Hepatitis C Prevention and Control Report, 2017

Ministry of Health
Population Health Branch

saskatchewan.ca

Saskatchewan

Executive Summary

The *Hepatitis C Prevention and Control Report, 2017* provides an overview of hepatitis C surveillance data, program, testing and financial information. The report is prepared by the Population Health Branch, Ministry of Health. Key information from this report can be found in the *Hepatitis C in Saskatchewan, 2017* infographics located at Saskatchewan.ca.

Hepatitis C is a liver infection caused by the hepatitis C virus (HCV). Hepatitis C is a blood-borne virus. Most people become infected with the virus by sharing needles or other equipment to inject drugs. For some people, hepatitis C is a short-term infection that is cleared by the immune system. For 70%–85% of people infected with hepatitis C, it becomes a long-term, chronic infection. Chronic hepatitis C is a serious disease than can result in long-term health problems, even death. The majority of infected persons might not be aware of their infection because they are not clinically ill. There is no vaccine for hepatitis C. The best way to prevent hepatitis C is by avoiding behaviors that can spread the disease, especially injecting drugs (U.S. Centers for Disease Control and Prevention, 2019)[1].

In Saskatchewan, reported HCV infections are not differentiated into acute, chronic, or resolved status. Therefore for the purpose of this report, all cases are reported as unspecified HCV infection and include acute, chronic and resolved cases.

Although there was an increase in testing in 2017, there was a 2% decrease in the number of people newly identified/newly diagnosed with HCV infection. Other data from 2017 include:

- The number of people newly identified with HCV infection ("*cases*") decreased to 710 cases in 2017 compared to 721 in 2016 and 724 cases in 2015.
- The greatest increase in the number of cases since 2016 was seen in the former Prairie North health region. Similar to 2016, the majority of cases came from areas with large urban centers.
- Of the 710 cases, 422 were male and 288 were female. The ratio of male to female cases was 3:2.
- 78% of the 288 female cases were in the childbearing age range (15 to 45 years).
- Injection drug use was reported by 54% of the 710 cases.
- Since reporting for hepatitis C began in 1991, 9% (1,468) of the 16,385 reported cases were also infected with HIV. Of those, 94% (1,374) self-reported injection drug use.
- Laboratory testing increased by 52% since 2010.
- More than half (61%) of the cases reported since 1991 were still living as of June 30, 2018.

Since 2009, the Ministry of Health and the Saskatchewan HIV Collaborative have continued to work toward the goals of reducing HIV rates; addressing risk factors; and improving the quality of life for those living with HIV/AIDS. Annual funding for HIV prevention and control totals $4.9M. Given the similarities in transmission (i.e., injection drug use), the resources and programs to address HIV also reach many of the HCV-positive and at-risk population.

Information in the *Hepatitis C Prevention and Control Report, 2017* indicate a need for focused efforts to enhance prevention, testing, support, initiation of care and treatment for HCV. There is ongoing opportunity to leverage the existing HIV Collaborative work to enhance efforts around HCV.

On December 4, 2017, the Saskatchewan Health Authority (SHA) was formed, transitioning 12 former Regional Health Authorities (RHA) to a single provincial health authority. Data for the 2017 report are based on former

[1] Centers for Disease Control and Prevention [CDC]. (2019). Retrieved from https://www.cdc.gov/hepatitis/hcv/index.htm

Hepatitis C Prevention and Control

Pan-Canadian Framework on Sexually Transmitted and Blood Borne Infections

In 2017, the Public Health Agency of Canada (PHAC) led a broad consultation process to identify concrete actions to reduce the impact of sexually transmitted and blood borne infections (STBBIs) in Canada following the release of the United Nations and World Health Organization strategies for each of viral hepatitis, sexually transmitted infections (STIs) and HIV. Consultations included professionals, community-based and civil society organizations, First Nations, Inuit and Métis organizations, researchers and governments. These consultations informed the development of *Reducing the Health Impact of Sexually Transmitted and Blood-Borne Infections in Canada by 2030: A Pan-Canadian Framework for Action* (The Framework*)*.

The Framework emphasizes four pillars: prevention, testing, initiation of care and treatment, and ongoing care and support. Saskatchewan's surveillance data indicate increased rates of sexually transmitted and blood borne infections (STBBI) and the need for focused attention to prevention, testing and treatment. There is more work to be done to leverage the work of the Saskatchewan HIV Collaborative (the Collaborative) to address HCV, as well as include targeted interventions to address chlamydia, gonorrhea and syphilis.

Saskatchewan's Collaborative Approach

The Collaborative is a provincial committee, formed in 2014 to provide advice and input on prevention, diagnosis, and care of those living with HIV/AIDS. The Committee includes a Medical Health Officer, pharmacist, nurse consultant, HIV Strategy Coordinator, a peer with lived experience, and representation from the Ministry of Health, First Nations and Inuit Health Branch, Saskatchewan Health Authority (SHA), Roy Romanow Provincial Laboratory (RRPL), and PHAC.

Members provide advice and direction on addressing target populations with common needs, behaviors and risk factors across a broad spectrum of communicable diseases such as HIV, HCV, and STIs. The vision of the Collaborative is to support a culturally informed, integrated approach to infectious disease care through partnerships and coordinated services, in order to reduce new infections and promote supportive communities for those affected by HIV and other communicable diseases.

In 2017 the Collaborative developed a three-year work plan. Key areas of focus include engaging communities to support HIV strategies, increasing public and provider education, strengthening linkages between clinical and community services, promoting collaboration between provincial and federal health systems, and addressing barriers to accessing HIV testing and treatment. Evolving best practice approaches include developing an integrated approach to addressing HIV, HCV, and other communicable diseases as there are high rates of co-infection and similar populations are impacted across conditions.

Much of the work led by the HIV Collaborative impacts HCV, including coordination with partners to address the root causes of preventable diseases and to implement enhanced prevention and control interventions. Front line providers strive to integrate services to benefit clients who are at risk of contracting HIV, HCV and STIs.

Saskatchewan's Response

Funding
In 2017-18, the Ministry of Health provided approximately $4.9M annually to HIV prevention and control. Given the similarities in transmission and determinants of health (primary risk factor is injection drug use), the resources allocated to HIV also serve persons with hepatitis C and the at-risk population. Ongoing efforts to improve access to health care and to address the key determinants of health include: testing, case management, and integrated multidisciplinary HIV/HCV/STI outreach clinics in some remote, northern, and First Nation communities.

Awareness
World Hepatitis Day (July 28) is an annual opportunity to increase awareness and testing for HCV. The SHA and community-based organizations held targeted testing and education events for World Hepatitis Day in 2017.

Access to Health Care
Increased resources for case management and outreach as a result of HIV program funding have increased capacity across the continuum of care for other communicable diseases including HCV.

Harm Reduction
Harm reduction programs are part of a comprehensive public health disease prevention strategy to reduce the spread of HCV, HIV and other blood-borne infections. In 2017, fifty-four percent (54%) of the people diagnosed with HCV in Saskatchewan self-reported injecting drugs as their main exposure to the virus, similar to 53% in 2016. It is important that people who inject drugs have clean supplies to reduce transmission to others and prevent health complications.

The Ministry provides annualized funding to the SHA for harm reduction programming. Services include: education; linking to support services; and supplies for safer drug use and sexual health.

Access to harm reduction programs has increased. A new site in a rural location in the province has attributed, in part, to an increase in the number of visits (up 14%) and needles distributed (up 8%) provincially. As of December 31, 2017, the provincially-funded programs included 26 fixed and three mobile programs located in eight former health regions: Regina Qu'Appelle, Five Hills, Saskatoon, Prairie North, Prince Albert Parkland, Sunrise, and the North (Mamawetan Churchill River and Keewatin Yatthé). Federal investments have supported significant growth in access to harm reduction programs and testing in First Nation communities.

Testing
Testing for HCV is widely available. In January 2017, Health Canada approved a point of care antibody test for HCV facilitating quicker access to results. As well, in April 2017, the *Canadian Task Force on Preventive Health Care* released clinical practice guidelines on screening for HCV. National advancements serve to increase testing and treatment of HCV. In 2017, there was a 1% increase in HCV testing performed by the RRPL; 900 more tests were done in 2017 than in 2016.

Dry blood spot testing has recently been introduced in Saskatchewan and is seen as a patient-centered approach for increasing access to testing. Similar to point of care testing, it involves blood collected through a finger prick. A smaller volume of blood is needed, transportation and storage of samples are simpler, and less equipment is required.

Supporting people to know their hepatitis C status is important so they can receive proper support, diagnosis and treatment and where appropriate encouraged to access harm reduction programs. This also helps reduce the risk of transmission to others. The number of HCV tests performed by the RRPL and the Saskatoon Laboratory has increased steadily each year. About 30,000 more tests were done in 2017 compared to 2010, an overall increase of 52%.

As shown in **Table 1**, RRPL costs associated with HCV testing increased more than five-fold from $157,390 in 2007-08 to $854,839 in 2017-18.

Table 1: RRPL costs associated with HCV testing

Fiscal Year	Funding ($)
2007-08	157,390
2008-09	211,425
2009-10	111,263
2010-11	214,938
2011-12	200,346
2012-13	287,489
2013-14	534,165
2014-15	646,606
2015-16	751,435
2016-17	854,710
2017-18	854,839
Total	**$4,824,606**

Source: Roy Romanow Provincial Laboratory, Saskatchewan Health Authority

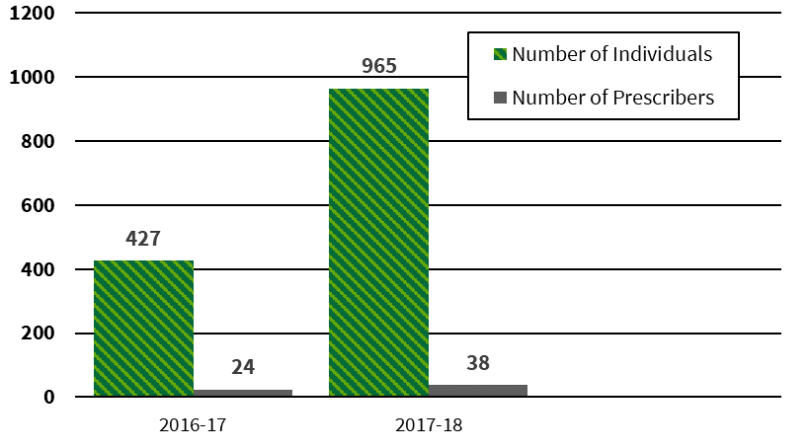
Capacity Building

Under the leadership of a Primary Health Care Capacity-Building Task Group, more primary care providers are engaged in the testing, treatment, and ongoing care of people living with HIV. The same model will be applied to increase the capacity of primary care providers for hepatitis C.

As shown in **Figure 1** below, the number of individuals receiving HCV medications increased from 427 in 2016-17 to 965 in 2017-18, and the number of prescribers of HCV medications increased from 24 to 38 in the same time period.

The Ministry will monitor the discrete number of individuals receiving HCV treatment alongside the number of prescribers on a quarterly basis to assist in tracking the goal of increasing prescribers and increasing treatment for HCV. The access to prescribers is also being monitored by location. [**Figure 2**]

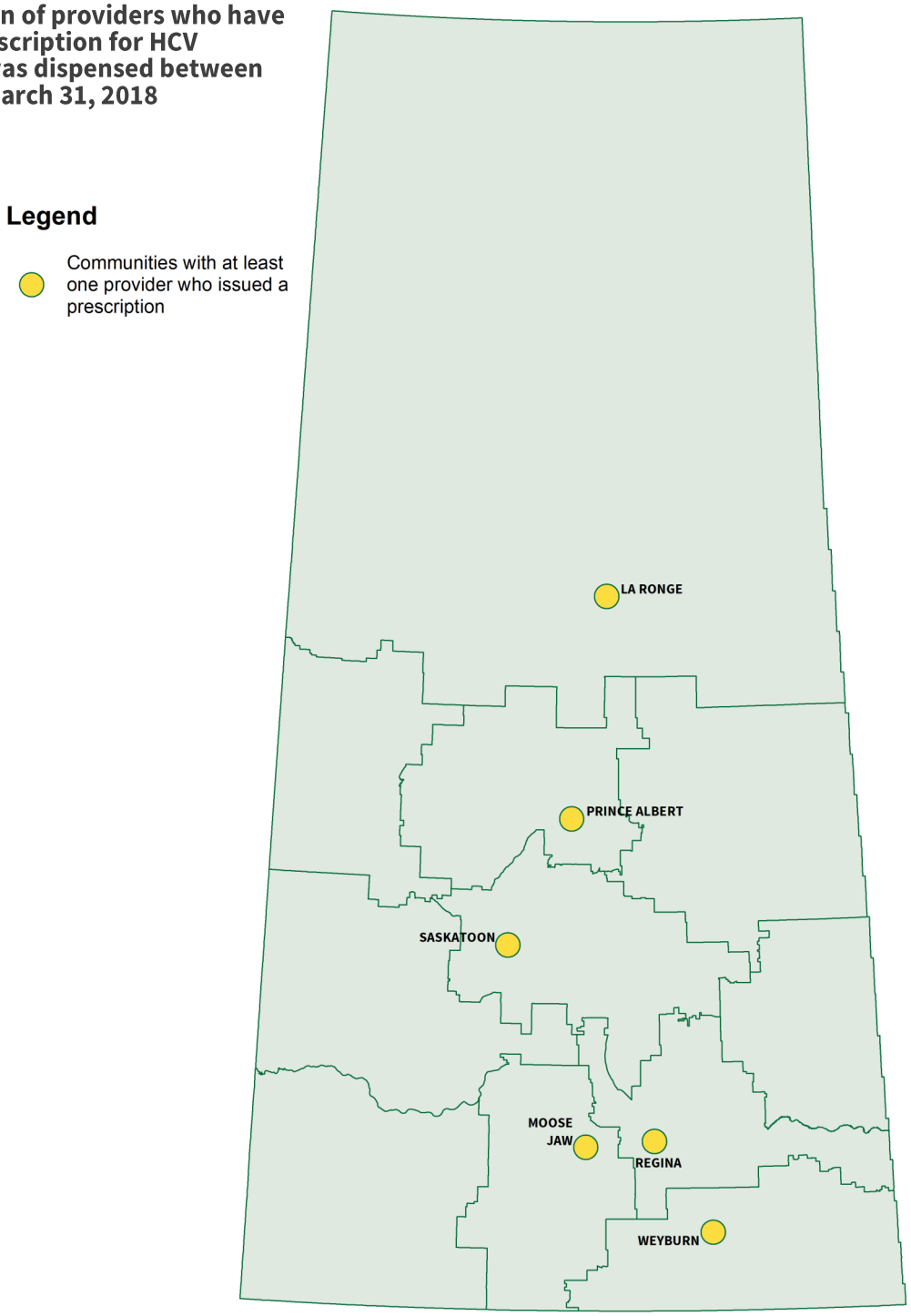
Figure 1: Number of individuals receiving HCV treatment and number of prescribers by fiscal year, 2016-17 to 2017-18



Source: Drug Plan and Extended Benefits Branch, Ministry of Health

Figure 2 overlays the location of prescribers of HCV medications on a map of Saskatchewan.

Figure 2: Location of providers who have ever issued a prescription for HCV treatment that was dispensed between April 1, 2016 to March 31, 2018



Treatment

Drugs used to treat HCV infection are listed on the Saskatchewan Formulary as exception drug status benefits, meaning patients must meet certain medical criteria in order to qualify for coverage. As of April 1, 2017, access was expanded by listing four new drugs and including patients with less severe disease. The expanded criteria are anticipated to support more individuals receiving treatment which is expected to reduce the number of individuals with current infections and thereby reduce further transmission. In 2017-18, the Drug Plan paid $22.6 million for eligible beneficiaries, nearly double the amount paid in 2016-17.

The medication costs to treat one person diagnosed with hepatitis C ranges from approximately $45K to over $100K, depending on the prescribed drug regimen and length of treatment.

As shown in **Table 2**, in 2017-18 the Drug Plan paid on average 98% of the total cost of prescriptions for the HCV medications listed on the Saskatchewan Formulary. This does not include prescriptions for recognized Inuit clients who are covered under the Non-Insured Health Benefits Program of the Department of Indigenous Services Canada.

Table 2: Hepatitis C drug expenditures for eligible drug plan beneficiaries, 2015-16 to 2017-18

Year	Patient or Private Insurance Paid	Drug Plan Paid	Total Prescription Cost	Drug Plan Paid as a % of Total Prescription Cost
2015-16	$368,667	$13,698,908	$14,067,575	97.4%
2016-17	$263,014	$12,277,786	$12,540,800	97.9%
2017-18	$404,980	$22,583,261	$22,988,242	98.2%

Source: Drug Plan and Extended Benefits Branch, Ministry of Health

Monitoring Progress

In May 2016, the World Health Organization developed a Global Strategy for viral hepatitis (2016-2021) with the goal of eliminating it as a major public health threat by 2030. This strategy calls upon signatories to reduce new HCV infections by 90% and reduce mortality by 65% by the year 2030.

Work is underway to formalize national indicators to monitor progress. The Ministry will monitor the number of individuals newly diagnosed with HCV, the number receiving treatment for hepatitis C and the number of providers prescribing the treatment.

Overview of people newly identified with hepatitis C infection

Table 3 provides a summary of the people newly identified with hepatitis C virus (HCV) infection ("*cases*") for the decade 2008 to 2017. **Table 4** provides the geographic information for the 2016 and 2017 hepatitis C cases.

The number of hepatitis C cases decreased to 710 cases in 2017 compared to 721 in 2016 and 724 in 2015 [**Table 3**].

Fluctuations from year to year range from a 13% decrease to a 18% increase. Six of the past 10 years saw fluctuations of less than 10% [**Table 3**].

The rates are relatively stable, ranging from 52.9 to 70.0 per 100,000 population **[Table 3, Figure 3]**.

78% (226) of the 288 female cases reported in 2017 were of childbearing age (15-45 years), similar to 2014-2016.

Males in the 30-39 age group had the highest rate with 139.3 cases per 100,000 population in 2017 [**Figure 6**].

Injection drug use was reported by 54% of cases.

Invasive body art (tattooing and body piercing) was self-reported by 12% of cases.

5% of the 2017 cases are co-infected with HIV, and of those, 91% reported injection drug use [**Table 14**].

Compared to the ten year period from 2007 to 2016, the former Prairie North and Cypress health regions saw notable increases in rates. 2017 rates for these former regions were 76.6 and 45.6 cases per 100,000 population, respectively [**Table 8**].

Table 3: People newly identified with hepatitis C infection in Saskatchewan, 2008-2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Incidence and Rate										
Cases	725	647	566	670	687	637	611	724	721	710
Change from previous year (%)	8%↑	11%↓	13%↓	18%↑	3%↑	7%↓	4%↓	18%↑	<1%↓	2%↓
SK rate per 100,000	70.0	62.4	52.9	61.8	63.0	56.7	53.2	63.0	61.4	59.3
Canadian rate per 100,000	35.7	33.2	31.0	29.5	29.4	29.5	29.7	30.5	31.3	31.7
Comparison of SK to Canada	2x	1.9x	1.7x	2.1x	2.1x	1.9x	1.8x	2.1x	2x	1.9x
Age and Gender										
Mean age (years)	34.4	35.9	36.7	37.8	37.1	36.8	37.2	37.3	37.5	37.4
Female	41%	44%	41%	40%	40%	42%	41%	43%	39%	41%
Women of child-bearing age*	87%	85%	83%	79%	83%	82%	78%	79%	78%	78%
Most Commonly Reported Primary Risk Factors										
History of injection drug use	58%	55%	55%	58%	61%	56%	58%	52%	53%	54%
Invasive body art	8%	10%	10%	15%	13%	13%	14%	12%	12%	12%
Other risks	6%	9%	10%	7%	10%	9%	9%	9%	8%	8%
No identified risks	1%	1%	1%	1%	2%	2%	2%	2%	2%	1%
No documented risks	27%	26%	24%	20%	15%	21%	16%	25%	26%	25%

*Expressed as a percentage of all female cases
NOTE: Minor differences in the numbers from previous reports are due to extensive data cleaning efforts.
Percentages may not add up to 100 due to rounding

Table 4: People newly identified with hepatitis C infection by former health region, 2016 & 2017

Former HR	2016	2017	Change from previous year (%)
Regina Qu'Appelle HR (RQHR)	**219**	**220**	↓ 1 (<1%)
Saskatoon HR (SKHR)	**160**	**155**	↓ 5 (3%)
Prince Albert Parkland HR (PAPHR)	**123**	**109**	↓ 14 (11%)
Sunrise HR (SHR)	**61**	**36**	↓ 25 (41%)
Prairie North HR (PNHR)	**50**	**65**	↑ 15 (30%)
Northern Regions (MCRHR,KYHR, & AHA)	**40**	**48**	↑ 8 (20%)
All other HRs*	**68**	**77**	↑ 9 (13%)
Total	**721**	**710**	**↓ 11 (2%)**

*Information for all other HRs is collapsed due to small numbers

For both 2016 and 2017, the majority of cases came from areas with large cities: Regina, Saskatoon, and Prince Albert [**Table 4**].

Notable increases in the number of cases in 2017 compared to 2016 were seen in Prairie North (up 15), the northern regions (up 8), and Cypress (included in *All other HRs*, up 9), while the former Sunrise health region saw a notable decrease (down 25).

The 710 cases in 2017 is a 2% decrease from 2016 (721 cases) and is above the 10 year average of 666 cases (2007-2016) [**Table 8**].

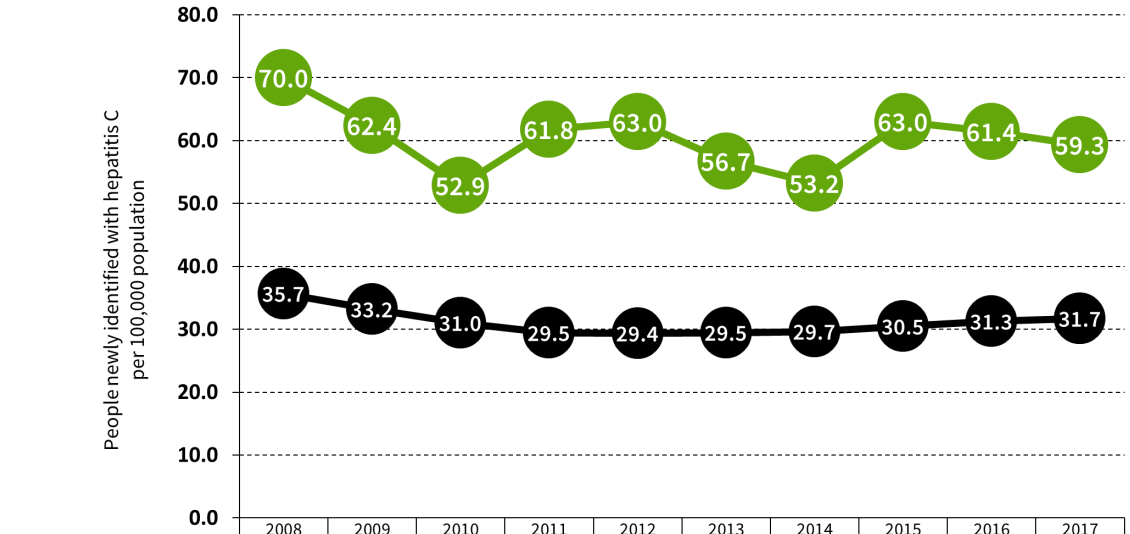
The national HCV infection rate declined from 2008 (35.7 cases per 100,000) to 2012 (29.4 per 100,000) and then gradually increased to 31.7 per 100,000 in 2017 [**Figure 3**].

Over the same period, Saskatchewan rates decreased from 2008 (70.0 cases per 100,000) to 2010 (52.9 per 100,000) then fluctuated between 53.2 and 63.0 per 100,000 from 2011 to 2017.

The Saskatchewan 2017 rate was 59.3 per 100,000 population, which was 1.9 times the 2017 national rate of 31.7 per 100,000.

Saskatchewan's 2017 hepatitis C rate is almost twice the national rate.

Figure 3: Hepatitis C diagnosis rates, SK versus Canada, 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
SK	70.0	62.4	52.9	61.8	63.0	56.7	53.2	63.0	61.4	59.3
Canada*	35.7	33.2	31.0	29.5	29.4	29.5	29.7	30.5	31.3	31.7
Comparison SK vs Canada	2.0	1.9	1.7	2.1	2.1	1.9	1.8	2.1	2.0	1.9

Year of Diagnosis

*Source: Public Health Agency of Canada

Profile of people newly identified with hepatitis C infection

Newly Reported Cases and Trends

In 2017, 710 individuals were newly identified with HCV infection, a marginal 2% decrease from 2016 (721 cases) [**Figure 4**]. Though newly identified, these individuals could have been infected years ago.

The 2017 rate of 59.3 cases per 100,000 population is below the peak rate in 2008 (70.0 cases per 100,000) [**Figure 3**].

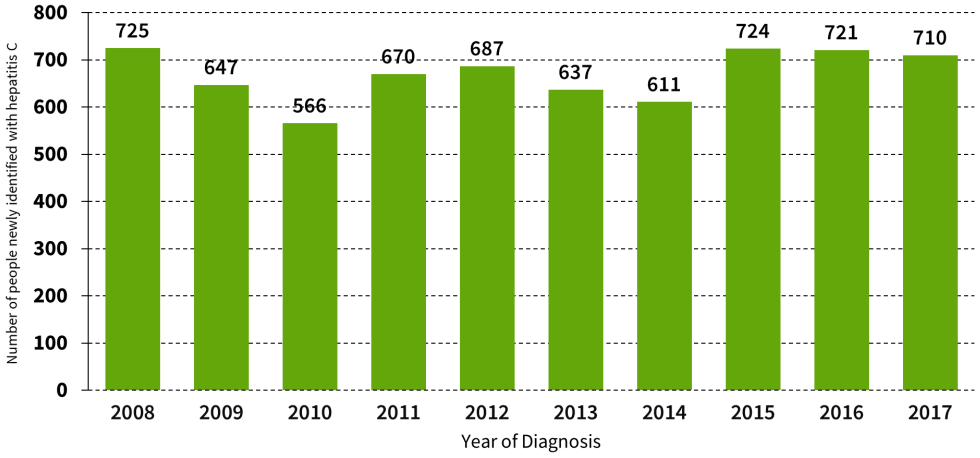
6,698 cases were reported in the decade 2008-2017, comparable to the 6,773 cases in the previous decade 1998-2007.

16,385 cases have been reported since reporting began in 1991.

From 1994 onwards, the yearly incidence of cases has consistently fluctuated between 520 and 760.

The number of newly identified hepatitis C cases decreased slightly in 2017 compared to the two previous years.

Figure 4: People newly identified with hepatitis C infection by year, 2008-2017



Gender and Age Characteristics

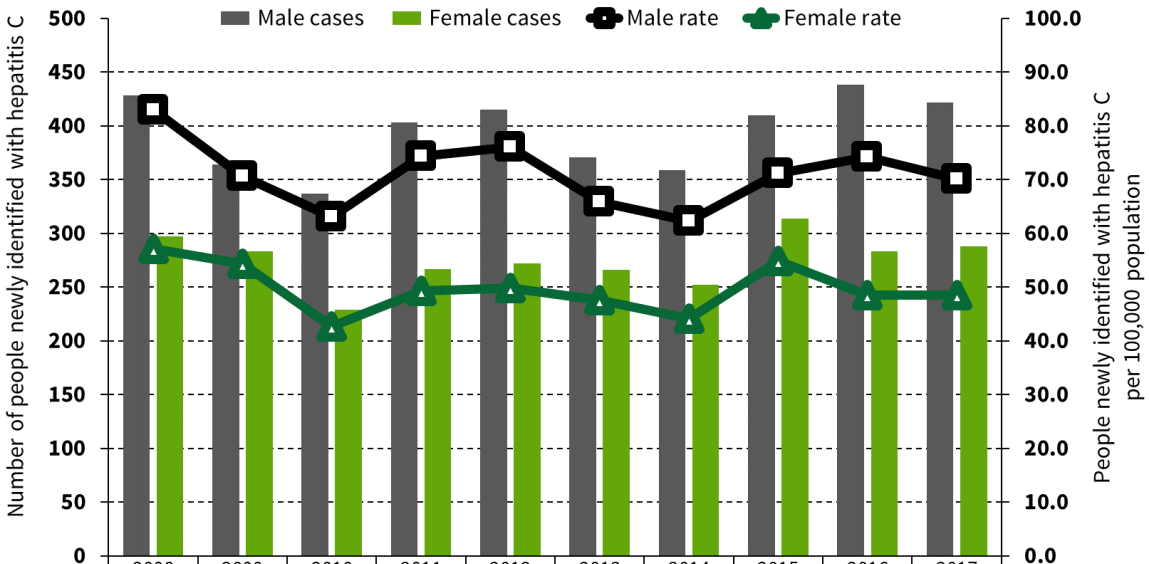
Of the 710 cases reported in 2017, 422 were male, down 4% from 2016. 288 cases were female, a marginal increase of 2% from 2016 [**Tables 5 & 6, Figure 5**].

Over the decade 2008-2017, the proportion of male cases fluctuated from 56% to 61%, while the proportion of female cases fluctuated from 39% to 44%. In 2017, the ratio of male to female cases was 3:2 **[Table 3].**

The 2017 rate for males was 70.1 cases per 100,000 and the rate for females was 48.4 cases per 100,000. The male rate decreased from 2016 (74.3 per 100,000), while the female rate remained unchanged (48.5 per 100,000 in 2016) [**Figure 5**].

Among those newly identified with hepatitis C in 2017, there are three males for every two females.

Figure 5: Incidence of reported hepatitis C cases and diagnosis rates by gender, 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Male cases	428	364	337	403	415	371	359	410	438	422
Female cases	297	283	229	267	272	266	252	314	283	288
Male rate	83.0	70.7	63.1	74.4	76.1	65.9	62.2	71.1	74.3	70.1
Female rate	57.1	54.3	42.7	49.2	49.8	47.6	44.2	54.9	48.5	48.4

Year of Diagnosis

Between 2016 and 2017, there was a decrease in rates for all age groups among males, with the exception of the 50+ age group, which saw a slight increase from 51.4 to 52.1 per 100,000. The 30-39 age group had the highest rate with 139.3 per 100,000 in 2017 [**Figure 6**].

In contrast to males, the 20-29 and 30-39 year age groups in females saw increased rates, 123.2 to 129.9 and 96.3 to 97.3 per 100,000, respectively; while the 40-49 and 50+ age group rates slightly decreased [**Figure 7**].

In 2017, female cases comprised 49% of the total cases aged 20-29 years (107 of 217 cases) and 40% of total cases aged 30-39 years (83 of 208 cases).

78% (226 cases) of all female cases diagnosed in 2017 were of a childbearing age (15-45 years). This is similar to 2014, 2015, and 2016, and is the lowest in the past decade; the highest was 87% (258 cases) in 2008.

The average age among female cases (34.6 years) is lower than that of male cases (39.3 years).

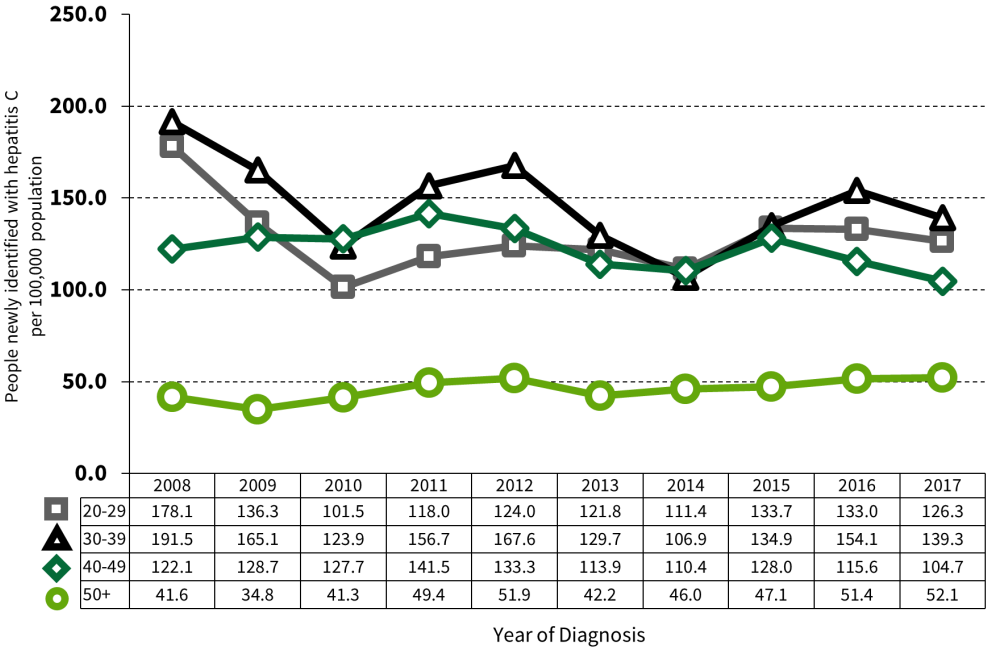
Table 5: Males newly identified with hepatitis C by age group, 2008-2017

Age Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
< 20	11 (03%)	5 (01%)	7 (02%)	7 (02%)	6 (01%)	8 (02%)	9 (03%)	6 (01%)	8 (02%)	8 (02%)
20-29	136 (32%)	103 (28%)	82 (24%)	97 (24%)	102 (25%)	105 (28%)	98 (27%)	114 (28%)	115 (26%)	110 (26%)
30-39	123 (29%)	106 (29%)	85 (25%)	111 (28%)	121 (29%)	100 (27%)	87 (24%)	111 (27%)	133 (30%)	125 (30%)
40-49	91 (21%)	93 (26%)	93 (28%)	102 (25%)	94 (23%)	81 (22%)	79 (22%)	90 (22%)	83 (19%)	77 (18%)
50+	67 (16%)	57 (16%)	70 (21%)	86 (21%)	92 (22%)	77 (21%)	86 (24%)	89 (22%)	99 (23%)	102 (24%)
Total	**428**	**364**	**337**	**403**	**415**	**371**	**359**	**410**	**438**	**422**

Table 6: Females newly identified with hepatitis C by age group, 2008-2017

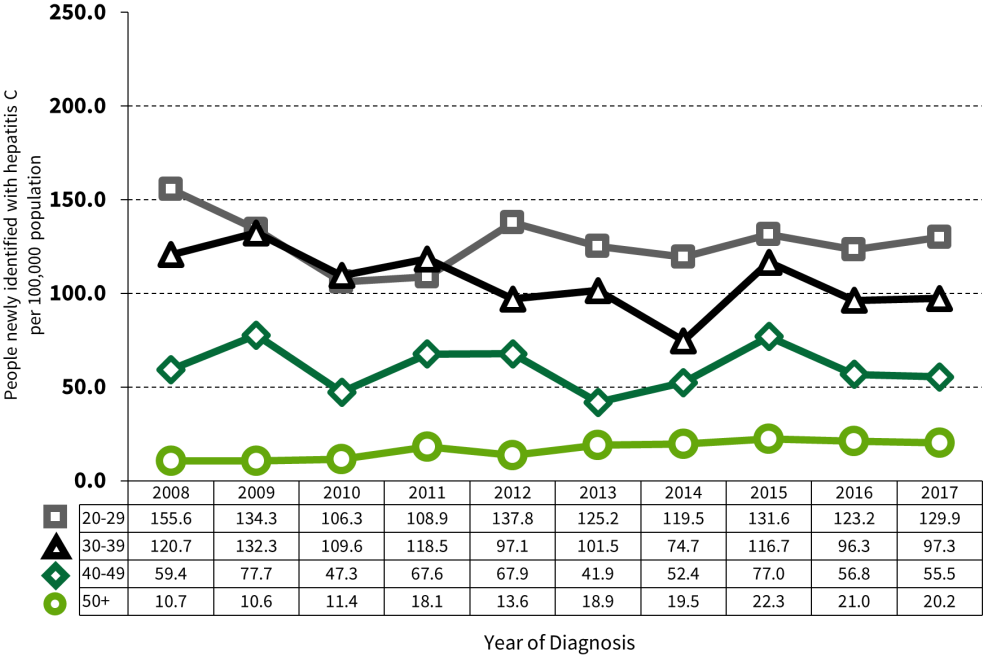
Age Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
< 20	45 (15%)	26 (9%)	19 (8%)	19 (7%)	23 (8%)	24 (9%)	21 (8%)	18 (6%)	21 (7%)	17 (6%)
20-29	113 (38%)	98 (35%)	82 (36%)	85 (32%)	108 (40%)	101 (38%)	98 (39%)	107 (34%)	101 (36%)	107 (37%)
30-39	76 (26%)	84 (30%)	73 (32%)	81 (30%)	68 (25%)	75 (28%)	58 (23%)	92 (29%)	79 (28%)	83 (29%)
40-49	44 (15%)	56 (20%)	34 (15%)	48 (18%)	47 (17%)	29 (11%)	36 (14%)	52 (17%)	39 (14%)	39 (14%)
50+	19 (6%)	19 (7%)	21 (9%)	34 (13%)	26 (10%)	37 (14%)	39 (15%)	45 (14%)	43 (15%)	42 (15%)
Total	**297**	**283**	**229**	**267**	**272**	**266**	**252**	**314**	**283**	**288**

Figure 6: Males newly identified with hepatitis C by age group, 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
20-29	178.1	136.3	101.5	118.0	124.0	121.8	111.4	133.7	133.0	126.3
30-39	191.5	165.1	123.9	156.7	167.6	129.7	106.9	134.9	154.1	139.3
40-49	122.1	128.7	127.7	141.5	133.3	113.9	110.4	128.0	115.6	104.7
50+	41.6	34.8	41.3	49.4	51.9	42.2	46.0	47.1	51.4	52.1

Figure 7: Females newly identified with hepatitis C by age group, 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
20-29	155.6	134.3	106.3	108.9	137.8	125.2	119.5	131.6	123.2	129.9
30-39	120.7	132.3	109.6	118.5	97.1	101.5	74.7	116.7	96.3	97.3
40-49	59.4	77.7	47.3	67.6	67.9	41.9	52.4	77.0	56.8	55.5
50+	10.7	10.6	11.4	18.1	13.6	18.9	19.5	22.3	21.0	20.2

NOTE: Rates for males and females below 20 years are not shown because of small numbers.

Newborns infected with hepatitis C

At the time of this report, there was one confirmed hepatitis C infected newborn born in 2017 . It may take up to 18 months or more to confirm hepatitis C diagnosis by antibody testing; hence, delays in reporting of infected newborns may be expected.

There were 18 hepatitis C infected newborns born in the decade since 2008.

Table 7 illustrates newborn cases by the birth year, though some may have been identified in months later. There were five cases born between 1991 and 2007 (17 years); there were seven cases born from 2008-2012, and 11 cases born from 2013-2017.

In the past decade, there were another nine cases aged 18 months to nine years that were possibly related to a vertical transmission of the virus, but other risks were reported.

Table 7: Newborns infected with hepatitis C by birth year, 1991-2017

	1991-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Newborns infected with hepatitis C	5	1	1	2	0	3	0	3	2	5	1	**23**

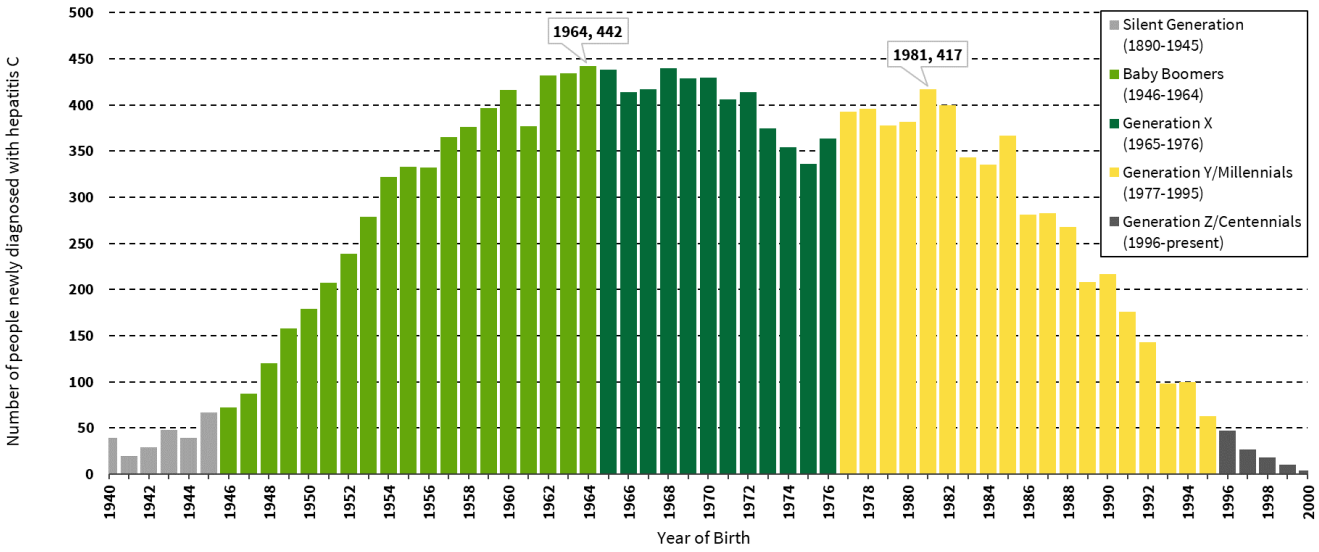
NOTE: Cases may be confirmed and reported at a later year.

Generational cohorts

The cases reported from 1991 to 2017 ordered by birth year follow a bell curve pattern between 1941 and 2000 with observable crests, the first among those born in 1964 and the second among those born in 1981 [**Figure 8**].

A third (34%) of all cases reported since 1991 were in the baby boomer generation born from 1946 to 1964. Roughly a third (29%) were in Generation X born from 1965 to 1976. Another third (32%) were in Generation Y (Millennials), born from 1977 to 1995. The remaining 5% were either in the Silent Generation, born 1890 to 1945, or Generation Z (Centennials), born 1996 or later.

Figure 8: Hepatitis C incident cases by birth year (1940 to 2000) from 1991 to 2017



Geographical distribution

The rates of HCV cases in the former Prince Albert, Prairie North, Regina, and the three Northern health regions were notably higher than the provincial rate of 59.3 per 100,000. The remaining former health regions had rates similar to or lower than the province in 2017 [**Figure 9**, **Tables 8 & 9**].

The former Prince Albert health region's hepatitis C rate in 2017 was 131.1 per 100,000, lower than its average rate of 144.1 per 100,000 over the past decade.

The HCV rate in the former northern health regions was 119.0 per 100,000 in 2017, higher than the average rate of 92.8 per 100,000 for this area over the past decade.

The former Regina Qu'Appelle health region's HCV rate of 72.2 per 100,000 in 2017 was consistent with the rates in this area since 2011 (70.2 to 78.4 per 100,000).

The former Prairie North and Cypress health regions saw notable increases in rates in 2017.

The rates in the former Prairie North health region fluctuated between 43.5 and 69.8 per 100,000 in the years 2007 to 2016, but increased notably to 76.6 per 100,000 in 2017.

The former Cypress health region rate in 2017 (45.6 per 100,000) was almost double the average rate (24.3 per 100,000) of the previous ten years (2007-2016).

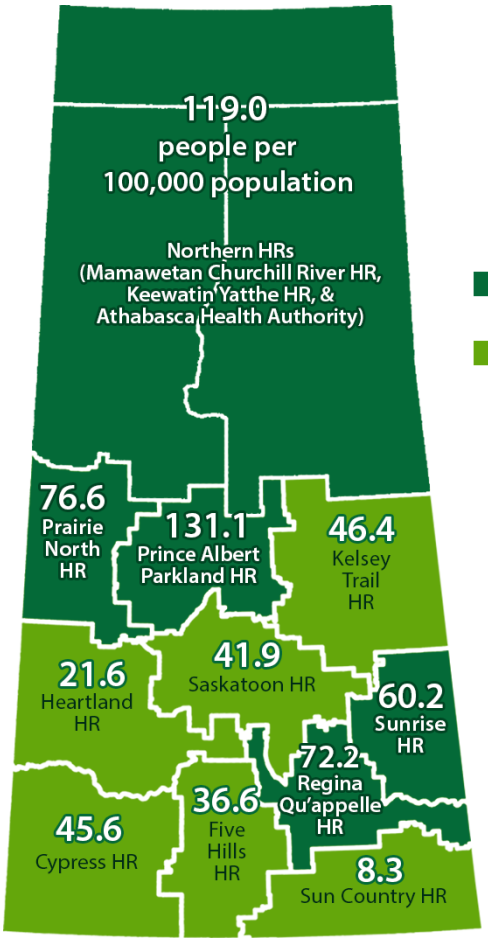


Figure 9: Hepatitis C infection rates by former health region, 2017

higher than the provincial rate of **59.3 per 100,000**

lower than the provincial rate

The consistently highest rates in the former Prince Albert health region in the past ten years may be related to the location of the federal correctional facility where rates of disease are impacted by friends and relatives moving to live in the community to be close to the incarcerated individuals. This phenomenon has been observed in other areas in Canada where federal penitentiaries are located.

Table 8: People newly identified with hepatitis C by former health region, 10-year counts and average, 2007-2017

Former HR	10 years (2007-16)			2017			
	Total	%	Average per year	Total	%	Change (%) (2007-16 average to 2017)	Rate per 100,000 population
Sun Country HR (SCHR)	89	1%	9	5	1%	↓ 44%	8.3
Five Hills HR (FHHR)	199	3%	20	21	3%	↑ 5%	36.6
Cypress HR (CHR)	106	2%	11	21	3%	↑ 91%	45.6
Regina Qu'Appelle HR (RQHR)	2021	30%	202	220	31%	↑ 9%	72.2
Sunrise HR (SHR)	314	5%	31	36	5%	↑ 16%	60.2
Saskatoon HR (SKHR)	1780	27%	178	155	22%	↓ 13%	41.9
Heartland HR (HHR)	86	1%	9	10	1%	↑ 11%	21.6
Kelsey Trail HR (KTHR)	111	2%	11	20	3%	↑ 82%	46.4
Prince Albert Parkland HR (PAPHR)	1177	18%	118	109	15%	↓ 8%	131.1
Prairie North HR (PNHR)	427	6%	43	65	9%	↑ 51%	76.6
North (MCRHR, KYHR, AHA)	347	5%	35	48	7%	↑ 37%	119.0
Total	**6657**	**100%**	**666**	**710**	**100%**	**↑ 7%**	59.3

NOTE: Cases from First Nation jurisdictions are assigned to and counted in the former health regions where the reserves are geographically located.

Table 9: Newly reported hepatitis C cases in large versus small cities and rural areas, 2017

Former Health Region (HR)	Hepatitis C cases [number (% of total cases)]	Hepatitis C cases living in large cities* [number (% of HR cases)]	Hepatitis C cases living in small cities or rural areas** [number (% of HR cases)]
RQHR	220 (31%)	168 (76%)	52 (24%)
SKHR	155 (22%)	142 (92%)	13 (08%)
PAPHR	109 (15%)	75 (69%)	34 (31%)
Other HRs	226 (32%)	N/A	226 (100%)
Total	**710**	**385 (54%)**	**325 (46%)**

* Saskatoon, Regina and Prince Albert

**includes people living on First Nations reserves

54% of the cases in 2017 were in the large cities.

More than half (385/710 or 54%) of the cases in 2017 were residents of the cities of Regina (168 cases), Saskatoon (142 cases), and Prince Albert (75 cases).

As illustrated in **Figure 10 and Table 10**, the proportion of the cases in the cities is slightly over half the total number of cases.

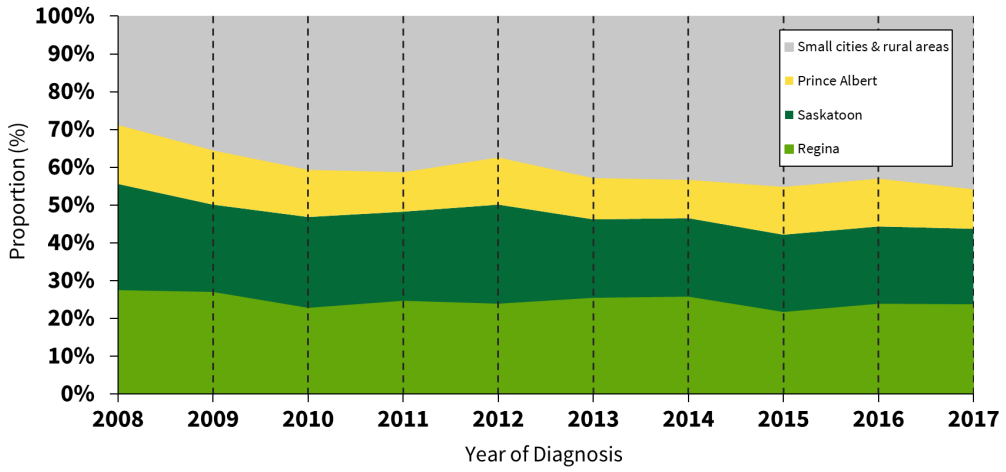
The proportion of the cases in the cities decreased from 71% in 2008 to 54% in 2017. The converse was noted in the percentage of newly diagnosed cases living in small cities and rural areas, 29% in 2008 to 46% in 2017 [**Figure 10**].

The proportion of cases who lived in Saskatoon fluctuated little in the decade 2008-2017 (20% to 28%). Similarly, the proportion of cases living in Regina fluctuated between 22% and 27% [**Table 10**].

Whereas the proportion of cases in Prince Albert was smaller (between 10% and 16%) compared to Regina and Saskatoon, the rates per 100,000 population were 2 to 3.7 times higher.

The rates in the small cities and rural areas showed a gradual increase from 35.7 per 100,000 in 2008 to 50.8 per 100,000 in 2017. However, these were lower than the rates in the cities of Regina and Saskatoon, which were fairly stable in the last five years, 2013 to 2017. The wide fluctuation in rates in the city of Prince Albert over same period of time was related to the year over year variation of the number of cases [**Figure 11**].

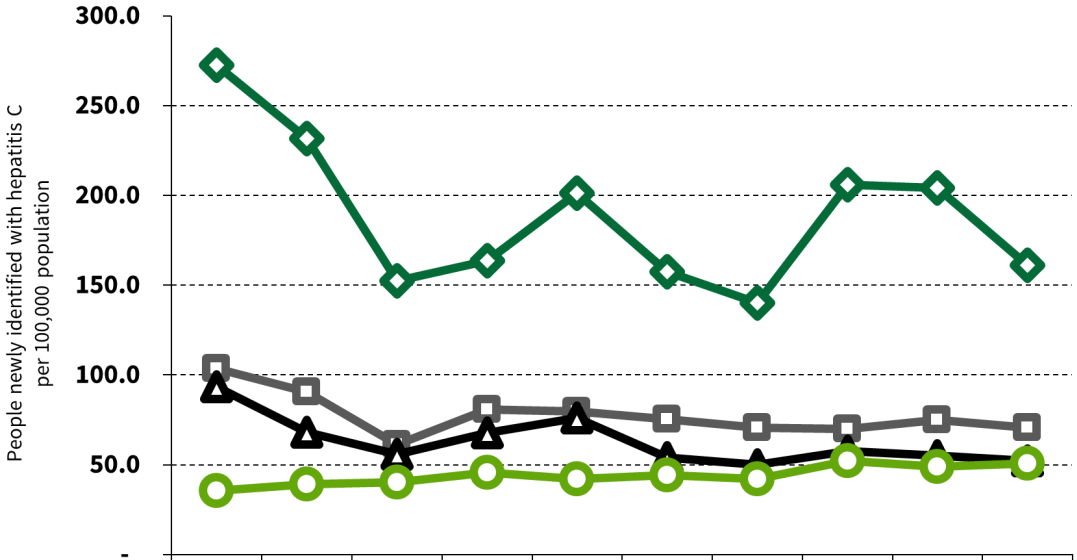
Figure 10 & Table 10: People newly identified with hepatitis C in the three largest cities versus the rest of SK (small cities and rural areas), 2008-2017



City of residence upon diagnosis	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Small cities & rural areas	208 (29%)	229 (35%)	230 (41%)	276 (41%)	255 (37%)	272 (43%)	264 (43%)	326 (45%)	309 (43%)	325 (46%)
Prince Albert	114 (16%)	94 (15%)	71 (13%)	71 (11%)	87 (13%)	70 (11%)	63 (10%)	93 (13%)	93 (13%)	75 (11%)
Saskatoon	204 (28%)	149 (23%)	136 (24%)	158 (24%)	180 (26%)	133 (21%)	127 (21%)	148 (20%)	146 (20%)	142 (20%)
Regina	199 (27%)	175 (27%)	129 (23%)	165 (25%)	165 (24%)	162 (25%)	157 (26%)	157 (22%)	173 (24%)	168 (24%)
Total	**725**	**647**	**566**	**670**	**687**	**637**	**611**	**724**	**721**	**710**

NOTE: Due to rounding, percentages may not total to 100%

Figure 11: Rates of people newly identified with hepatitis C by location of diagnosis (large urban versus small urban and rural communities), 2008-2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Regina	103.5	90.7	61.3	80.8	79.5	75.3	70.7	70.1	74.9	70.7
Saskatoon	93.3	68.1	55.7	67.9	76.1	54.0	50.0	57.7	55.2	52.1
Prince Albert	272.5	231.7	152.5	163.5	201.3	157.5	140.0	205.8	204.1	161.2
Small urban & rural	35.7	39.2	40.4	45.7	42.2	44.1	42.1	52.3	48.9	50.8

Hepatitis C high risk lifestyle behaviours

The risk of getting hepatitis C varies widely depending on the type of exposure or behavior. Some exposures to hepatitis C carry a much higher risk of transmission than other exposures.

For some exposures, while transmission is biologically possible, the risk is so low that it is not possible to put a precise number on it; however, risks add up over time. In other words, there may be a relatively small chance of acquiring hepatitis C when engaging in a risky behavior one time; but if repeated many times, the overall likelihood of becoming infected after repeated exposures is actually much higher.

Lifestyle activities are presented according to a hierarchy or level of risk of being exposed to hepatitis C virus (for example, people who reported both injection drug use [IDU] and tattooing were categorized in the IDU category). These activities are self-reported. 23% (1,517) of the 6,698 cases over the past ten years did not have any documentation of risks in the case record [**Figure 12 & Table 11**].

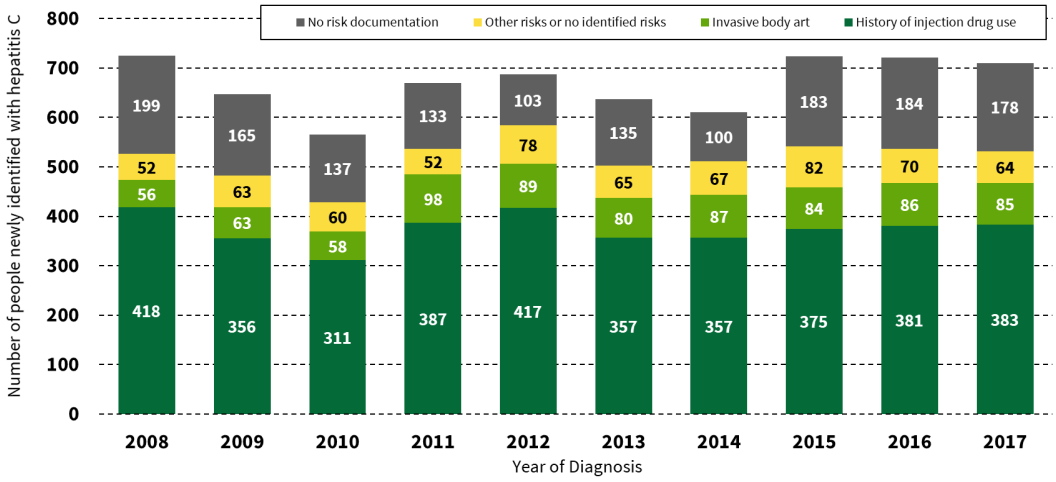
54% of new hepatitis C cases in 2017 reported injecting drugs.

54% (383 of 710 cases) of newly diagnosed cases in 2017 reported injecting drugs, which could include injecting steroids.

Tattooing and body piercing was the second highest risk for acquiring hepatitis C, comprising 85/710 or 12% of newly diagnosed people in 2017.

8% of newly diagnosed cases in 2017 had other documented risks (e.g., men having sex with men, ever received blood or blood products, heterosexual contact, etc.). 25% had no documented risks.

Figure 12 & Table 11: Self-reported primary risk factors for acquiring hepatitis C infection among newly diagnosed people, 2008-2017



Primary Risk Factor	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
History of injection drug use	418 (58%)	356 (55%)	311 (55%)	387 (58%)	417 (61%)	357 (56%)	357 (58%)	375 (52%)	381 (53%)	383 (54%)
Invasive body art	56 (8%)	63 (10%)	58 (10%)	98 (15%)	89 (13%)	80 (13%)	87 (14%)	84 (12%)	86 (12%)	85 (12%)
Men having sex with men	9 (1%)	9 (1%)	13 (2%)	9 (1%)	14 (2%)	7 (1%)	10 (2%)	19 (3%)	14 (2%)	9 (1%)
Received blood or blood products	12 (2%)	9 (1%)	8 (1%)	12 (2%)	14 (2%)	13 (2%)	18 (3%)	10 (1%)	12 (2%)	9 (1%)
Heterosexual contact	10 (1%)	24 (4%)	18 (3%)	9 (1%)	21 (3%)	21 (3%)	19 (3%)	16 (2%)	14 (2%)	23 (3%)
Born or resided in an endemic country	13 (2%)	17 (3%)	14 (2%)	15 (2%)	17 (2%)	14 (2%)	7 (1%)	17 (2%)	11 (2%)	15 (2%)
Perinatal transmission*	2 (<1%)	0 (0%)	2 (<1%)	1 (<1%)	1 (<1%)	0 (0%)	2 (<1%)	3 (<1%)	4 (<1%)	3 (<1%)
No identified risks**	6 (1%)	4 (1%)	5 (1%)	6 (1%)	11 (2%)	10 (2%)	11 (2%)	17 (2%)	15 (2%)	5 (1%)
No documented risks**	199 (27%)	165 (26%)	137 (24%)	133 (20%)	103 (15%)	135 (21%)	100 (16%)	183 (25%)	184 (26%)	178 (25%)
Total	**725**	**647**	**566**	**670**	**687**	**637**	**611**	**724**	**721**	**710**

*Perinatal transmission cases are not necessarily born within the same year of their diagnosis.
**_No identified risks_ is an exposure category, whereas _no documented risks_ means there was nothing recorded.
NOTE: Risk data may be updated as more information becomes available; figures may not match the previous reports.
Percentages may not add up to 100 due to rounding.

Injection drug use - the highest self-reported risk behaviour

67% of those who injected drugs were aged 20 to 39 in 2017.

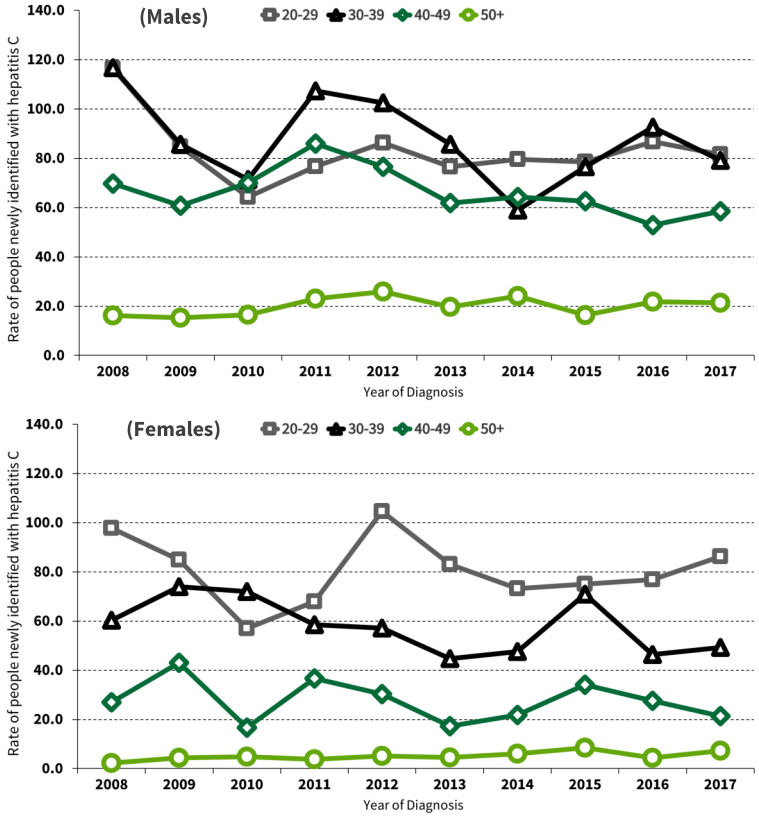
In 2017, among those who self-reported IDU, 37% were in the 20 to 29 year age group and 30% were in the 30 to 39 year age group [**Table 12**].

Figure 13 demonstrates that there is relatively little fluctuation over the past decade in the age distribution of newly identified cases who self-reported IDU.

Table 12: Number of cases who self-reported injection drug use by age group, 2008-2017

Age Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
< 20	43 (10%)	20 (6%)	18 (6%)	20 (5%)	19 (5%)	24 (7%)	24 (7%)	13 (3%)	17 (4%)	13 (3%)
20-29	160 (38%)	126 (35%)	96 (31%)	116 (30%)	153 (37%)	133 (37%)	130 (36%)	128 (34%)	138 (36%)	142 (37%)
30-39	113 (27%)	102 (29%)	97 (31%)	116 (30%)	114 (27%)	99 (28%)	85 (24%)	119 (32%)	118 (31%)	113 (30%)
40-49	72 (17%)	75 (21%)	63 (20%)	88 (23%)	75 (18%)	56 (16%)	61 (17%)	67 (18%)	57 (15%)	58 (15%)
50+	30 (7%)	33 (9%)	37 (12%)	47 (12%)	56 (13%)	45 (13%)	57 (16%)	48 (13%)	51 (13%)	57 (15%)
Total	**418**	**356**	**311**	**387**	**417**	**357**	**357**	**375**	**381**	**383**

Figure 13: Rates of cases who self-reported injection drug use by gender and age group, 2008-2017

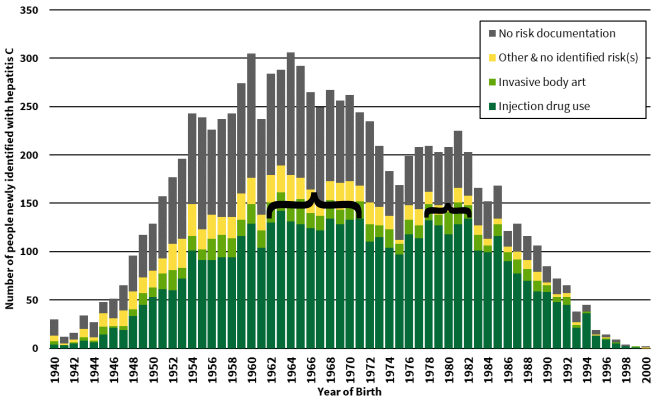


In 2017, the rates of cases who self-reported IDU among the Saskatchewan male population are higher than the rates among the female population in all age groups except in those aged 20-29 years. In this age group, the rate among females (86.2 per 100,000 population) was higher than the rate among males (81.6 per 100,000).

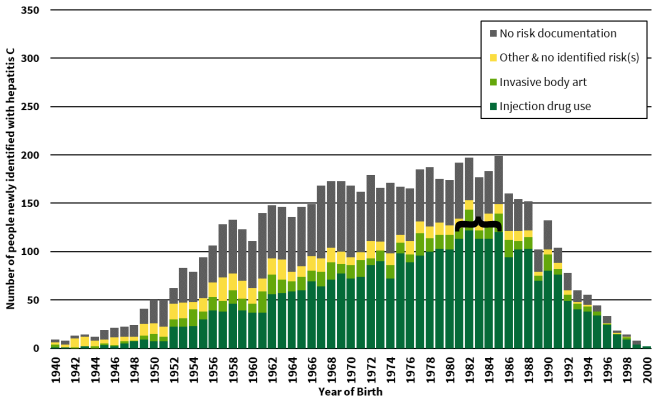
The highest rates of cases who self-reported IDU among males were clustered in the 20 to 49 age groups.

The highest rates in cases who self-reported IDU among females was in the 20 to 29 age group, followed by the 30 to 39 age group and the 40 to 49 age group.

Figure 14: Males and females who self-reported risk factors for acquiring hepatitis C infection by year of birth, 1940-2000



(Males)



(Females)

Figure 14 illustrates the two crests among males cases who reported injecting drugs: one among those born in between 1962 to 1971 (122 to 142 cases) and the second among those born between 1978 and 1982.

Unlike the male cases, females who self-reported injecting drugs tend to be younger, peaking in the 1981 to 1985 birth cohort.

Invasive body art (tattooing and body piercing)

For 12% (85/710) of people newly identified with hepatitis C, tattooing and body piercing were the most probable risk for contracting the virus.

In 2017, tattooing and body piercing was reported by 285 of 710 newly identified cases; 200 of whom also practice injection drug use.

An average of two cases per year aged less than 20 in 2008 to 2017 reported tattooing and body piercing as their primary risk factor. 89% were females, mainly in the 15 to 19 age group.

Blood and blood product recipients

64 people newly identified with hepatitis C in 2017 and born before blood testing began in 1990 stated they received blood or blood products; however, the year of transfusion is not known.

Of these 64 cases, 33 also self-reported injection drug use and 39 reported tattooing and body piercing. Therefore, receiving blood and blood products was not necessarily the source of HCV infection.

Multiple lifestyle risks

The majority of newly identified hepatitis C cases have a lifestyle involving multiple risks for acquiring the hepatitis C virus. 20% reported only one risk factor; one case reported as many as six risk factors [**Table 13**].

In 2017, 208 of the 710 people newly identified with HCV (29%) reported three or more risk factors.

Not all risks are investigated by the case interviewer. The reported risks represent only those documented in the case record, therefore, the actual number of multiple risks could be higher.

Table 13: Newly identified cases with multiple reported risk factors, 2017

Number of self-reported risk factors for each person	Number and proportion of newly identified cases
No risk factors reported	4 (1%)
One (1) risk factor	145 (20%)
Two (2) risk factors	175 (25%)
Three (3) risk factors	151 (21%)
Four (4) risk factors	50 (7%)
Five (5) risks factors	6 (1%)
Six (6) risks factors	1 (<1%)
No risks documented	178 (25%)
Total	**710**

Co-infection with HIV

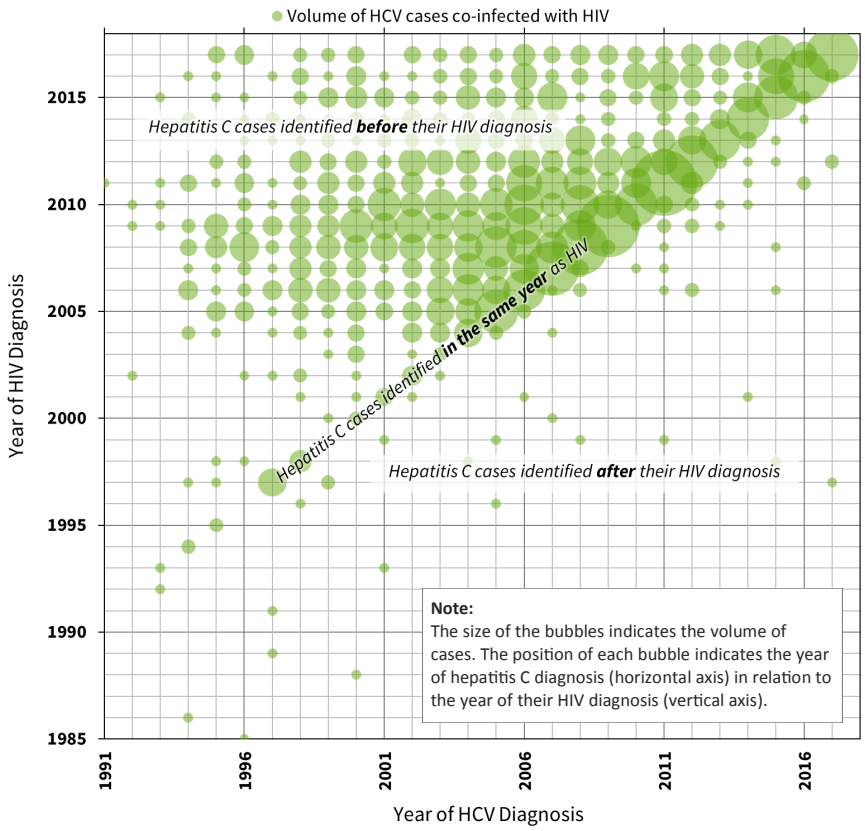
HCV is more infectious than HIV. However, HIV is more virulent in that the body does not ever clear the virus and all individuals die from infection if not treated.

HCV infections that have resolved spontaneously are not consistently reported within the surveillance system. Hence, some cases reflected in this section may not be truly infected by both viruses at the time of diagnosis.

Since reporting for hepatitis C began, 9% (1,468) of the 16,385 identified cases were also infected with HIV. Of those, 94% (1,374) self-reported injection drug use.

69% (1,018) of 1,468 co-infected cases were identified with HCV infection prior to their HIV diagnosis; of these, 32% (323) were diagnosed with HIV within three years [**Figure 15**]. This indicates missed opportunities for testing and prevention since the risks for acquiring HIV are similar to hepatitis C (e.g., risk behavior may have remained unchanged leading to contracting HIV).

Figure 15: People newly identified with hepatitis C co-infected with HIV by year of diagnosis, 1991-2017 (HCV), 1985-2017 (HIV)



25% (369) of 1,468 co-infected cases were identified with both hepatitis C and HIV at the same time of testing.

Another 6% (81) were identified with hepatitis C after their HIV diagnosis, which indicates missed opportunities for testing and prevention. More than half (54% or 44 cases) of these were identified with HCV infection within two years of their HIV diagnosis.

In 2017, 5% (33 cases) of newly identified hepatitis C cases were co-infected with HIV; of these, 91% (30) self-reported injection drug use. 85% (28 cases) of the 33 cases were diagnosed with both viruses within the same year.

9% (578) of the 6,698 individuals newly identified with hepatitis C infection from 2008 to 2017 were co-infected with HIV, which was identified either prior, at the same time, or after their hepatitis C diagnosis. The time between the identification of HIV to HCV (or vice-versa) of the cases ranged between zero to 20 years. 91% (528) of these 578 co-infected cases self-reported IDU [**Table 14**].

Table 14: People newly identified with hepatitis C who are HIV positive, 2008-2017

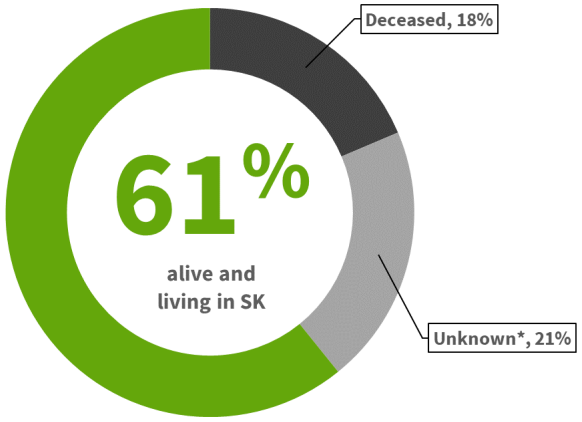
	Total HCV cases	HCV cases co-infected with HIV (% of cases among total HCV cases)
2008	725	98 (14%)
2009	647	75 (12%)
2010	566	54 (10%)
2011	670	86 (13%)
2012	687	62 (9%)
2013	637	35 (5%)
2014	611	43 (7%)
2015	724	53 (7%)
2016	721	39 (5%)
2017	710	33 (5%)
Total	**6698**	**578 (9%)**

Prevalence and vital status

A review of the 16,385 cases reported from 1991 to 2017 showed that 61% (9,961) of the cases were alive and living in Saskatchewan as of June 30, 2018. [**Figure 16**]. Approximately 25% (range 15-25%) of HCV infections will resolve spontaneously (U.S. Centers for Disease Control and Prevention, 2008). Hence, some of these 9,961 individuals may not be currently infected as they will have resolved or will have been cured with medication.

Around 3 out of 5 individuals identified with hepatitis C since 1991 were living in Saskatchewan in 2018.

Figure 16: Reported hepatitis C cases living in Saskatchewan as of June 30, 2018



*Vital status cannot be determined because:

- unable to match the individual to the Person Health Registration System (PHRS) (n=489);
- status is unknown on the PHRS (n=21);
- coverage with Saskatchewan Health was terminated before July 1, 2018 (n=2,866).

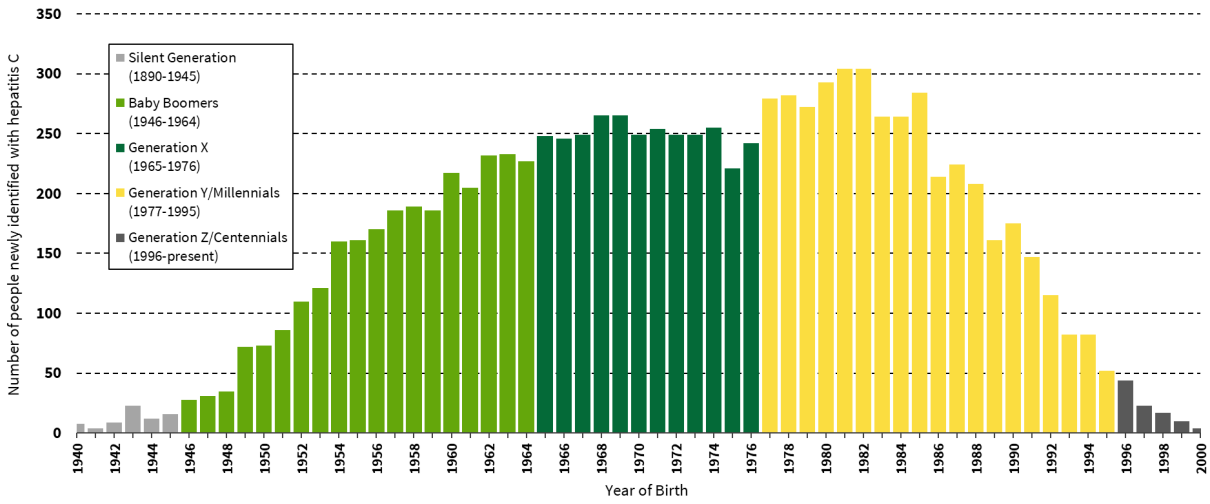
Source: Person Health Registration System (PHRS)

40% (4,006 cases) of those living in the province are in the Generation Y (born 1977-1995), currently between ages 23 to 41 years; 30% (2,992 cases) are in the Generation X (born 1965-1976), currently between ages 42 to 53 years; and 27% (2,722 cases) are baby boomers (born 1946-1964), currently 54 years and older [**Figure 17**].

19% (3,048 cases) of all cases have died from any cause; of those, 14% (420 cases) died within 12 months of the HCV identification, and another 54% (1,653 cases) in the decade thereafter.

36% (762 of 2,134 cases) of those aged 50 and older at the time of identification of HCV have died.

Figure 17: Reported hepatitis C cases living in Saskatchewan, by birth year as of June 30, 2018 (n=9,961)

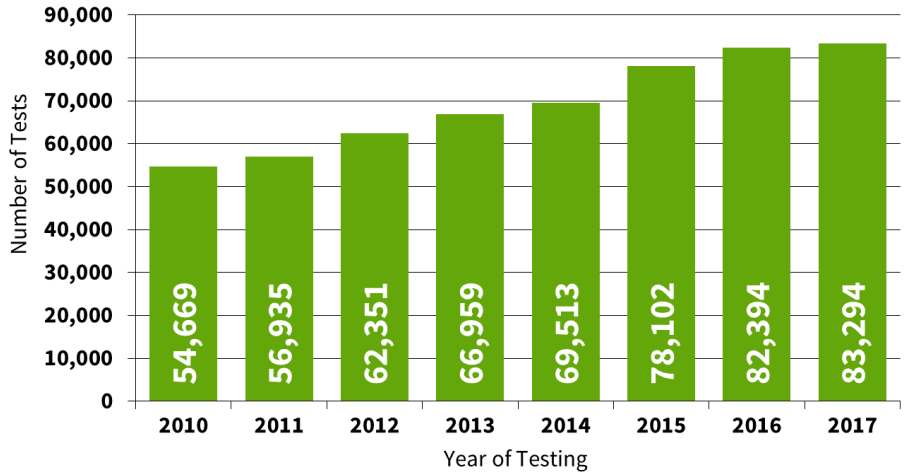


Laboratory testing

The number of tests for HCV performed by the RRPL and the Royal University Hospital (RUH) increased steadily each year.

About 30,000 more tests were done in 2017 compared to 2010, an overall increase of 52% [**Figure 18 & Table 15**].

Figure 18 & Table 15: Hepatitis C screening tests performed, 2010-2017



	2010	2011	2012	2013	2014	2015	2016	2017	Total
Number of Tests	54,669	56,935	62,351	66,959	69,513	78,102	82,394	83,294	**554,217**
% Change from previous year	-	4%	10%	7%	4%	12%	5%	1%	**52%↑***

*Percent change 2010 to 2017

Source: Roy Romanow Provincial Laboratory (RRPL) and Saskatoon Laboratory

A portion of tests represent individuals with past exposures and wishing to know their hepatitis C status. Some tests represent repeat testing requested by physicians for patients with an ongoing high risk lifestyle or for clinical monitoring of patients.

Appendix

Technical Notes and Data Limitations

All hepatitis C cases have been confirmed positive by laboratory testing. Hepatitis C testing is done at the RRPL (formerly the Saskatchewan Disease Control Laboratory) and the RUH laboratory.

Notification of hepatitis C cases to the local Medical Health Officer and the Saskatchewan Ministry of Health is mandated by the Disease Control Regulations under *The Public Health Act, 1994.*

Data in this report are based on information extracted from the archived hepatitis C data set and the Integrated Public Health Information System (iPHIS) on August 15, 2018 by the Ministry of Health.

Most areas do not report HCV infection differentiated into acute and chronic status. Therefore for the purpose of this report, such differentiation is not highlighted and all cases are reported as unspecified HCV infection and include acute, chronic, and resolved infections.

The screening and confirmatory other testing required to determine acute or chronic test for hepatitis C infection is an antibody test.

Delays and updates occur in the reporting of hepatitis C data such as risk exposure categories, vital status information, and case classification (e.g., confirmed, reported out of province, etc.). As updated information becomes available, case data may be reassigned based on this information. As such, numbers may differ from previous reports or at the time of future reports.

Hepatitis C counts are based on the year of the first positive lab result; therefore, they do not necessarily represent the number of new infections that year because individuals can first be tested years after their infection.

The childbearing age of women includes ages 15 to 45 years.

The generational categories are based on a widely understood demographic cohorts. The reference for the year range of the categories are based on The Center for Generational Kinetics (https://genhq.com/faq-info-about-generations/)

Hepatitis C rates cited in this report are crude rates. Rates were calculated by dividing the total number of hepatitis C cases by the Saskatchewan covered population as of June 30 of the year for which the rate was calculated. Rates are expressed as the number of cases per 100,000 population.

Due to the incompleteness of staging information and lack of indication in the record, re-infected hepatitis C cases reported as repeat cases are considered previously reported and removed from the data set, and therefore not counted within the report. It is not known if some of these cases were the result of re-infection. The data do not include hepatitis C cases currently living in Saskatchewan who were initially diagnosed outside of the province. Individuals lab-confirmed by the RRPL & RUH must be residents in the province for six months to be included in the annual case count; otherwise they are referred to the jurisdiction where they resided and are counted there.

First Nations individuals known to be living on reserve at the time of hepatitis C diagnosis are included in figures for the former health regions where the First Nations reserve is located.

Risk exposure information is self-reported, also limiting the accuracy and completeness of the data. For reporting purposes, hepatitis C cases were assigned to a single exposure category based on a hierarchy of most likely risk for acquiring the virus. When more than one risk factor is provided, cases are classified as the exposure category that is highest in the hierarchy:

- IDU – Injection Drug Use
- Invasive body art – tattooing and body piercing
- Other or no identified risks
  - ⇒ MSM – Men having sex with men. Spending time in jail was considered a proxy for MSM.
  - ⇒ Ever received blood or blood products – History of receiving blood or blood products at any point in time. Although all blood or blood products are screened for the virus after 1990, the data lacks detail on the time component on this risk; hence, this variable cannot be validated. This risk was considered invalid for cases born after 1990 and removed from the hierarchy of risks for those cases.
  - ⇒ Heterosexual contact – Heterosexual exposure includes partnering with an individual at risk for hepatitis C, including those from an endemic country, or partners who have no known risk for hepatitis C. This category also includes individuals where heterosexual contact is the only exposure activity reported.

  - ⇒ Endemic – Origin from a hepatitis C-endemic country.
  - ⇒ Perinatal – Infected newborns of a hepatitis C-positive mother.
  - ⇒ NIR – No identified risk, unknown risk and less likely sources of infection.
- No documentation on risks – records that have no risks entered and no indication that risks were identified.

The Saskatchewan Drug Plan provided information on the number of prescribers and the individuals receiving treatment. This is based on the number of individuals filling prescriptions. This does not account for individuals who may be seen by physicians and who do not fill prescriptions for treatment.

The vital status of the HCV cases is verified by linking the records to the person health registration system (PHRS) using the health services number (HSN). Individuals whose records report active coverage with Saskatchewan Health are assumed to be *alive and living in Saskatchewan*. Those individuals whose records report a date of death are classified under the *deceased* category. The unknown vital status category includes individuals whose coverage with Saskatchewan Health was terminated (e.g., moved out of province, incarcerated in a federal penitentiary, joined the Armed Forces), who reported an out-of-province health services number (e.g., Lloydminster, Alberta residents who receive public health services from Saskatchewan), who were diagnosed and reported in the province but could not be matched to the PHRS by HSN or name, and whose status is incomplete on the PHRS.