OVERVIEW

The hepatitis C epidemic in Canada: An overview of recent trends in surveillance, injection drug use, harm reduction and treatment

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Abstract

Hepatitis C continues to be a significant public health concern in Canada, with the hepatitis C virus (HCV) responsible for more life-years lost than all other infectious diseases in Canada. An increase in reported hepatitis C infections was observed between 2014 and 2018. Here, we present changing epidemiological trends and discuss risk factors for hepatitis C acquisition in Canada that may have contributed to this increase in reported hepatitis C infections, focusing on injection drug use. We describe a decrease in the use of borrowed needles or syringes coupled with an increase in using other used injection drug use equipment. Also, an increased prevalence of injection drug use and use of prescription opioid and methamphetamine injection by people who inject drugs (PWID) may be increasing the risk of HCV acquisition. At the same time, while harm reduction coverage appears to have increased in Canada in recent years, gaps in access and coverage remain. We also consider how direct-acting antiviral (DAA) eligibility expansion may have affected hepatitis C rates from 2014 to 2018. Finally, we present new surveillance trends observed in 2019 and discuss how the coronavirus disease 2019 (COVID-19) pandemic may affect hepatitis C case counts from 2020 onwards. Continual efforts to i) enhance hepatitis C surveillance and ii) strengthen the reach, effectiveness, and adoption of hepatitis C prevention and treatment services across Canada are vital to reducing HCV transmission among PWID and achieving Canada's HCV elimination targets by 2030.

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Introduction

Hepatitis C is a preventable and, in almost all cases, curable liver infection. Despite this, hepatitis C is responsible for more life-years lost than any other infectious disease in Canada (1–3). Researchers estimate that, in 2017, at least one person was infected with the hepatitis C virus (HCV) every hour in Canada, and 194,500 Canadians were living with chronic hepatitis C (4). In June 2018, the federal, provincial and territorial ministers of health released the *Pan-Canadian Sexually Transmitted and Blood-borne Infections Framework for Action* (5). The Framework endorses the World Health Organization's target to eliminate viral hepatitis as a public health threat by 2030, including achieving a 90% reduction in new cases of chronic hepatitis C infections by 2030 (5).

Hepatitis C is a nationally notifiable disease monitored by the Public Health Agency of Canada (PHAC). The Agency reports annually on trends in reported hepatitis C cases overall and by age, sex and province or territory. Surveillance data show a 14% increase in the reported national hepatitis C rate, from 29.4 per 100,000 people in 2014 to 33.6 per 100,000 people in 2018 (6), representing a total of acute, chronic and unspecified hepatitis C cases. In addition, from 2014 to 2018, the reported hepatitis C rates increased faster for females than for males (20% vs 10% increase) (6).

This article summarizes several trends and factors that may have influenced the rising hepatitis C rates between 2014 and 2018. While several factors are associated with the risk of hepatitis C acquisition, injection drug use is the most common risk factor for new infections in Canada (7–9). In this overview, we describe changes in injection drug use patterns and practices as well as in harm reduction services and practices. We also consider the impact—recent and potential—of expanding direct-acting antiviral (DAA) eligibility on hepatitis C rates. Finally, we discuss

surveillance trends from 2018 to 2019 and the potential impact of the coronavirus disease 2019 (COVID-19) pandemic on the hepatitis C epidemic in Canada.

A changing landscape: Injection drug use on the rise

An estimated 1% of Canada's population have ever injected drugs (10) and about 0.3% were using injection drugs in 2014 (11). PHAC estimated that people who inject drugs (PWID) made up almost half of those who ever had a hepatitis C infection in 2017 (4). Based on data from 2000 to 2016, PWID make up between 60% and 85% of all new HCV infections in Canada (7–9). The sharing of needles, syringes and other injection equipment appears to be the primary driver of HCV transmission in Canada today (7–9). A modelling study estimated that the PWID population in Canada increased by 32% between 2011 and 2016 (11).

Injection drug use, social determinants of health and key populations

Injection drug use is associated with a history of trauma and family instability (12,13), transactional sex (12,13), food insecurity (14,15), incarceration (12,16), insecure housing (12,17–23), low income (12,17,20,24), lower levels of education (12), systemic discrimination (12,24) and unemployment (21,23,25).

Indigenous peoples bear a disproportionate burden of substance use disorders and associated harms in Canada, a situation that is associated with structural injustices rooted in colonization. Available evidence suggests Indigenous peoples are overrepresented among PWID in several regions in Canada (12,26–29). Estimates show that Indigenous youth (aged 24 years and younger) make up between 70% and 80% of new HCV infections among young PWID in Canada (30–32).

Gay, bisexual and other men who have sex with men (gbMSM) are an emerging population at risk for hepatitis C (33,34). An estimated 5% of gbMSM have a past or current HCV infection (35). Injection drug use appears to be the leading risk factor for hepatitis C in this population in Canada (33), though sexual transmission in the context of certain sexual practices associated with a risk of exposure via blood has also been known to occur, particularly among gbMSM living with HIV (36–38).

Understanding evolving behaviours related to HCV acquisition is essential to understanding the evolving hepatitis C epidemic among PWID.

Increased prevalence of prescription opioid injection and methamphetamine use among people who inject drugs

Substance use patterns in North America have been described in terms of "twin epidemics," comprising the opioid crisis, which has been responsible for a significant burden of morbidity and mortality among PWID in Canada over the past two decades (39), and an apparent resurgence of psychostimulant use and related harms since 2017 (40). In the most recent bio-behavioural Tracks survey of PWID in Canada (Phase 4: 2017–2019), the five most frequently reported injected drugs (in the six months before the survey) were cocaine (60.0%), hydromorphone (50.1%), methamphetamine (43.5%), morphine (41.6%) and heroin (32.4%). Of note, hydromorphone, morphine and heroin are all opioids (12).

Although national prevalence estimates are not available, non-medical use of prescription opioids has become increasingly common among PWID in Canada over the past 15 years (41–43). One study from Montréal found that in a prospective cohort of PWID, the proportion reporting prescription opioid injection increased from 21% in 2004 to 75% in 2009. PWID who reported prescription opioid injection were more likely than PWID who were non-prescription opioid injection drug users to acquire hepatitis C (41). This increased risk may be in part due to more frequent injections and increased opportunities for sharing used injection equipment (42,44) among those who use prescription opioids, a cohort that tends to be younger and less experienced with injection drug use (41).

The prescription opioid epidemic may be accelerating the transition to injection drug use among younger people who use drugs (45). Several studies from the United States have found an association between the increasing use of injection prescription opioids and increased rates of hepatitis C infections, particularly among younger adults (<30 years old) and reproductive-aged females (46–48).

There has also been a reported increase in the prevalence of methamphetamine use in Canada over the past 15 years (12,49,50). In the Tracks survey of PWID in Canada, the proportion of participants injecting methamphetamine increased from 6.8% in Phase 1 (2003–2005) to 43.5% in Phase 4 (2017–2019) (12). Methamphetamine use has been associated with HCV transmission in Canadian studies (51,52) and linked to increased frequency of syringe sharing (53) and increased injection frequency (54). Rates of methamphetamine use vary widely across the country (50). The most pronounced increases appear to be in Western and Central Canada (50,55,56). In 2016, the Winnipeg region declared a hepatitis C outbreak linked to a dramatic increase in the use of methamphetamine (57–59).

Injection drug use equipment sharing practices are changing

The proportion of Tracks survey participants who reported borrowing used needles or syringes decreased from 20.2% in Phase 1 (2003–2005) to 11.6% in Phase 4 (2017–2019) (12). In contrast, the proportion of participants who reported borrowing other used injection equipment (water, filters, cookers, spoons, tourniquets, ties, swabs and acidifiers) increased by almost one-third between Phase 1 and 4 (from 29.8% to 38.0%) (12). This finding is a concern as the risk of HCV acquisition from sharing drug-preparation equipment is similar to that associated with syringe sharing (60) and persists in the absence of needle or syringe sharing (61). Some studies have linked prescription opioid injection use to increased sharing of other used injection equipment, specifically, the sharing of "washes" (the residue found on used filters and cookers) (42,61–63).

Harm reduction coverage across Canada is increasing, but gaps remain

In 2016, the federal minister of health announced an updated drug strategy for Canada, the Canadian Drugs and Substances Strategy (CDSS) (64,65). The CDSS puts an increased emphasis on public health in the Government of Canada's response to substance use, with harm reduction included as one of the pillars of the strategy in addition to prevention, treatment and enforcement (64,65). Increased federal action and investments to address substance use, overdose prevention, addictions, harm reduction and drug treatment followed the launch of the CDSS. In 2017, PHAC created the Harm Reduction Fund, one of the CDSS initiatives (66), to support community-based projects across Canada that help reduce HIV and hepatitis C acquisition and transmission among people who share injection and inhalation drug use equipment. Evidence-based harm reduction strategies, such as needle-and-syringe programs, opioid agonist therapy and supervised consumption services are essential to reducing the risk of HCV transmission and reinfection among PWID (67,68). The Phase 4 (2017–2019) Tracks survey of PWID found that 90.1% of participants reported using a needle-and-syringe distribution program, 47.3% used some form of opioid agonist therapy and 13.5% used a supervised consumption service in the 12 months before the survey (12).

One Canadian modelling study found that between 2011 and 2016, needle-and-syringe coverage increased from 193 to 291 needles and syringes per PWID (11). Opioid-agonist-therapy coverage increased from 55 to 66 recipients per 100 PWID, despite increasing injection drug use over this period (11). Based on these preliminary data, Canada appears to be meeting the World Health Organization's needle-and-syringe-program and opioid-agonist-therapy provision targets overall. However, coverage and access vary across provinces and territories (11,33).

Hepatitis C rates among females in Canada are on the rise

From 2014 to 2018, reported hepatitis C rates increased for both females and males (6). However, while rates were consistently higher among males, rates for females in 2018 were 20% higher than those in 2014; while rates for males were 10% higher. Also, women aged 25 to 39 years old showed the largest hepatitis C rate increases in Manitoba, Ontario, Québec, New Brunswick and Yukon during this time. Similarly, during the same period, higher rate increases of other sexually transmitted and bloodborne infections (STBBI), such as syphilis and HIV, were reported among females compared to males in several jurisdictions (69,70). Several studies from the United States have also reported an increase in hepatitis C rates among reproductive-age females in recent years, a trend that has been linked to the opioid crisis (46–48).

While the bio-behavioural surveillance data from Phase 4 of the Tracks survey of PWID found that the proportion who self-reported borrowing other used injecting equipment in the past six months was 45.9% for cisgender females versus 33.7% for cisgender males (12), understanding what is driving these increasing rates among females is challenging for three main reasons: i) national routine surveillance data do not include risk factor data; ii) no testing volume data are available; and iii) Canadian research to contextualize this trend is limited.

Low hepatitis C treatment rates, expansion of direct-acting antivirals and its potential impact on future hepatitis C rates among the people who inject drugs community

According to the 2017–2019 PWID Tracks survey, 10.6% of PWID who were aware of their hepatitis C infection had ever taken hepatitis C treatment and 3.8% were currently receiving treatment (12). Low treatment rates are of concern for the health of the individual living with hepatitis C and the potential risk for HCV transmission.

There is substantial evidence demonstrating that PWID, including those with ongoing substance use, can be successfully treated for hepatitis C (71–73) particularly when treatment is delivered in a low-barrier setting and paired with wrap-around social and harm reduction supports (74–77). Moreover, Canadian modelling studies show that treatment can act as prevention in high-prevalence groups, such as PWID, especially when combined with opioid agonist therapy and high-coverage needle-and-syringe programs (78,79).

From 2014 to early 2018, Canadian hepatitis C treatment guidelines limited second-generation DAAs (with cure rates above 95% against the main HCV genotypes) to people with advanced liver fibrosis or cirrhosis (80). In June 2018, the

Canadian guidelines removed all disease-stage restrictions on DAA eligibility, making DAAs eligible for all people with chronic hepatitis C (81). However, the rollout of lifting disease-stage restrictions differed by province and territory, and other non-disease-stage restrictions remain and differ by province and territory (82,83). Although it is likely that expanded DAA eligibility may have contributed to an increase in hepatitis C testing across Canada from 2014 to 2018, there is, unfortunately, a lack of Canadian scientific evidence to support this hypothesis.

A study by Saeed *et al.* found that while hepatitis C treatment uptake increased dramatically among PWID after treatment restrictions were lifted in British Columbia, Ontario and Québec, uptake rates declined a year later (83). This was thought to reflect a "warehousing effect," as physicians began clearing the initial backlog of treatment-eligible individuals engaged in care who had been deferring treatment until DAAs became available (83). To this end, we need innovative and tailored programs and policies to successfully engage PWID in care and facilitate increased levels of treatment initiation (33,83–87).

The advent of DAAs has raised concerns about a potentially higher risk of reinfection in high-risk populations, such as PWID and HIV-positive gbMSM (88,89). However, concurrent harm reduction strategies and behavioural and structural interventions appear to reduce the risk of reinfection (72,74,77,90,91). The impact of DAA on treatment uptake and reinfection risk are both areas that warrant further scholarly attention and surveillance.

Anticipating the impact of the COVID-19 pandemic on hepatitis C in Canada

Evidence is already emerging that the COVID-19 pandemic and public health mitigation measures have adversely impacted the delivery of and demand for STBBI prevention, testing, treatment and harm reduction services in Canada (92). According to a 2020 PHAC survey of how the COVID-19 pandemic impacted the delivery of STBBI and harm reduction services in Canada, 21% of service providers providing support and treatment services for people living with HIV, hepatitis C or both experienced a decreased demand for and ability to deliver their services (92). In addition, 44% of STBBI prevention, testing and treatment service providers experienced a decrease in their ability to provide their services. Concurrently, 40% of harm reduction and drug treatment service providers reported an increase in demand for their services, although 63% reported no change or only a slight change in their ability to deliver their services (92). Given decreased access to HCV testing, this will likely impact the number of HCV diagnoses in 2020 and 2021, generating in underestimating the rate of newly reported hepatitis C cases. This would occur in the context of changing drug use practices generating from the pandemic's impact on harm reduction service availability and the quality and quantity of the drug supply, and COVID-related isolation requirements (93–97).

Conversely, the COVID-19 pandemic may generate in new opportunities for engagement in hepatitis C care. The same survey noted that 81% of STBBI-related service providers provided remote services since the beginning of the pandemic. Of these, 66% created new remote services during this period (92). The recent expansion of virtual care, if sustained, may present opportunities to improve access to hepatitis C care in the future, particularly for rural and remote populations (92,93,98), and could reduce wait times for accessing specialty care (99), enabling faster treatment scale-up. However, future monitoring and research will be needed to determine whether such virtual services have high uptake among PWID.

At the time of going to press, the latest available hepatitis C surveillance data showed the national reported hepatitis C rate had declined by 10% from 2018 to 2019 (100). Furthermore, all but two provinces and territories showed declining reported hepatitis C rates, of between −4% and −40% (Prince Edward Island's hepatitis C rates increased by 15% since 2018, and Nova Scotia's remained stable). Unfortunately, due to the impacts of the COVID-19 pandemic, it will be difficult to determine if the rate drop from 2018 to 2019 should be interpreted as a blip or a new trend.

Discussion

This overview article summarized several changing trends and risk factors associated with hepatitis C, with a strong focus on injection drug use practices. These trends and risk factors may partially explain the rising reported hepatitis C rates observed in Canada between 2014 and 2018. We also discussed how the staggered expansion of DAA eligibility across Canada may have contributed to an increase in hepatitis C testing and how this and the COVID-19 pandemic might influence future rates of reported hepatitis cases.

Limitations

This overview has several limitations: first, national surveillance data are limited to reported cases by age, sex and province or territory. It does not provide any risk factor data or differentiate between acute, chronic or reinfection cases. While injection drug use is the most commonly cited risk factor for hepatitis C, and thus the focus of this overview, there are other risk factors such as having received care in an hepatitis C–endemic area, other non-injection drug use, needle-stick injury among healthcare workers, having had a blood transfusion before 1992, sex practices that lead to blood exposure, and mother to child transmission (101). Changes associated with any of these risk factors may have also contributed to the observed increase in rates of reported cases from 2014 to 2018. However, there was insufficient literature to determine this.

Second, Canadian surveillance data do not include the number of people testing for hepatitis C, which would inform changes in testing practices over time. Finally, the surveys and papers reviewed used varying time points, and each came with its own set of limitations. For example, the Tracks surveys are cross-sectional and descriptive (12).

Conclusion

The continuous routine and enhanced bio-behavioural surveillance of hepatitis C are crucial for monitoring Canada's hepatitis C epidemic. Improvements to national surveillance data, including collecting risk factor and sociodemographic data and differentiating hepatitis C cases by infection status using standardized national definitions, would improve our understanding of the structural and behavioural risk factors driving HCV transmission in Canada. At the time of developing this overview, PHAC was reviewing the hepatitis C case definition in collaboration with provinces and territories and considering the feasibility of adding a reinfection case definition.

Furthermore, ongoing efforts to strengthen the reach, effectiveness and adoption of evidence-based hepatitis C prevention and treatment services across Canada are vital to reducing HCV transmission among high-risk PWID and achieving Canada's HCV elimination targets by 2030.

Authors' statement

LL — Conceptualization, research, writing, original draft, final draft, review, editing, supervision
MK— Conceptualization, research, writing, original draft, editing
JT — Editing, research
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Competing interests

None.

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