated issue surrounding the absence of guidelines, manuals, interventions and screenings tools specific to cannabis use in pregnancy (Beatty et al., 2012; Holland et al., 2016b). Only a small number of interventions specifically addressing multiple risks among disadvantaged pregnant women have been trialed and to date this issue has been largely neglected in health policy and practice (Passey et al., 2013). Colorado is one of the first states to legalize recreational cannabis use while developing regulations related to purchase, possession and consumption (Brooks-Russell et al., 2017). Oregon is the only state at present that necessitates a point-of-sale warning regarding cannabis use in pregnancy and breastfeeding for women (Chasnoff, 2017). There is no current regulation from the U.S. Food and Drug Administration (FDA) and no labels or safety precautions, contraindications or indications (ACOG, 2015). In Canada, Health Canada has not approved Cannabis for therapeutic use or instilled any rules surrounding it (Kahan & Spithoff, 2013). "Legal scholars have argued that when used for medicinal purposes, marijuana should be considered a pharmaceutical agent governed by the Food, Drug & Cosmetic Act with regulatory oversight, including evaluation of its safety and efficacy, provided by the FDA" (Warner et al., 2014 p.3). There is an argument from the College of Physicians that this places health care providers in an unfair and unethical position expecting them to prescribe medical cannabis when it has not been tested, lacks dosing guidelines, precautions or regulations (Kahan & Spithoff, 2013).

Issue of Legal Consequences

There was a consensus in many documents that punitive and legal consequences pertaining to cannabis use in pregnancy are not therapeutic and act as a barrier to prevention/management (ACOG, 2015; Alharbi & El-Guebaly, 2014; Jarlenski et al., 2016; Kahan & Spithoff, 2013; Warner et al., 2014). For higher risk groups, a harm reduction approach should be attempted instead of legal consequences (Kahan &; Spithoff, 2013). One survey respondent indicated that "a barrier may be that many of our clients are using alcohol and opiates and using a harm reduction philosophy, cannabis is often the lesser of these evils".

Cannabis Rates Escalating

Escalating rates of cannabis use continue with recreational legalization in states in the US. (Ko et al., 2015). Recreational legalization of cannabis in Canada may have a similar impact (SOGC, 2017). A survey respondent echoes that "with marijuana being legalized, people assume it is natural and not harmful to use, including during pregnancy." Nevertheless, the cost of utero-exposed infants to cannabis may be a significant detriment to the health care system (Metz, Kochi & Fisher, 2012). One survey respondent indicated that "in light of impending legalization of cannabis, it is very important that our community is well equipped to prevent/reduce cannabis exposed pregnancies" while another respondent worries that "upcoming legalization of marijuana will make it much harder for youth and women to believe the key messages."

RECOMMENDATIONS

In terms of broader recommendations, one study that looked at obstetric providers' attitudes and counseling strategies regarding perinatal cannabis use through interviews stated: "To inform future policy and regulations regarding perinatal marijuana use, we need to gain a better understanding of how different policy environments regarding legalization of marijuana impact beliefs, attitudes, behaviours, practices and concerns regarding marijuana use among pregnant patients and their providers" (Holland et al., 2016a, p.1450). According to Chasnoff (2019, p.29), "From a public health perspective, at the very least, we must acknowledge that marijuana use during pregnancy has potential risks, and we need to incorporate guidelines into the new and emerging marijuana laws and recognize and communicate that risk." One suggestion involves developing informational and point of sale warning materials for sites where recreational and medical cannabis is sold (Chasnoff, 2017). In addition, the ACOG (2015) suggests that drug enforcement policies instilling punitive, legal consequences should not exist as they deter women from seeking prenatal care and inhibit a therapeutic patient provider relationship.

With regards to institutional policies and the literature reviewed, Jaques et al. (2014) recommends that each institution should work towards a policy of ensuring best practices for working with their particular population of people who use cannabis. In terms of clinical practice guidelines there were a number mentioned highlighting obstetricians. Some of the most notable included: discouraging OB/GYN prescribing or suggesting the dose of cannabis for medical purposes during preconception and during pregnancy; the need for systematic screening of cannabis use through urine testing; and seeking obstetric care should not expose a woman to criminal or civil penalties for cannabis such as incarceration, involuntary commitment, loss of custody of children or loss of housing (ACOG, 2015; Alharbi & El-Guebaly, 2014).

7. RESEARCH

OPHS (2008) RH Requirement #1:

"The board of health shall conduct epidemiological analysis of surveillance data, including monitoring trends over time, emerging trends, and priority populations, in accordance with the Population Health Assessment and Surveillance Protocol, 2008 (or current) in the areas of: preconception health, healthy pregnancies, reproductive health outcomes and preparation for parenting."
(p.37)

OPHS (2008) RH Requirement #2:

"The board of health shall work with community partners using a comprehensive health promotion approach, to influence the development and implementation of healthy policies and the creation or enhancement of supportive environments to address preconception health, healthy pregnancies and preparation for parenting."
(p.37)

OPHS (2018) HG&D Requirement #1:

"The board of health shall collect and analyze relevant data to monitor trends over time, emerging trends, priorities, and health inequities related to healthy growth and development and report and disseminate the data and information in accordance with the Population Health Assessment and Surveillance Protocol, 2018 (or as current)."
(p.36-37)

OPHS (2018) HG&D Requirement #2:

"The board of health shall develop and implement a program of public health interventions using a comprehensive health promotion approach to support healthy growth and development in the health unit population"
(p.37)

During the period this research was completed, research regarding cannabis use in pregnancy was limited. Without research and higher levels of evidence, the ability to relay accurate public health messaging to increase awareness is not possible. There is a severe lack of data to provide clear and accurate messaging to the public and providers (Jarlenski,et al., 2016). No randomized controlled trials (RCT) currently exist on cannabis use in pregnancy. Huizink (2015) highlights in a review that there are RCT's on alcohol use and its effect prenatally and interventions for smoking cessation. This is also within low levels of evidence and minimal research. A Canadian 2017 Rapid Response report found two systematic reviews with meta-analysis and 9 non-randomized trials relating to: "The safety of cannabis use (medical or recreational) during pregnancy for pregnant women and their children. No relevant health technology assessments, RCT's or evidence-based guidelines were identified" (Canadian Agency for Drugs and Technologies in Health [CADTH], 2017, p.4). There are few studies that accurately study the effects of prenatal cannabis use and human fetus exposure (Huizink, 2015). At the time this research was undertaken no medication exists to mitigate or substitute cannabis use in pregnancy. According to Alharbi & El-Guebaly (2014), research is limited in this area as well. However, there is enough evidence to suggest cannabis is not a harmless drug especially during pregnancy contrary to what is being perceived (Chasnoff, 2017). Research is often heavily confounded (ACOG, 2015; Alaharbi & El-Guebaly, 2014; Holland et al., 2016a; Marroun et al., 2008). Most studies are confounded by sociodemographic factors and the comorbidity of other drugs especially nicotine (Madgula et al., 2011). There are many barriers when conducting research on cannabis use in pregnancy including: ethical considerations, legal consequences, demographics and poly-substance use (Alharbi & El-Guebaly, 2014; Madgula et al, 2011). Human studies on substance use in pregnancy generally have gaps in methodologies: based on self-report with risk of recall bias, retrospective, choice of outcome measures, correlated risk factors, heritable factors and other methodological challenges (Huizink, 2015, p.93). Any available animal studies cannot be generalized to humans due to differences

in anatomy (Huizink, 2015). Self-reporting tools for cannabis use in pregnancy lack validation and the research has been mainly performed in the U.S. with little Canadian data (Hotham et al., 2012). This results in providers not reliably and consistently screening patients (Hotham et al., 2016).

RECOMMENDATIONS

There are a number of research areas highlighted in the literature that are needed in order to contribute to a decrease in cannabis exposed pregnancies. These research areas include: patient perceptions and attitudes; provider perception and attitudes; effects of cannabis on pregnant woman; effects of cannabis on infant outcomes (in utero and later in life); and effective intervention tools. Given the ongoing therapeutic and medical use of cannabis in pregnancy, objective clinical trials are required to examine the benefits and risks of this practice (Alharby & El-Guebaly, 2014; Minnes et al., 2011). Controlled studies examining pharmacotherapies would be beneficial (Minnes et al., 2011). There is also a need to examine potential adverse effects of medical and recreational cannabis on pregnancy (Ko et al., 2015). Recommendation number five of the SOGC (2017) position statement endorses research into the effects of cannabis on pregnancy and lactation. There is a need for high quality contemporary prospective data to better understand the effects of cannabis use in pregnancy and lactation (CADTH, 2017). Future controlled studies with larger samples are encouraged (Tzilos et al., 2013). Larger scale studies are required to increase methodologies and reduce bias and confounders (Madgula et al., 2011). Other areas of focus for researchers include: examining risks of maternal cannabis use on infant outcomes; examining demographic, social and emotional determinants on offspring outcome and prenatal cannabis exposure; developing longitudinal studies on child cognitive development; examining long term neurobehavioral effects and patient perceptions and attitudes toward drug and cannabis use (Chang et al., 2015; Chasnoff, 2017; Ko et al., 2015; Marroun et al., 2008; Metz et al., 2015). Investigation and data collection on what inhibits women from disclosing cannabis use in pregnancy is desirable (Chang et al., 2015). Understanding how providers counsel and respond to patients reporting cannabis use in pregnancy would also be a relevant area for future investigation (Chang et al., 2015). Future research is needed regarding effective strategies to prevent prenatal illicit drug use including cannabis (Chang et al., 2015). Empirical assessments to evaluate the performance of different screening or communication tools are warranted. Further research should evaluate the longitudinal outcomes and efficacy of mobile interventions (mobile app) targeting perinatal substance use (Forray & Foster, 2015)

Next Steps

The information obtained from this Phase 1 report will help determine next steps to help inform our program planning as well as provide baseline information as we move into phase 2 “Cannabis and Pregnancy: Transitioning into Cannabis Legalization (report launch Sept 2019) and phase 3 “Cannabis and Pregnancy: One Year Post Legalization” (refer to Appendix 2). As we continue with the next phases of our project we will monitor the impact of legalization and gain an understanding of the changing landscape and how this may or may not impact perceptions and needs related to cannabis and pregnancy. Other community partners (local and provincial) looking to prevent and/or reduce cannabis exposed pregnancies may find these next steps useful as the local landscape from our environmental scan was congruent to the research obtained through the literature review. Recommendations provided in this report may be taken into consideration including government initiatives that will accompany the new legislation.

The following next steps have been suggested for the 7 themes while considering the Social Determinants of Health:

1. Surveillance

Based on research, moving forward it is suggested that Public Health's role in tracking cannabis information will be an important component of obtaining accurate/non-biased surveillance information. A coordinated approach is recommended for all levels of government (local, provincial and federal) to ensure that specific priority populations like pregnant women are included in the population health surveillance.

As we move from pre-legalization of cannabis as an illicit drug to post legalization of cannabis as a licit drug, comparisons between pre and post legalization data will be required to determine effects of legalization on prevalence rates and in turn fetal outcomes. Public Health should consider tracking information that will also look at associations and comparison in conjunction with tobacco and alcohol. At the time of this research, no randomized controlled trials related to cannabis and pregnancy had been conducted. It is of utmost importance that more funding be allocated for studies on effects of cannabis use on this priority population.

In addition, dissemination and communication of surveillance data by all levels of government will be imperative in order to keep policy makers and health care providers abreast of the issues related to cannabis use and pregnancy.

2. Attitudes/Beliefs

As mentioned in the literature, the public's perception, attitudes and beliefs regarding cannabis has influence on pregnant women. A better understanding at all levels about the attitudes and beliefs of women, the public, and primary health care providers related to cannabis and pregnancy is required throughout all the themes. This will allow the tailoring of awareness, education, screening and interventions for this priority population. Phase 2 of our project will gather baseline information on attitudes and beliefs of cannabis exposed pregnancies through a public perception survey, following the legalization of cannabis in October 2018. Health care provider and public perception post surveys will be conducted in phase 3 of our project one year after the baseline survey.

3. Raising Awareness

Raising awareness about the harms of cannabis use during pregnancy is an important next step for a comprehensive approach, particularly when an issue like cannabis is perceived by the public as safer than other drugs. Following the lessons learned from evidence based campaigns such as "Good To Know" in Colorado, it is imperative that in addition to focusing on the general public, targeted campaigns must also be developed to tailor messages to priority populations like women and those that play a role in the woman's life such as family, friends and health care providers, for maximum effectiveness. As we move into an additional phase of our project, the Thunder Bay District Health Unit will be assessing for gaps in provincial and federal awareness campaigns to look at what areas we may need to address locally. As well, current awareness campaigns identified through our future research to meet local needs will be utilized and shared with our community partners.

4. Education for Health Care Providers

Based on the research findings from the literature review and our environmental scan, next steps should include increased education and training for health care providers to prevent cannabis exposed pregnancies as we transition into cannabis legalization. Public health and community partners (local, provincial or federal) have a role to play in seeking out any relevant research that could be shared in order to develop tailored education strategies.

Education topics identified by service and health care providers from both the literature review and environmental scan include: discussions on the changing landscape and practice with cannabis as a licit drug; effects of cannabis use in pregnancy; early detection of cannabis use; current evidence based research, harm reduction approaches and how to effectively communicate with clients in a non-judgemental way. More research on best practice screening tools and interventions should take place and be shared with professionals and primary health care providers that service pregnant and prenatal women. Mobilizing community partners and professional bodies like SOGC is critical to effectively develop tailored training programs based on health care provider needs and their discipline.

5. Screening /Interventions

Public health and professional bodies will need to play a role in disseminating timely updated information related to screening and intervention. Although the research found that there are no tested and validated screening tools specific to cannabis use with women of childbearing age and pregnant women, health care providers will need to ensure they ask clients about cannabis use and discuss its negative effects as part of the overall assessment. Screening should be administered multiple times throughout pregnancy using a non-judgemental approach to identify potential high risk clients. Based on the research reviewed, primary health care providers should refrain from prescribing cannabis during pregnancy as a precautionary approach. Health care providers should focus on interventions that lead to cessation rather than temporary abstinence. A harm reduction approach to decrease consumption is warranted when cessation is not an option. Psychosocial interventions tested and validated for smoking cessation will need to be piloted by health care providers to determine its effectiveness with cannabis management in pregnancy.

6. Policy/Regulations

As we move forward with the legalization of cannabis in Canada, the development and implementation of policies and regulations at all levels will be of utmost importance to ensure that cannabis exposed pregnancies are prevented. In order to inform future policy and regulations regarding perinatal cannabis it will be essential to gain a better understanding of how different policy environments regarding legalization will impact beliefs, attitudes, behaviours, practices and concerns. Public health will need to acknowledge the potential risk of cannabis use during pregnancy and incorporate guidelines into new and emerging cannabis laws. Public health will need to communicate the risks of use during pregnancy through initiatives such as point of sale warnings where cannabis is sold. Drug enforcement should not instill punitive, legal consequences as they deter women from seeking prenatal care and affect patient provider relationship. Institutional policies will need to be developed using best practice policies that are complimentary to their particular population of cannabis users. Consideration should be given to developing clinical practice guidelines that: discourage prescribing or suggesting cannabis for medical purposes during pregnancy or preconception; look at the need for systemic screening of cannabis use through urine testing as part of first prenatal check-up; and encourage women to seek care while not exposing women to criminal or civil penalties including loss of custody of children or loss of housing. As we move into phase 2 of our cannabis and pregnancy research project, TBDHU will be taking a close look at the policy and regulation landscape at a local, provincial and federal level to determine next steps for phase 3.

7. Research

There is an urgent need for research within all themes discussed given the low levels of evidence found on the topic of cannabis exposed pregnancies. Given the changing landscape of cannabis becoming a licit drug, researchers will need to focus on a number of priority areas including: patient and provider perceptions and attitudes; effects of use during pregnancy and lactation; effects on infant outcomes (in utero and later in life); effective screening, communication and intervention tools; social and emotional determinants on offspring outcome; longitudinal studies on child cognitive development; long term neuro behavioural effects; and associations of legal system and lack of disclosure by women. As we move forward with our research project, we will be closely looking at all new research related to cannabis and pregnancy to help inform our future work.

Conclusion

The findings from the environmental scan of local service and health care providers as well as provincial health unit professionals, were congruent with the findings from the literature review conducted regarding effective strategies and interventions during preconception and pregnancy to prevent or reduce cannabis exposed pregnancies as it relates to pre-legalization. Seven themes were identified from the literature review as areas of important consideration: surveillance; attitudes/beliefs; raising awareness; education for Health Care Providers; screening/interventions; policy/regulations and research. The literature supported the integrations of the social determinants of health into all themes. A multi-pronged approach to reducing and/ or preventing cannabis exposed pregnancies is warranted.

As we transition into cannabis legalization, public health will play an important role in the surveillance of prevalence rates and fetal outcomes due to cannabis exposed pregnancies. With current perceptions about cannabis being safe to use during pregnancy, an understanding of these perceptions, attitudes and beliefs regarding the risks of cannabis use during pregnancy will be important to raise awareness and inform programming, interventions and education.

Community partners and professional bodies like SOGC are critical to effectively develop tailored training programs based on health care provider needs and their discipline. Policies and regulations will need to acknowledge risk of cannabis use during pregnancy and include: point of sale warnings regarding effects of cannabis use during pregnancy; institutional policies that take into consideration the population of people who use cannabis; and clinical practice guidelines regarding prescribing/suggesting, and testing for, cannabis use among pregnant women that does not discourage women from continuing to seek care if cannabis use is disclosed.

Additional research on effective screening, interventions and strategies relating to cannabis exposed pregnancy prevention is needed as there were limited studies available. Emerging evidence will continue to be reviewed as cannabis becomes licit and will be helpful in determining next steps as the TBDHU conducts phase 2 of our project looking at public perceptions of the risk of cannabis use during pregnancy and identifying new or promising promotion, prevention, intervention and screening practices. Recommendations provided in this report may be taken into consideration by community partners (locally, provincially and federally) including government initiatives that will accompany the new legislation.

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Appendix 1

What is Cannabis?

Cannabis plant
may be grown anywhere (indoors or outdoors) and is most commonly prepared as Marijuana, Hashish or Hash Oil (Committee on Obstetric Practice, 2015; Health Nexus, 2017; Porath-Waller, 2015)

Cannaboids
are compounds that have medicinal and psychoactive properties acting on cannaboid receptors in the body (Committee on Obstetric Practice, 2017)

Tetrahydrocannabinol (THC)
is a significant psychoactive molecule, lipophilic (fat soluble), and may be dispersed to the brain and fat (Committee on Obstetric Practice, 2017; Jaques et al., 2014; National Institute on Drug Abuse, 2017)

Cannabidiol (CBD)
is a non-psychoactive cannaboid (MontanaBioTech, 2013; Porath-Waller, 2015)

Cannabinol (CBN)
is mildly psychoactive and a non-narcotic analgesic (MontanaBioTech, 2013)

Use of cannabis as a psychoactive substance may cause an individual to experience euphoria, relaxation, changes in perception, and attention deficits, time distortion, body tremors, and impaired motor functioning (Porath-Waller, 2015)

Appendix 2

TBDHU Cannabis and Pregnancy Phases

	PHASE 1	PHASE 2	PHASE 3
Legalization Time Point	Pre-Legalization	Transition	Post-Legalization
Drug Type	**Cannabis** "Illicit drug"	**Cannabis** "Licit drug" (excluding edible cannabis)	**Cannabis** "Licit drug" (including edible cannabis)
Ontario Public Health Standards	2008 Ontario Public Health Standards - Reproductive Health 2018 Ontario Public Health Standards - Healthy Growth and Development	2018 Ontario Public Health Standards - Healthy Growth and Development	2018 Ontario Public Health Standards - Healthy Growth and Development
Report Launch	October 2018	September 2019	April 2020
Research Periods	Jan. 2017 - Oct. 2018	Nov. 2018 - Sep. 2019	Nov. 2019 - Apr. 2020
Report Components	- Environmental scan - Literature review	- Public perception survey - Literature review	- Environmental scan - Public perception survey - Literature review

Appendix 3

Environmental Scan of Service Providers

Methodology:

Three mixed methods (qualitative and quantitative) surveys were developed: The first survey was developed for internal TBDHU staff; the second survey, using the same questions was developed for local (Thunder Bay) service providers and Ontario Public Health Units(OPHU); and the third survey with similar questions was developed for local (Thunder Bay) primary health care providers.

The surveys asked about: current promotion, prevention, intervention and screening strategies of various organizations and primary health care providers to prevent cannabis exposed pregnancies; partnerships; gaps and barriers to reducing/preventing cannabis exposed pregnancies; service provider/PHCP knowledge about cannabis exposed pregnancies; SP/PHCP preferred learning/educational methods on the effects of cannabis exposed pregnancies; and SP/PHCP perceived client use of cannabis.

The first question on all surveys asked if the respondent offers services to pregnant and/ women of preconception age. If the response was "no" then the participant was disqualified from completing the survey. These respondents were still given the opportunity to receive a copy of the final report, if they wished.

Distribution of Surveys:

Local Health Unit Scan (Thunder Bay District Health Unit): Internally within the Thunder Bay District Health Unit, convenience sampling was used with the survey being sent via email with a link to survey monkey to program managers who forwarded the email and link to lead staff that worked in programs providing services to pregnant and preconception age women.

Provincial Health Unit Scan: Provincial Health Unit surveys were sent to the additional 35 Public Health Units within Ontario. Email was used to contact the Family Health Managers within each Health Unit to complete the survey monkey link or to forward to the appropriate staff member to complete.

Local Service Provider/Organization Scan: Convenience sampling was used for local service providers that provide awareness, services or interventions to pregnant or preconception age women. The local service provider survey was distributed to community partners from the Thunder Bay Prenatal Coalition, INGODEWIZI committee, and the Maternal Substance Use Working Group directly via email. Other members of the Family Health Team shared contact information that they felt should have a voice in the

survey. These people were contacted via email by the student researcher as well.

Local Primary Health Care Provider Scan: Convenience sampling was used to send the PHCP survey by fax to targeted Primary Health Care Providers that provide services to pregnant and preconception age women. Both a hard copy to fax back and a survey monkey link was provided as options for PHCPs to complete and return the survey.

Analysis:

Once the responses were received, the quantitative and qualitative data from the surveys were downloaded to an excel spreadsheet off survey monkey, with any hard copy responses being added to the excel spreadsheet and overall results tallied and analyzed manually through excel. Each service provider type (internal, local service provider, local primary health care provider and provincial health unit) had its own spreadsheet results.

Appendix 4

Literature Review Methodology

From May 2017-August 2017 a literature review entitled "Cannabis and Pregnancy: Getting Ahead of Policy" was completed to obtain baseline information related to cannabis and pregnancy pre legislation. The following research question was developed:

"What are effective interventions and strategies during preconception and pregnancy to reduce and/or prevent cannabis exposed pregnancies? Exclusion=after pregnancy"

Table 6 - PICO Chart

POPULATION	**I**NTERVENTION	**O**UTCOME
Preconception & Pregnant Women	Intervention or Strategy	Reduced or Lack of Cannabis Exposure in Pregnancy

Part 1: A member of The Thunder Bay District Health Unit library staff conducted a literature search utilizing the following databases: Embase, Medline, PsychINFO, and CINAHL. Other sources were also investigated to discover relevant grey literature. The library staff eliminated duplicates yielding 419 articles, and then removed 277 from the total after careful assessment for relevance. Limitations included English documents only and published within the last ten years. A Masters of Public Health (MPH) student then screened a total of 167 articles from the library staff and from her own findings. The MPH student screened by title and abstract to remove 50 articles. 117 full documents were then assessed for quality and eligibility. 59 documents were eliminated by the MPH student resulting in a total of 12 Grey Literature Articles and 46 White Literature Articles of relevance to the research question (N=58). Additional articles were also identified through references sections and other sources by the MPH student. A comprehensive White Literature and Grey Literature template was created and included a summarization of the articles deemed relevant to the topic.

Part 2: Inductive thematic analysis was performed collaboratively by the MPH student and Public Health Nurse (PHN) in Family Health Program. For the purposes of theming, the White Literature Articles were utilized only, as the Grey Literature Articles exhibited low qualities of evidence and relevance to the research question. Each process is detailed in chronological order below:

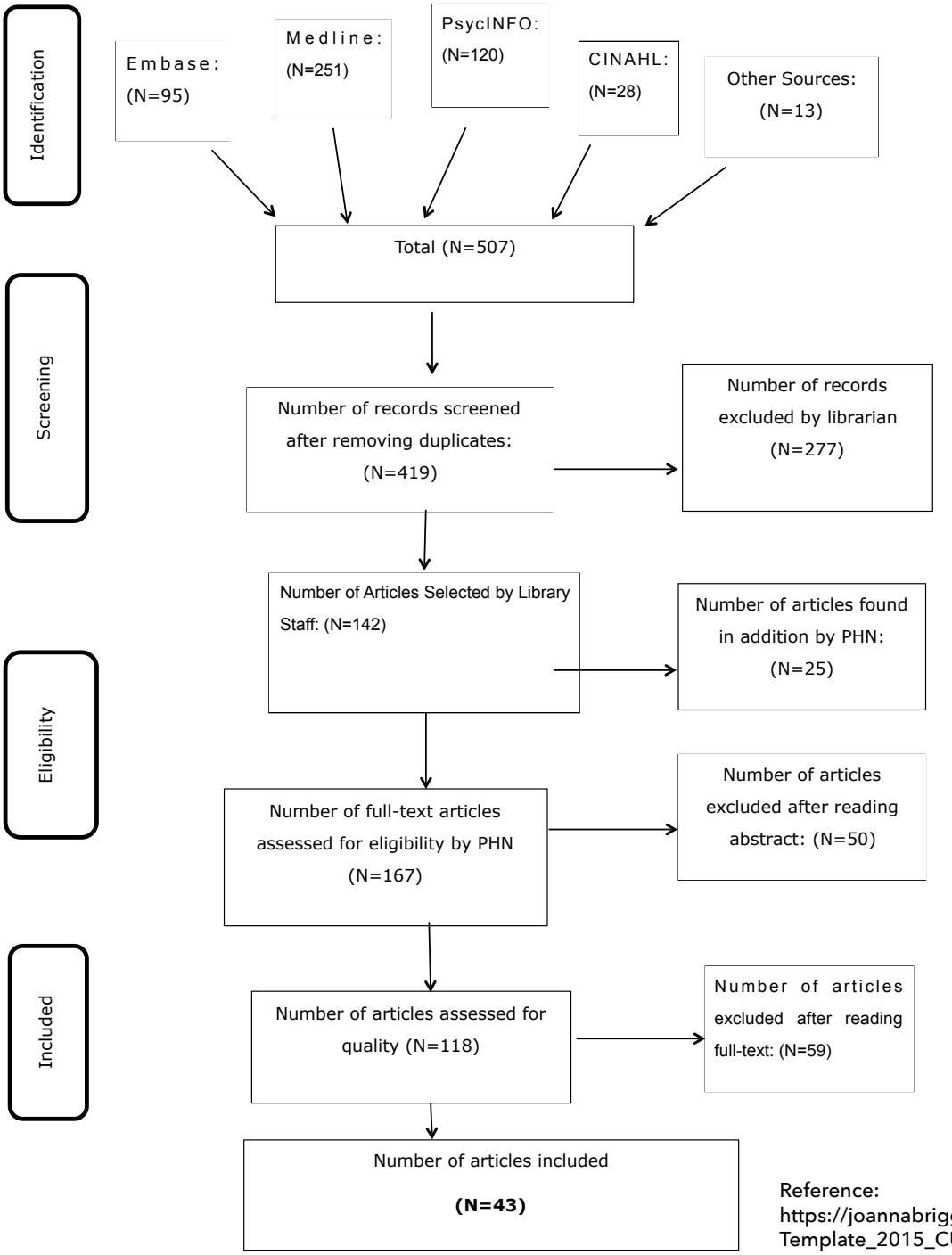
PHN - Family Health Program	MPH Student: Lakehead University
1. Created codes for themes using sticky notes/index cards	1. Created codes for themes in Excel spreadsheet
2. Identified over-arching themes	2. Identified sub-themes
3. Identified Sub-themes	3. Identified over-arching themes.
4. Recorded coding in excel spreadsheet	4. Recorded coding in excel spreadsheet
5. Collaborated with MPH student to compare and discuss themes	5. Collaborated with PHN student to compare and discuss themes

Total articles used for theming: 43

Total themes identified: 7

Part 3: Seven themes were identified and discussed within this document. Both researchers agreed upon the themes. A third party was not necessary, as major discrepancies did not arise in the theming process. The occurrence of each theme was calculated among the 43 articles themed. Please see PRISMA Diagram (APPENDIX 5) detailing the above methodology.

Appendix 5



Reference:
https://joannabriggs.org/.../CReMS_Review_Report_Template_2015_CURRENT.docx

October 2018