Epidemiology of Acute Hepatitis C Infection in Canada
Results from the Enhanced Hepatitis Strain Surveillance System (EHSSS)

At a Glance

- *Reported rates of acute HCV declined from 2.5 per 100,000 population in 2004 to 1.6 per 100,000 population in 2006. Since then, there has been a reversal of the downward trend, with the preliminary reported incidence rate of acute HCV infection increased to 2.2 per 100,000 population in 2008.*
    - *Preliminary 2008 data suggest that this increase may be driven by acute HCV infections diagnosed among females aged 15-24 years and among males aged 25-34 years.*
- *Between 2004 and 2008, reported rates of acute HCV were 5.5 times as high in Aboriginal persons as in non-Aboriginal persons*
- *Injection drug use accounted for 63% of reported acute HCV cases with known risk factor information.*

Introduction

Hepatitis C is one of the major causes of liver failure and transplant in the developed world[1]. The hepatitis C virus (HCV), which causes Hepatitis C, is transmitted through blood contact with someone infected with hepatitis C. In Canada, recreational injection drug use (IDU) continues to be the predominant risk factor for HCV acquisition (due to sharing of needles, syringes, and other injection equipment), and is associated with 70-80% of newly acquired HCV cases in Canada. In larger Canadian cities, the second largest risk factor is travel or residence to a HCV-endemic region because of the higher rate of health care-acquired HCV infections in these regions. Sharing of equipment for inhalation drug use (e.g. crack pipes, straws, etc.) may also be associated with HCV infection. Sexual and perinatal (mother-to-child) transmission occurs uncommonly. Elevated risk is associated with tattooing or body piercing with contaminated equipment, the sharing of personal hygiene items (e.g. razors, toothbrushes) with someone infected with HCV, or occupational blood exposure. While there have been cases of HCV transmission via contaminated blood transfusions in the past, the enhanced screening procedures of Canada's blood supply since 1990 has virtually eliminated this risk. Currently, there is no vaccine for HCV, although vaccine research is in progress[2].

Recent estimates indicate that as of December 2007, approximately 242,500 Canadians had been infected with HCV, corresponding to a prevalence rate of approximately 0.7% of the total population[3]. In the United States, combined data from 1999 through 2002 from the National Health and Nutrition Examination Survey estimated the prevalence of chronic HCV infection to be 1.3%[4]. Recently published estimates from the United Kingdom suggest that approximately 0.4% of the population aged 15-59 were chronically infected with HCV, and a 2006 study in Australia estimated that 197,300 people were chronically infected in that country, corresponding to a prevalence rate of approximately 0.9%[5,6]. The World Health Organization estimates that 2-3% of the world's population (approximately 123-170 million people) is infected with HCV[7,8]. Countries of highest endemicity are located in Africa, Latin America, and Central and Southeast Asia. In these regions, HCV prevalence rates of 5% to 10% are frequently reported[9].

The purpose of this report is to present data on acute HCV infection in Canada, examining trends in reported infections. Data are from the Enhanced Hepatitis Strain Surveillance System (EHSSS), a

national surveillance initiative that contributes to our understanding of the epidemiology of newly identified acute and chronic hepatitis B and hepatitis C infections and associated risk factors in Canada.

Methods

In EHSSS, an acute HCV infection meets either of the following criteria: a) seroconversion from negative HCV antibody (anti-HCV) to positive anti-HCV in 12 months or b) evidence of clinical hepatitis C, requiring satisfaction of both clinical and laboratory criteria. Clinical criteria include an acute illness with a discrete onset of symptoms. Laboratory criteria include laboratory confirmation of HCV infection and elevated serum aminotransferase levels, excluding other causes of acute hepatitis.

The method used in EHSSS has been described previously[10]. The use of detailed forms to investigate all newly identified cases from participating sites allows for the comparison of rates and risk factors among various socio-demographic groups. This report represents data collected from January 2004 through September 2008. Currently, EHSSS has expanded to eleven sites across Canada covering approximately 41.8% of the Canadian population, or 13.2 million people.
Cases who reported more than one risk factor for infection during the exposure period were assigned to a risk group based on a mutually exclusive hierarchy which has been previously described[11].

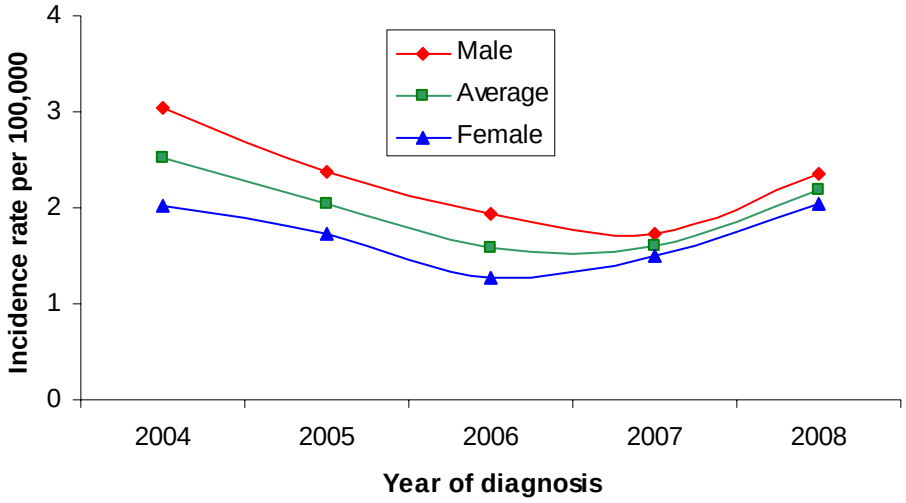
Results

After a period of declining rates, there is evidence of an increase in the reported rate of acute HCV infection

- Acute HCV infection reported through EHSSS declined from a rate of 2.5 per 100,000 in 2004 to 1.6 per 100,000 in 2006. Since then, there has been a reversal of the downward trend, the preliminary reported incidence rate being 2.2 per 100,000 in 2008 (Figure 1).

- The rate of acute HCV infection is higher among males than females. The gender difference in reported rates has decreased over time. (Figure 1).

Figure 1: Reported rates[1] of acute hepatitis C infection, EHSSS, 2004-2008[2]

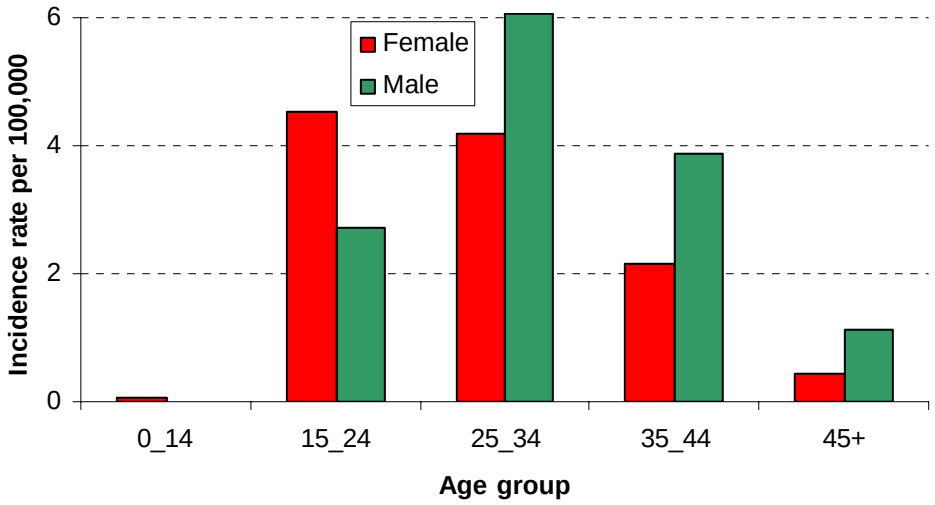


[1] Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates
[2] From January 1, 2004 through September 30, 2008

The majority of reported acute HCV infections occur in individuals aged 15 to 44. Although the overall reported rate of acute HCV infection is higher in males, females predominate in the 15-24 age group.

- 84% of the acute HCV infections detected through EHSSS between January 2004 and September 2008 were diagnosed in people between the ages of 15 and 44 years (Figure 2).
- Overall, males have a higher rate of acute HCV infection than females; however, in cases aged 15-24, acute HCV infection in females is predominant (Figure 2).

Figure 2: Cumulative rate[1] of reported acute HCV infection by age group and gender, EHSSS, 2004-2008[2]

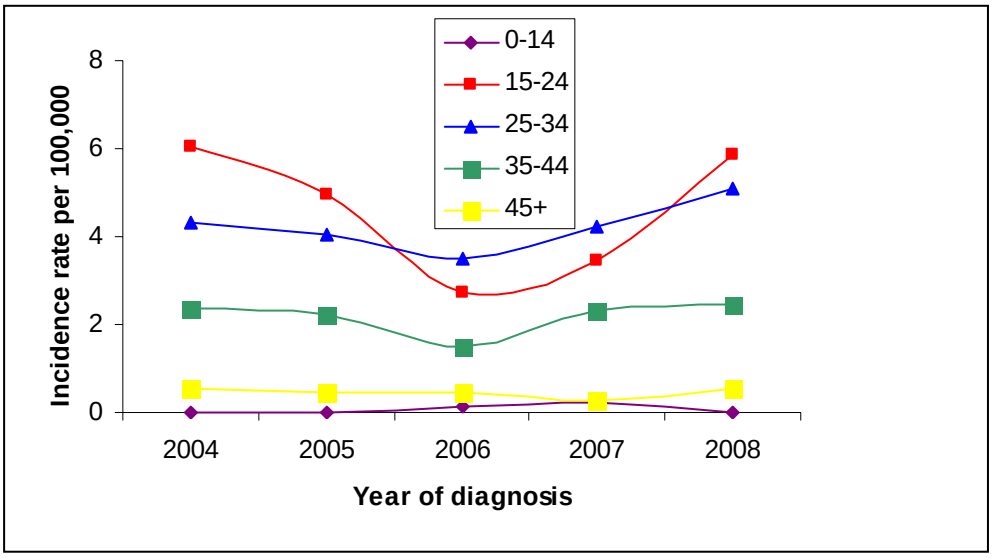


[1] Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates
[2] From January 1, 2004 through Sept 30, 2008

Rates of acute HCV infection are increasing faster in young females than in any other group

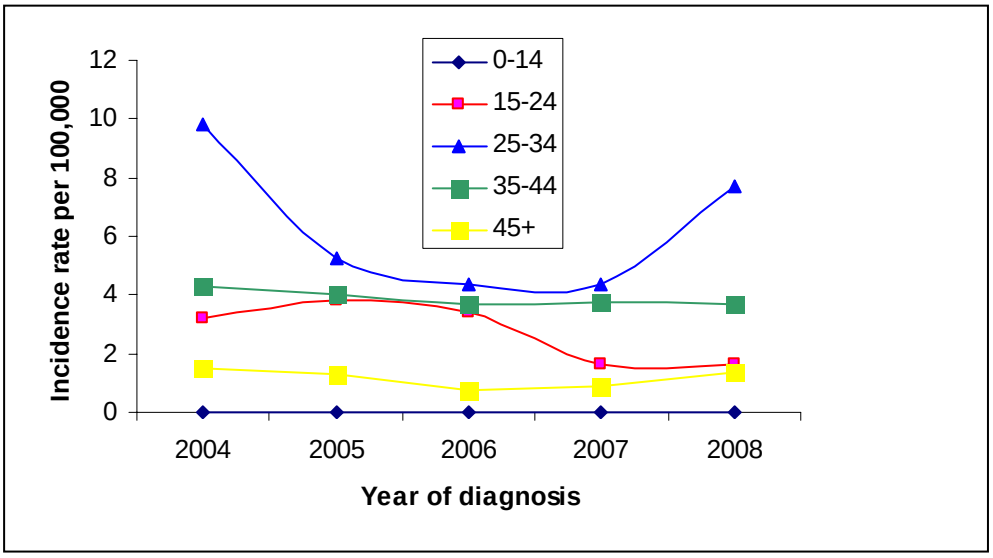
- The highest increase in reported rates of acute HCV infection was among females aged 15-24 years with an increase of 114% between January 2006 and September 2008 (Figure 3).
- Overall, males experienced stable or decreasing rates of acute HCV infection. However, reported rates of acute HCV infection among males aged 25-34 increased by 76.6% between January 2007 and September 2008 (Figure 4).

Figure 3: Reported rates[1] of acute HCV infection by age group among females, EHSSS, 2004-2008[2]



[1] Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates
[2] From January 1, 2004 through September 30, 2008

Figure 4: Reported rates[1] of acute HCV infection by age group among males, EHSSS, 2004-2008[2]

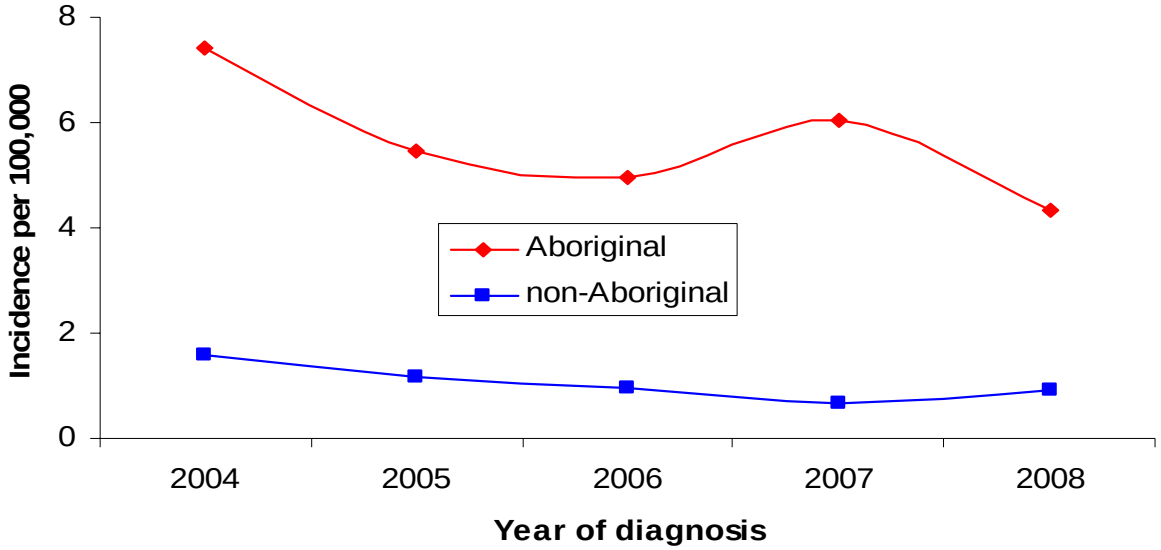


[1] Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates
[2] From January 1, 2004 through September 30, 2008

The reported rate of acute HCV infection is higher among Aboriginal peoples compared to non-Aboriginal persons

- Between January 2004 and September 2008, among cases with known information on ethnicity, the reported rate of acute HCV infection was 5.5 times as high in Aboriginal persons as in non-Aboriginal persons (Figure 5).

Figure 5: Reported incidence[1] of acute HCV infection by year and ethnic group in seven sites, EHSSS, 2004-2008[2]



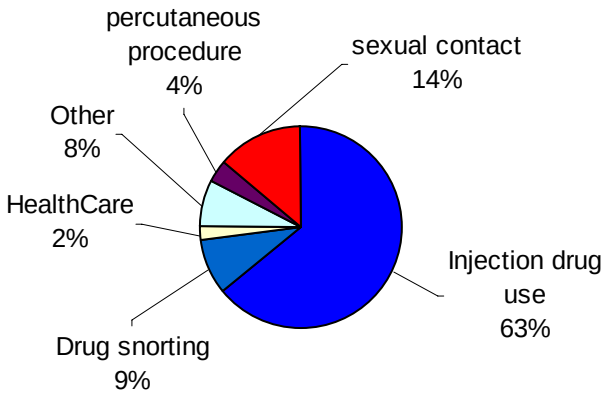
[1] Rates of acute hepatitis C were calculated through the use of health-region-specific 2001 and 2006 census data and intercensal population estimates
[2]From January 1, 2004 through September 30, 2008

Injection drug use is the most prevalent risk factor for HCV infection

- Risk factor information is available for 45% of the 921 cases of acute HCV infection reported to EHSSS between January 1, 2004 and September 30, 2008 (Figure 6).

- Of the acute HCV cases with known risk factor information, injection drug use (IDU) is associated with 63% of infections, 9% drug snorting, 14% sexual contact, 2% health care acquired (including blood transfusion, receipt of blood product, hemodialysis, surgery, and dental surgery), and 8% other (including occupational exposure to blood, household contact with hepatitis C carriers, incarceration without other risk factors).

Figure 6: Distribution of mutually exclusive risk factors for newly-acquired HCV infection among cases with known risk factor information in EHSSS, 2004-2008[1]



[1] From January 1, 2004 through September 30, 2008

Discussion

Data from EHSSS indicate that after several years of decline in acute HCV infection rates in Canada, since 2006, there may be an increase in the reported rate of acute HCV infection. Preliminary 2008 data suggest that this increase seem to be driven primarily by acute HCV infections diagnosed among females age 15-24 and among males age 25-34. Although the annual rates may be underestimated due to undiagnosed infections, the time trend should be valid if the proportion of asymptomatic cases remained constant and screening and disease reporting have not changed during the time period.

EHSSS data also indicate that IDU continues to be the predominant risk factor for HCV infection in Canada. This data is supported from information gathered through other surveillance programs including I-Track, the enhanced surveillance project of persons who inject drugs[12].

The increased reported rate of infection in younger females compared to their male peers may reflect an earlier introduction to IDU, and a social structure that may inhibit young women's ability to negotiate safer drug use and sexual behaviours[13]. It is important to identify cases with acute HCV infection in order to offer appropriate counselling and treatment. Discovering and implementing effective ways of preventing initiation of high-risk drug-related behaviours, and preventing transmission of HCV among those who use drugs, especially among people aged 15 to 39 years, are also important.

There is a considerable disparity in acute HCV infection rates between Aboriginal and non-Aboriginal populations. This observed inequality emphasizes the need for an appropriate and effective public health strategy including planned and implemented prevention programs, in partnership with aboriginal communities and local hepatitis C prevention organizations, to reduce HCV infection among these populations.

EHSSS provides important information on the epidemiology of HCV infection in Canada that is used to support decision-making in public health. EHSSS offers an in-depth look at demographic and risk factors for HCV infection, and allows for the identification of acute HCV infection. This comprehensive surveillance program currently covers over 40% of the Canadian population. However, this sentinel site approach may only be applicable to the populations covered by the system. Data on HCV infection in Canada are also collected via the Canadian Notifiable Disease Surveillance System (CNDSS). These data were excluded from this report because of several limitations, including the inability to distinguish acute from chronic HCV infection and the lack of national risk factor information. Data tables on reported cases and rates of HCV in Canada are available at the following website: http://www.phac-aspc.gc.ca/sti-its-surv-epi/index-eng.php.

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