

Inside this issue: Hepatitis B

July 28, 2014, is World Hepatitis Day. Hepatitis B (HB) is a global public health issue. HB virus has infected approximately 2 billion people worldwide – almost one third of the world's population – and an estimated 400 million people currently live with chronic HB infection. HB vaccine has been part of Canada's routine immunization schedule for about 20 years now, so our acute HB rates are relatively low. See how HB rates have continued to drop over the past few years; get an update on the clinical care of HB and how to prevent contracting this virus when travelling; and see our *Rapid communication* regarding international travel and the recent re-emergence of poliovirus. Please note that we will be publishing monthly over the summer.

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Submission deadline:

October 15, 2014	Best practices to address antimicrobial resistance
November 1, 2014	Public Health issues in remote areas



Hepatitis B surveillance in Canada: 2005-2012

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Abstract

Objective: To describe surveillance trends by age, sex and infection status of Hepatitis B (HB) virus in Canada between 2005 and 2012.

Methods: Data on acute and chronic HB cases reported to the Canadian Notifiable Disease Surveillance System were compiled at the national level to examine trends by age and sex over time. Time trends are presented from 2005 to 2012, corresponding to the availability of data differentiated by acute and chronic infection status.

Results: The rate of reported acute HB infections decreased from 1.0 to 0.6 per 100,000 between 2005 and 2012. Both sexes showed rate decreases over this time, although acute HB rates were consistently higher among males than females. The rate of reported chronic HB infections decreased from 14.1 to 12.0 per 100,000 between 2009 and 2012. These results are based on data in which infection status was specified. The proportion of unspecified cases in any given year may somewhat alter the results.

Conclusion: This is the first time that trends in reported cases and corresponding rates of HB in Canada have been examined by acute and chronic infection status using national surveillance data. Canada continues to have a downward trend in HB rates across Canada, most notably in acute HB cases. Increasing national capacity to differentiate between acute and chronic HB will facilitate a more thorough understanding of trends in transmission and of the burden of HB infection in Canada.

Introduction

Hepatitis B (HB) is an important clinical and public health issue worldwide. Globally, it is estimated that two billion people have been infected with HB virus (1) and approximately 400 million individuals are chronically infected carriers (2). Approximately 10% of infants infected at birth and over 90% of adults will recover completely from HB; in the rest, chronic HB infection develops, which may result in severe illness and premature death (3). In 2011, acute HB infection was reported as the underlying cause of 43 deaths in Canada while chronic HB infection was reported as the underlying cause of 19 deaths (4). This may be an underestimate, as deaths attributable to chronic HB may have been coded as more proximal causes such as hepatocellular carcinoma or cirrhosis.

The rates of acute HB observed in Canada are low, and routine HB vaccination programs have undoubtedly contributed to this low rate. In Canada, all provinces and territories have had an HB vaccination program since the 1990s (5). Although programs differ by jurisdiction, all offer HB immunization to infants and/or school-aged children (6) and in some jurisdictions to individuals at increased risk (7,8). In 2009, HB immunization coverage by the second birthday was estimated to be 69% in provinces and territories with a three-dose infant program (9). Coverage with at least two doses of the HB vaccine by the 17th birthday was 74.8% in 2011 (10). In 2012, national HB immunization coverage was estimated at only 39.7% in the non-institutionalized adult population; however, approximately 64.9% of health care workers in close contact with patients had received the HB vaccine (11).

Diagnosis of HB requires laboratory confirmation by means of a blood sample to differentiate HB infection from other types of hepatitis. Infection markers present in the blood can also be used to distinguish between acute and

chronic HB infection. Until recently, surveillance data reported to the Canadian Notifiable Disease Surveillance System (CNDSS) by most provinces and territories did not distinguish between acute and chronic HB infection, starting with data reported for 2005, a number of provinces and territories began reporting HB cases differentiated by acute and chronic infection status. The objective of this analysis was to describe surveillance trends by age, sex and infection status in Canada between 2005 and 2012.

Methods

Data sources

HB has been nationally notifiable since 1969; data on acute and chronic HB cases are reported to the CNDSS by provincial and territorial ministries of health, which in turn obtain data from local and regional health authorities. Most provinces and territories distinguish reported HB cases by infection status, namely acute, chronic and unspecified HB infection (refer to **Table 1** for case definitions). Reporting of infection status by provinces and territories has increased over time; however, some cases are still reported without infection status. Only acute and chronic HB cases are analyzed in detail in this report, thus presented results are not inclusive of all HB cases reported to the CNDSS.

Table 1. Hepatitis B case definitions used under the CNDSS

Infection status	Case definition (12)
Acute HB infection	HBsAg and anti-HBc IgM positive in the context of a compatible clinical history or probable exposure or clearance of HBsAg in a person who was documented to be HBsAg positive within the last six months in the context of a compatible clinical history or probable exposure.
Confirmed chronic HB infection	A person being HBsAg positive for more than 6 months or detection of HBsAg in the documented absence of anti-HBc IgM or detection of HB DNA for more than 6 months.
Unspecified HB infection*	Serologic profile not in line with either acute or chronic case definition and HBsAg positive or detection of HB DNA.

* For the purposes of this report, cases reported as unspecified could also include cases not differentiated as acute or chronic by the reporting province or territory.

HBsAg: Hepatitis B surface antigen.

anti-HBc IgM: IgM antibody against Hepatitis B core antigen.

Analysis

Descriptive analysis of HB infection by year, age group and sex was conducted using data reported to the CNDSS. Analyses are presented separated by acute and chronic HB infection status, and rates are given per 100,000 population. Rates, percentages, and percent change in rates were calculated using unrounded numbers, thus presented rounded numbers may not sum to the total. Population data for the calculation of rates were provided by Statistics Canada, Demography Division, Demographic Estimates Section. The following estimates were used: for 2005, final intercensal estimates; for 2006-2009, final postcensal estimates; for 2010-2011, updated postcensal estimates; and for 2012; preliminary postcensal estimates.

In order to examine trends over time, HB analyses were restricted to provinces and territories that consistently provided acute and/or chronic HB data to the CNDSS over the entire time frame used. Acute HB analysis for the time period 2005 to 2012 involved data from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, the Yukon and the Northwest Territories. In some provinces and territories, chronic HB did not become reportable until recent years; it remains non-reportable in Ontario. Reporting of chronic HB infection became more consistent in 2009; thus, trend analysis of chronic HB was restricted to 2009 to 2012. It includes data from British Columbia, Alberta, Saskatchewan, Quebec, New Brunswick and Nova Scotia. Two provinces (Newfoundland and Labrador and Prince Edward Island) provided exclusively unspecified HB data over the entire reporting period and thus are not reflected in any of the national-level analyses presented here.

Demographic patterns (age and sex) were examined for cases of HB reported in 2012 to provide a more detailed snapshot of the most recent available data. In these analyses, all provinces and territories that reported HB cases for that year were included; thus, in 2012, data on acute HB cases from Nova Scotia and on chronic HB cases from Manitoba and Yukon were also included.

Results

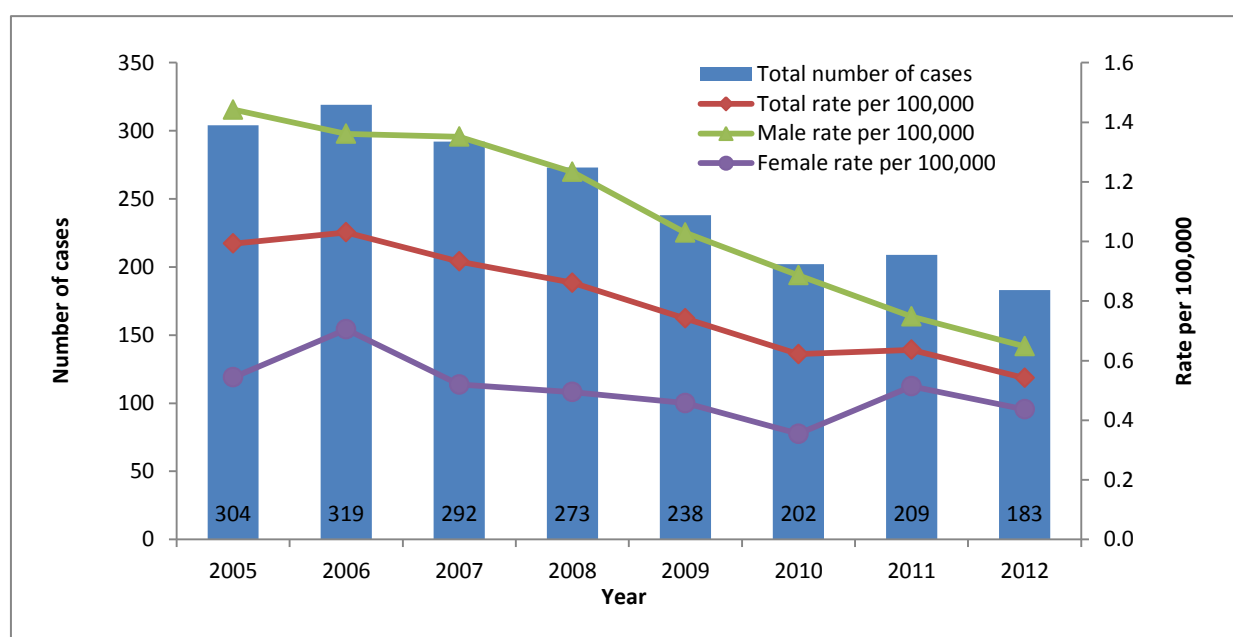
Acute HB infection

Trends over time

The total rate of reported cases of acute HB infection decreased steadily between 2005 and 2012. In 2005, a total of 304 cases of acute HB infection were reported, corresponding to an overall rate of 1.0 per 100,000. In 2012, 183 cases were reported, which represents a rate of 0.6 per 100,000 (**Figure 1**).

Between 2005 and 2012, rates of reported cases of acute HB were consistently higher among males than females, although the gap between the sexes narrowed over time. Though rate decreases were observed over time in both sexes, males showed a greater decrease (53.8% for males versus 19.8% for females) (**Figure 1**).

Figure 1. Reported number of cases and rates of acute HB infection in Canada* by sex, CNDSS, 2005-2012



*Includes BC, AB, SK, MB, ON, QC, NB, YT, NT

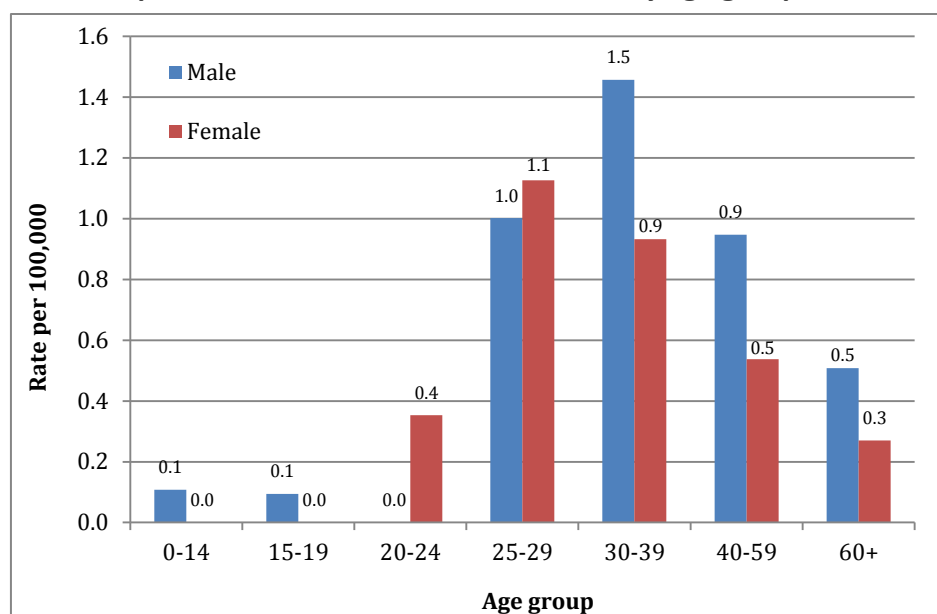
Trends by age group and sex

Between 2005 and 2012, the rates of reported cases of acute HB among males decreased across all age groups. There were consistently fewer acute HB cases reported in males less than 25 years of age, corresponding to rates of 1.0 per 100,000 or less in the younger age groups for all years. In 2005, males aged 30 to 39 years had the highest rate of reported acute HB infection at 3.1 per 100,000. In 2012, this rate had decreased to 1.5 per 100,000. A large decrease in rates was also observed among males aged 40 to 59 during this period, from 2.2 to 0.9 per 100,000 (data not shown).

Among females, both increases and decreases in rates of reported cases of acute HB were observed between 2005 and 2012. Most changes in rates were marginal, with the exception of females in the 20 to 24 age group whose rate decreased by 71.8%, from 1.3 to 0.4 per 100,000. Few cases were reported among females, especially in the younger age groups (< 30 years). Continued monitoring of subsequent years of data will be useful in identifying any emerging trends among females.

In 2012, the highest rate of reported cases of acute HB infection was observed among males in the 30 to 39 age group (1.5 per 100,000), followed by females in the 25 to 29 age group (1.1 per 100,000). Overall, for both sexes rates of acute HB were higher among those aged 25 to 59 years and lower among both younger (< 20 years) and older (> 60 years) age groups (**Figure 2**).

Figure 2. Rates of reported cases of acute HB in Canada* by age group and sex, CNDSS, 2012

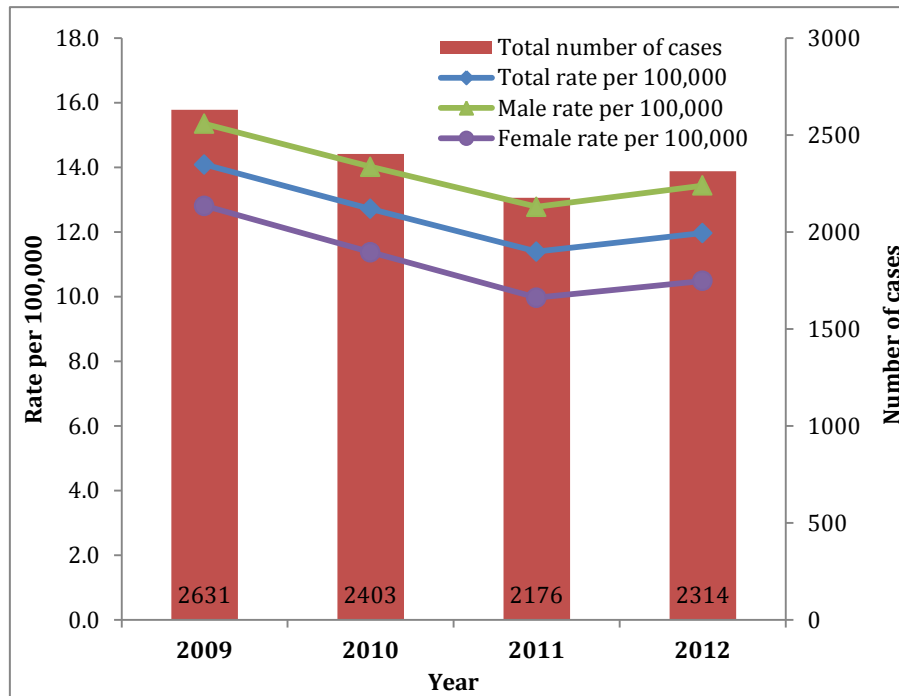


*Includes BC, AB, SK, MB, ON, QC, NB, NS, YT, NT

Chronic HB infection

There was some variation in the rate of reported cases of chronic HB infection between 2009 and 2012, but the overall trend was a decrease over this time frame. In 2009, a total of 2,631 cases of chronic HB were reported, corresponding to an overall chronic HB rate of 14.1 per 100,000. In 2012, there were 2,314 cases, resulting in a rate of 12.0 per 100,000. Between 2009 and 2012, chronic HB rates were consistently higher among males as compared with their female counterparts, though rate increases and decreases were observed in both sexes (**Figure 3**).

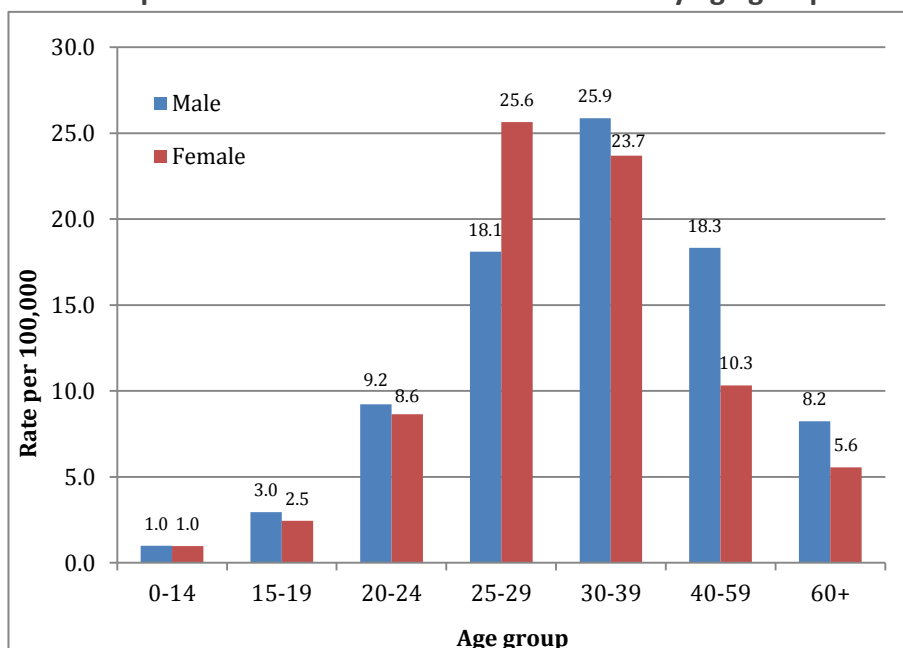
Figure 3. Reported number of cases and rates of chronic infection in Canada* by sex, CNDSS, 2009-2012



*Includes BC, AB, SK, QC, NB, NS

In 2012, rates of reported chronic HB for all age groups were higher among males than females, with the exception of the 25 to 29 age group, in which the reverse was found. Overall, the highest rates of reported cases of chronic HB in 2012 were observed among males in the 30 to 39 age group, followed by females in the 25 to 29 age group (25.9 and 25.6 per 100,000 respectively). In 2012 rates were higher among individuals between the ages of 20 and 59, with lower rates observed in both males and females of younger (< 20 years) and older (> 60 years) age groups (**Figure 4**).

Figure 4. Rates of reported cases of chronic HB in Canada* by age group and sex, CNDSS, 2012



*Includes BC, AB, SK, MB, QC, NB, NS, YT

Discussion

This is the first time that trends in reported cases and corresponding rates of HB in Canada have been examined by acute and chronic infection using national surveillance data. It provides insights into general trends, based on the provinces and territories that were able to report data on HB infection status to the CNDSS.

Acute HB cases offer valuable insight into current transmission trends and patterns in Canada. There was a 45% decrease in the rate of reported acute hepatitis cases in Canada over the reporting period. These low rates may be attributable to the implementation of routine HB immunization. Children who received HB vaccine in the early 1990s when routine HB immunization programs first started have now reached adulthood. As an increasing proportion of the Canadian population is covered by HB immunization, it is reasonable to expect continued decreases in acute HB rates.

It is not surprising that similar decreases were not seen in the number of chronic HB infections. Although chronic HB infection rates are generally low in the general Canadian population, high rates have been documented among people born outside Canada. It has been estimated that approximately 4% of immigrants in Canada are chronically infected with HB (13).

Declining rates of acute HB have been similarly observed in countries with comparable population structure, health status and public health infrastructure, as evidenced by data from routine and/or enhanced surveillance (14-17). With respect to chronic HB infection, Canadian rates were considerably lower than those observed in other countries, though cross-country comparison is difficult because of differences in reporting practices (14,16).

Limitations

These findings need to be interpreted in light of several limitations. First, the data are based on the number of reported cases; changes in provincial/territorial diagnostic and reporting practices may affect trends. By limiting our analysis to time periods and jurisdictions for which reporting was consistent, we have attempted to mitigate these effects. Additionally, when rates are based on small numbers of reported cases, they are more prone to fluctuations over time.

Second, the observed rates may be an underestimate of true HB incidence, possibly as a result of underdiagnoses of subclinical or mildly symptomatic cases. According to results from the Community Health Measures Survey, only 46% of Canadian respondents who tested positive for a current HB infection reported that they had been diagnosed with HB (18). Cases of chronic HB in Canada reported here are known to be an underestimate because of the unavailability of chronic HB data from Ontario, where a significant proportion of the Canadian population reside, many of whom are immigrants from countries where HB is endemic (19). A recent assessment of liver disease estimated that approximately 50% of individuals with chronic HB in Canada reside in Ontario (20).

Third, longer-term trends of chronic HB in Canada cannot be examined, as only a few provinces and territories reported chronic HB data before 2009.

Fourth, as only acute and chronic HB cases are analyzed in detail in this report, the findings are not inclusive of all HB cases reported to the CNDSS; infection status cannot be determined for all HB cases. In 2012, 737 (22.6%) of the 3,262 HB cases reported nationally did not specify infection status. These unspecified cases could contribute to higher rates for either acute or chronic cases if infection status could be determined.

Finally, the data are limited to analysis by age, sex and infection status. At this time, there are no additional data elements in the CNDSS that could explain observed trends. Consequently, it is not clear what proportion of reported HB infections is due to importation of cases through immigration from endemic countries, injection drug use or high-risk sexual practices.

Conclusion

From a public health planning and policy development perspective, it is important to identify populations disproportionately affected by HB as well as the factors associated with transmission of infection. Surveillance, supported by research that examines factors affecting observed trends, could contribute to the development and amelioration of tailored HB interventions in Canada.

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Conflicts of interest

No conflicts of interest to declare.

Summary of the *Primary Care Management of Hepatitis B – Quick Reference*

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Introduction

Hepatitis B (HB) virus is a highly infectious vaccine-preventable disease. Canada is a region of low endemicity; however, certain vulnerable populations, including Aboriginal peoples, men who have sex with men, street-involved youth and people who are or have been incarcerated, are disproportionately affected. The low prevalence is mainly attributable to universal HB immunization programs, which are available and accessible in all provinces and territories.

In Canada, an estimated 300,000 individuals are chronically infected with HB, which represents less than 1% of Canadians. Data suggest that of those affected with chronic HB, 70% are immigrants from highly endemic regions. Two thirds of chronically infected people are unaware of their status. In the absence of appropriate intervention 15% to 40% of them will have long-term sequelae of HB, such as cirrhosis, end-stage liver disease and/or hepatocellular carcinoma, and in addition can infect others. There is an urgent need to screen, diagnose and treat, where appropriate, chronic HB infection in order to reduce the associated morbidity and mortality and to prevent further transmission.

The objective of the *Primary Care Management of Hepatitis B – Quick Reference* (1) is to assist primary care and public health practitioners in the prevention, screening and management of HB in patients at risk of or infected with HB. This document provides a brief summary.

The *Quick Reference* does not supersede any provincial/territorial legislative, regulatory, policy and practice requirements or professional guidelines that govern and inform the practice of care providers in their respective jurisdictions.

Methods

The *Quick Reference* was developed by the Public Health Agency of Canada in collaboration with working group members with expertise in HB, HIV and related co-infections. The content of this clinical resource reflects current published information and evidence-based resources, such as the *Management of Chronic Hepatitis B: Canadian Association for the Study of the Liver Consensus Guidelines* (2) and was tailored on input from expert hepatologists, laboratory specialists, public health practitioners, physicians and nurses.

Results

The content of the *Quick Reference* is divided into 11 modules and includes links to credible resources to support the most recent immunization, treatment and other management recommendations. **Table 1** identifies the titles of all the modules and provides a short summary of the content available in each module.

Table 1. Highlights of the *Primary Care Management of Hepatitis B – Quick Reference*

Modules	Highlights
1. Who Should Be Tested for HB?	Screen routinely at first visit anyone who has risk factors for HB (e.g. blood exposure; high risk sexual behaviours; intravenous drug use; incarceration; and travel to/former residence in an endemic country), and screen routinely anyone who is pregnant, has Hepatitis C, HIV or other immunocompromising condition or is planning to take an immunosuppressive agent. In addition, clinicians should test anyone with signs and symptoms of acute hepatitis or clinical and laboratory findings suggestive of liver disease.
2. Approach to HB Screening and Testing	The most commonly used HB serologic markers are the surface antigen (HBsAg), the surface antibody (anti-HBs) and the core antibody (anti-HBc), either to detect infection or to determine immune status. Other HB serologic markers exist for screening in patients with defined clinical conditions or for testing to confirm diagnosis in patients with acute hepatitis. Note: the choice of tests should be based on patient history and clinical presentation.
3. Interpretation of HB Diagnostic Test Results	Given the various HB diagnostic tests and serologic markers available, interpretation of results can be complex and, where appropriate, the guidance of a specialist should be sought. A table provides guidance for the interpretation of the different HB serologic test results and recommended actions.
4. Initial Management of Patients with HBsAg-Positive Results	An algorithm highlights the responsibilities of both primary care and public health. The primary care provider advises the patient of the diagnosis and reports to local public health. An algorithm lists specific actions on follow-up for both the primary care provider and the public health department, and also highlights the importance of ongoing communication between the two parties to achieve proper case management and follow-up.
5. Natural History and Management of Acute HB	Acute HB does not require antiviral treatment, as 95% of immunocompetent adults will recover within 6 months and develop lifelong immunity. The management of acute HB includes relief of symptoms, if any, monitoring and prevention of hepatic complications, as well as counselling aimed at preventing transmission. The module outlines baseline laboratory testing and lists indications for repeat testing to confirm/rule out chronic infection. It also lists indications for urgent referral to a specialist of patients with a severe presentation.
6. Initial Evaluation of Confirmed Chronic HB	Provides guidance on baseline clinical evaluation and initial laboratory/imaging evaluation of patients with confirmed chronic infection, and lists indications for urgent and semi-urgent referral to a specialist.

<p>7. Natural History of Chronic HB</p>	<p>The natural history and progression of chronic HB is complex and non-linear, and varies from person to person. Familiarity with the different phases can help guide decisions related to treatment and monitoring. The module describes the phases of chronic HB and the associated serologic markers, and explains their relations to liver inflammation, histologic activity, degree of fibrosis and the risk of progression to cirrhosis and hepatocellular carcinoma. The module includes a schematic visualization of the different phases of chronic HB.</p>
<p>8. Long-Term Management of Confirmed Chronic HB</p>	<p>Outlines the recommended frequency of serologic and histologic monitoring, the goal being to prevent progression to cirrhosis, hepatocellular carcinoma and liver decompensation. It is recommended that certain patients who meet the outlined criteria undergo lifelong screening for hepatocellular carcinoma at 6-month intervals by means of abdominal ultrasound. A table of suggested follow-up by phase of infection as determined by serologic and histologic findings is also available.</p>
<p>9. Treatment of Chronic HB and Monitoring of Patients on Treatment</p>	<p>The module does not provide treatment options/regimens. Practitioners are referred to the <i>Management of Chronic Hepatitis B: Canadian Association for the Study of the Liver Consensus Guidelines 2012</i>.</p> <p>Not all patients with chronic HB infection require treatment; the decision to treat depends on several factors.</p> <p>The current approved treatments for HB are interferon injections or oral nucleoside/nucleotide analogues, all of which should be initiated by a hepatologist or other physician with experience in the management of viral hepatitis (e.g. an infectious disease specialist). The module provides advice on the decision to treat, treatment initiation and the duration of therapy. It also provides guidance for ongoing monitoring of patients receiving treatment and indications for follow-up with a specialist.</p>
<p>10. Prevention and Vaccination Checklist</p>	<p>Provides a link to details on publicly funded HB vaccine programs in Canada. It includes a checklist that prompts practitioners to discuss and offer vaccine to patients, as per the recommendations in the Canadian Immunization Guide. Special attention is paid to pregnant women. If a pregnant woman tests positive for HB, practitioners are advised to refer her to a specialist before the third trimester of pregnancy for guidance on indications for/timing of treatment initiation to prevent vertical transmission. The module also provides guidance on when treatment can be discontinued postpartum; however, it should be noted that the discontinuation of treatment is only applicable if the mother does not require ongoing therapy for HB.</p>
<p>11. Patient Education and Counselling</p>	<p>Provides practitioners with guidance on counselling for all patients to reduce the risk of transmission, including advice on disclosure, and specific advice for pregnant women and patients with acute HB. The module also provides general guidance to help patients with chronic HB reduce their risk of liver damage and specific advice for all patients, including those with cirrhosis, on maintaining a healthy lifestyle.</p>

Discussion

The *Quick Reference* is a very useful and practical clinical resource for primary care and public health professionals, as it guides them through all the main steps for the complete management of HB and refers them to credible resources already available for treatment, immunization and management recommendations.

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Conflicts of interest

There are no conflicts of interest to declare.

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Summary of recommendations for the prevention of viral hepatitis during travel

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Abstract

Viral hepatitis is considered the most common travel-related, vaccine-preventable disease. All non-immune travellers to developing countries should consider vaccination with inactivated Hepatitis A (HA) virus vaccine and recombinant Hepatitis B (HB) virus vaccine. Inactivated HA and recombinant HB vaccines are safe, have few side effects and are effective in providing long-lasting protection. All monovalent HA and HB vaccines available for use within Canada are equally effective, and each can be used interchangeably. HA Ig (immune globulin) should be used to prevent HA only in those for whom active HA vaccines are contraindicated, in immunocompromised individuals who may not respond adequately to the active vaccines or in infants less than one year of age. All travellers should practise routine protective measures when abroad. HB virus carriers travelling to Hepatitis D virus-endemic countries should be particularly vigilant in avoiding high-risk activities such as skin piercing and unsafe sexual practices.

Background

Hepatitis A is the most common travel-related illness for which there is an effective vaccine. [A map of countries and areas of risk for Hepatitis A \(HA\) virus and Hepatitis B \(HB\) virus](#) is available from the World Health Organization. Detailed information about HA and HB, including the epidemiology in Canada, available vaccines, recommendations for use in Canada and precautions and contraindications can be found in the [Canadian Immunization Guide](#). A full summary of the background of risks of HA and HB among travellers and recommendations are available in the Committee to Advise on Tropical Medicine (CATMAT)'s statement on hepatitis vaccines for travellers (1).

Prevention

Vaccine recommendations for Canadian travellers

Inactivated HA and recombinant HB vaccines are safe, have few side effects, and are effective in providing long-lasting protection (2,3). Both are considered safe in pregnancy and lactation (3,4). All monovalent HA and HB vaccines available for use within Canada are equally effective and each can be used interchangeably against its respective target virus (3,5).

All non-immune travellers to developing countries should consider vaccination with inactivated HA and recombinant HB vaccine (2,6-9).

Administration of HA vaccine up to the day of departure is considered efficacious and need not be accompanied by immune globulin (Ig) administration (10,11).

For travellers who have no or an incomplete history of HB vaccination, completion of a vaccination series is recommended before departure. One or two doses of HB vaccine administered before travel will still provide some protection and may initiate an HB vaccination series that can be completed after travel for those who cannot complete the full series before departure (1).

For travellers presenting less than 21 days before departure, monovalent HA and HB vaccines should be administered separately, with completion of both immunization series after travel (1).

Travellers already infected with Hepatitis C should receive HA and HB vaccines, if not already administered by their primary care provider (1).

HA, HB and HAHB vaccines may be administered concomitantly with other vaccines at different injection sites using separate needles and syringes (3).

Immune globulin

Vaccine is the preferred agent for pre-exposure prophylaxis for HA, therefore Ig should be used to prevent HA only in those for whom active HA vaccines are contraindicated, in immunocompromised individuals who may not respond adequately to the active vaccines or in infants under one year of age (1,3).

Co-administration of Ig and HA vaccine is not necessary (except possibly in immunocompromised individuals) and may result in an attenuated immune response to the HA vaccine (10,12,13).

There are no immunoglobulin preparations or effective vaccines available in Canada that provide protection against Hepatitis C, D or E virus (9,14-18).

For individuals with a high likelihood of prior exposure (e.g. long-term residence in a highly endemic region or history of a compatible illness) and for whom cost is a significant issue, it may be reasonable to assume immunity. It may be cost-effective to test adults who grew up in developing countries or Canadian-born adults born before 1945 for anti-HA IgG prior to travel, if time permits, and immunize only those susceptible (3,19,20).

Routine serology

Routine serologic testing after HA or HB vaccination is unnecessary except for HB among health care workers and immunocompromised travellers, who should confirm their seroprotection (3,21,22). Refer to the [Canadian Immunization Guide](#) for additional risk groups recommended to have pre-immunization serologic testing for HB.

Routine serologic testing of previously immunized travellers for anti-HBs (antibody to Hepatitis B surface antigen) IgG is not necessary unless they are health care workers who have never had their anti-HBs titres verified (3).

Personal protective measures

Travellers should be advised to do the following:

- Closely follow [food and water precautions](#) and wash their hands frequently to minimize the possibility of exposure to HA or Hepatitis E (23-25).
- Adopt safer sexual practices and avoid any voluntary skin piercing, such as tattooing, acupuncture and body piercings, to minimize the possibility of exposure to HB, Hepatitis C or Hepatitis D.
- Take great care when seeking medical or dental care requiring percutaneous or invasive procedures, to minimize the possibility of exposure to HB, Hepatitis C or Hepatitis D (1,21).

HB carriers travelling to Hepatitis D-endemic countries should be particularly vigilant in avoiding high-risk activities such as skin piercing and unsafe sexual practices (1).

Human immunoglobulin does not provide protection against Hepatitis C, Hepatitis D or Hepatitis E, and currently no vaccines targeting these infections are available.

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Conflict of interest

None declared.

Statement on poliovirus and the international traveller

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Abstract

Introduction: The World Health Organization declared the recent international spread of wild poliovirus a public health emergency of international concern on May 5, 2014. Temporary recommendations were issued to reduce the risk of further spread of the disease, focusing on countries currently exporting wild poliovirus and those with individuals infected with wild poliovirus but not exporting the virus to other countries. The purpose of this statement is to review the implications of the new temporary recommendations for Canadian travellers and to provide guidance for health care practitioners for the prevention of poliomyelitis (polio) in travellers from Canada.

Methods: This statement was developed by the Committee to Advise on Tropical Medicine and Travel (CATMAT) and is designed to complement the Canadian Immunization Guide, a comprehensive resource on immunization. CATMAT has taken into consideration both the need for protection and the potential for adverse effects of vaccination.

Background: Polio is a highly infectious, vaccine-preventable, viral disease. Though polio is asymptomatic in the majority of cases, in approximately 1% it attacks the central nervous system and leads to paralysis.

Epidemiology and risk to traveller: Canada was declared free of wild poliovirus in 1994 and cases since then have been associated with importations and very rarely (1 per 2.7 million doses) to vaccine-associated paralytic polio with the use of oral poliovirus vaccine. There is still a risk to travellers going to regions outside those in which polio has been eliminated.

Prevention: Routine vaccination of children and adults is recommended in Canada. Complete information about polio vaccine recommendations in Canada is available in the most recent version of the Canadian Immunization Guide. Travellers should ensure that they are vaccinated against polio before travelling to countries where polio is known or suspected to be circulating.

Introduction

The World Health Organization (WHO) declared the recent international spread of wild poliovirus [a public health emergency of international concern](#) on May 5, 2014 (1,2). This followed recent outbreaks of polio in 2013 due to imported cases in several countries that had previously eradicated the disease. In 1988, a global initiative to eradicate polio by 2000 was undertaken through a resolution adopted at the World Health Assembly. At that time polio was endemic in 125 countries on five continents. This marked the launch of the [Global Polio Eradication Initiative](#) set up by national governments, WHO, Rotary International, the Centers for Disease Control and Prevention, and the United Nations Children's Fund. By 1999, polio type 2 had been globally eradicated. By the onset of 2013, the incidence of polio had been reduced by 99%, only remaining endemic in three countries: Afghanistan, Nigeria and Pakistan (3,4).

In 2013, the Syrian Arab Republic, Cameroon and a number of countries in the Horn of Africa, including Somalia, Ethiopia and Kenya, had outbreaks of polio following importation from endemic countries (4). In addition, the virus has been detected in sewage samples in Israel, the West Bank and Gaza strip, but no cases have been reported

to date (4). Polio cases due to circulating vaccine-derived polio were reported in 2013 in Nigeria, Niger, Chad, Cameroon, Pakistan, Afghanistan, Somalia and Yemen.

In an attempt to limit further spread of polio, a coordinated international response was deemed essential. Temporary polio vaccination recommendations were issued under the 2005 International Health Regulations, to be reviewed after three months, focused on countries currently exporting wild poliovirus and countries with populations infected with wild poliovirus but not exporting the virus to other countries (1,2). These recommendations included direction on vaccination before international travel for residents and long-term visitors of these countries (for a [full description](#), see reference (1)). A list of countries with confirmed cases of wild polio can be viewed on the [Global Polio Eradication Initiative website](#) together with weekly updates on the epidemiological situation and a breakdown of the number of cases of wild poliovirus by country. The Public Health Agency of Canada also maintains an up-to-date travel health notice with a [global update on polio](#) (5). The purpose of this statement is to review the implications of the new temporary recommendations for Canadian travellers and provide guidance for health care practitioners for the prevention of polio in travellers from Canada.

Methods

This statement was developed by a working group of the Committee to Advise on Tropical Medicine and Travel (CATMAT). Each member is a volunteer, and none declared a relevant conflict of interest. The statement was developed to complement the thorough literature review and analysis conducted to develop the [National Advisory Committee on Immunization's](#) recommendations, available in the Canadian Immunization Guide, a comprehensive resource on immunization. CATMAT has taken into consideration the need for protection, vaccination requirements and the potential for adverse effects of vaccination.

Background

Polio is a highly infectious, vaccine-preventable, viral disease caused by one of three serotypes of human poliovirus: type 1, 2 and 3. Currently, polio is caused mainly by type 1, as type 2 was eliminated globally by 1999 and type 3 has nearly been eradicated. Clinical polio is more common among children less than five years of age but can occur in anyone who is not immune, regardless of age. It is spread from person to person, primarily via the fecal-oral route and less frequently through close personal contact with infected respiratory secretions or saliva.

The majority of those infected have no symptoms, but in approximately 1% of cases polio can attack the central nervous system and destroy the nerve cells that activate particular muscles, leading to paralysis. Most cases of polio are caused by naturally circulating virus in the environment (wild-type virus). In very rare cases, infection may be caused by the strains of virus found in the oral polio vaccine (OPV). Vaccine-associated polio, when it occurs (vaccine-associated paralytic polio), mostly follows immunization with OPV (about 1 per 2.7 million doses) but also occurs occasionally among close contacts of those vaccinated. OPV is not available in Canada, although it continues to be widely used internationally. The inactivated polio vaccine (IPV), which is used in Canada, cannot cause infection and does not cause vaccine-associated paralytic polio.

IPV consists of inactivated strains from all three poliovirus types. IPV triggers an excellent protective immune response in most individuals. However, it induces only very low levels of mucosal immunity; therefore, the ingested poliovirus can still multiply and be shed in the feces of those immunized with IPV.

A full description of the poliomyelitis vaccines authorized for use in Canada is available in the [Canadian Immunization Guide](#) (6).

Epidemiology of polio in Canada

The WHO declared Canada to be free of wild poliovirus in 1994 (7,8). The last indigenous case of wild poliovirus in Canada was in 1977 (6). Since then cases in this country have been associated with importations of wild polio

and the use of OPV. Between 1980 and 1995, 11 cases of vaccine-associated paralytic polio associated with OPV vaccine were reported in Canada (6). Since 1995/6, all vaccine programs switched from OPV to IPV. A full description of the epidemiology of polio in Canada is available in the [Canadian Immunization Guide](#) (6).

Risk to traveller

Until polio has been certified as globally eradicated, there is still a risk to travellers. There is little or no risk to travellers going to regions where polio has been eliminated, such as the Americas, Europe and the Western Pacific. The risk to travellers going outside of these regions is low and depends on factors such as length of stay, living conditions, and food and water hygiene at the destination.

Prevention

Vaccine recommendations for Canadian travellers

Independent of travel plans, routine vaccination of children and adults is recommended in Canada. A primary series of immunization for children is recommended at 2, 4, 6 and 12-23 months (generally given at 18 months of age) with a booster dose at age 4-6 years. Complete information about polio vaccine recommendations in Canada is available in the most recent version of the [Canadian Immunization Guide](#) (6), and the [provincial/territorial immunization schedules](#) are available on the Public Health Agency of Canada website.

IPV is the only vaccine currently available in Canada.

For travel to countries where polio is known to be circulating or countries at risk of importation of polio

Travellers with unimmunized infants/children should be advised to *seriously consider delaying travel* to areas where polio is endemic or outbreaks are occurring, ideally until full immunization has been obtained or until at least two doses of IPV have been received (90% seroprotection; see *Immunogenicity and safety of vaccine*).

Infants

- 1) If rapid protection is required, the first dose of DTaP-IPV-Hib or DTaP-HB-IPV-Hib vaccine can be given at 6 weeks of age.
- 2) The first three doses may be administered at intervals of 4 weeks.
- 3) Optimally, the fourth dose is given 12 months after the third dose.
- 4) The fourth dose may be given at a minimum interval of 6 months after the third dose in certain situations (e.g. travel) but must be administered at or after 12 months of age for sustained immunity.
- 5) If IPV vaccine is not available in the region to which the child is travelling, children may complete their series with OPV vaccine while travelling. Parents of children receiving OPV vaccine should be informed that infants can excrete poliovirus for a few weeks after vaccination (refer to *Immunogenicity and Safety of Vaccine*), so household contacts and caregivers of these infants should have up-to-date polio immunization. Caregivers should be instructed to wash their hands carefully after changing diapers. There is a small risk of vaccine-associated polio (approximately 1 per 2.7 million doses distributed).
- 6) If travel is imperative, the risks of an incomplete course of vaccination before travel must be communicated to the parents (see *Immunogenicity and Safety of Vaccines*).

Previously unimmunized children

- 1) Should start a primary series of an IPV-containing vaccine, with consideration given to an accelerated schedule (refer to [Schedule](#)) (6).

Unimmunized or incompletely immunized travellers should receive IPV-containing vaccine as appropriate for age and vaccination status (refer to the [Canadian Immunization Guide](#)).

Children with a complete primary series do not require additional doses of IPV vaccine before travelling.

For adults with a complete primary series, a single lifetime dose of polio-containing vaccine is recommended.

International travel temporary recommendations

- 1. Recommendations based on the WHO declaration of polio as a Public Health Emergency of International Concern. These recommendations are intended to prevent the spread of polio and not primarily to protect the individual traveller.**

Travellers who intend to stay in one of the designated polio-exporting countries or polio-infected countries for the long term (over four weeks) must comply with recent WHO recommendations to receive a dose of OPV or IPV between four weeks and 12 months before international travel.

Therefore, to exit one designated country or enter into another may require a polio booster, even if the adult booster dose has already been received and the traveller is considered to have been adequately immunized.

Countries currently exporting wild poliovirus are **Pakistan, Equatorial Guinea, Cameroon and the Syrian Arab Republic**, and those infected with wild poliovirus but not currently exporting are **Afghanistan, Ethiopia, Iraq, Israel, Somalia and particularly Nigeria**. The WHO has developed [frequently asked questions for travellers](#) about the temporary recommendations (9).

- 2. Travel to India**

The [Ministry of Health and Welfare, Government of India](#), has issued requirements for visitors from their own list of polio-endemic countries and those with imported cases of polio to have proof of vaccination with OPV before entry to India, and for Indian residents to have proof of vaccination with OPV before travelling to those same countries (10).

This requirement is not mandatory for Canadian citizens (i.e. foreign nationals) and Canadian travellers, either for entering or exiting India or for transiting through polio-infected countries.

- 3. Polio vaccination record**

It is recommended that travellers affected by these temporary recommendations carry a written vaccination record in the event that evidence of vaccination is requested for country entry or exit requirements (11). The International Health Regulations 2005 [International Certificate of Vaccination or Prophylaxis](#) is the official document to show proof of vaccination against polio. It is currently available at yellow fever vaccination centres in Canada. [A complete list of these centres](#) is available on the Public Health Agency of Canada's website.

The Public Health Agency of Canada has developed guidelines for completing the [International Certificate of Vaccination or Prophylaxis](#).

Immunogenicity and safety of vaccine

Studies have shown that between 89% and 100% of infants vaccinated with IPV in a two-dose schedule (2 and 4 months) and 93%-100% of infants given a three-dose schedule (2, 3 and 4 months) developed seroprotective antibodies one month after the last dose. This is compared with close to 100% seroprotection with a 2, 4, 6 and 12-18 month schedule (12).

Adverse events following IPV are usually limited to mild injection site reactions. Serious adverse events are rare following immunization with IPV-containing vaccines and, in most cases, data are insufficient to determine a causal association. Anaphylaxis may occur but is very rare (6).

Vaccine strains of polio can be present in the throat for one to two weeks and can remain in feces for several weeks following immunization with OPV. In some rare cases, including cases in immunocompromised people, polio (from natural infection or OPV vaccine) can be excreted for prolonged periods of time (from greater than six months to a number of years). A full description of the safety of the vaccine is available in the Canadian Immunization Guide.

Non-immune people can be “passively immunized” by coming into contact with the OPV vaccine strains, usually in feces. IPV immunization does not lead to vaccine strain shedding.

Immunocompromised travellers

IPV can be administered to immunocompromised travellers. Immunocompromised individuals who will be staying for over four weeks in a country that requires a booster for exit should not receive OPV. They may benefit from having a letter of exemption if OPV is the only vaccine available in that country.

Hygiene interventions

Travellers should be advised to practise good hygiene interventions, including frequent hand washing, to reduce the risk of transmission of polio during travel.

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Conflict of interest

None declared.

Infectious disease news briefs

Short summaries of recently published infectious disease articles

Management of chronic Hepatitis B infection: Current treatment guidelines, challenges, and new developments

Current international guidelines recommend first-line treatment of chronic Hepatitis B (HB) infection with pegylated interferon, entecavir or tenofovir, but the optimal treatment is contentious. Increasing evidence suggests that HB genotyping, as well as serial on-treatment measurements of HB surface antigen and HB DNA kinetics, should be used to predict and follow antiviral treatment response. A sustained virological response may be increased by extending treatment duration and using combination therapy.

Tang C, On Yau T, Yu J, World J Gastroenterol 2014 May 28; 20(20): 6262-6278

Committee to Advise on Tropical Medicine and Travel (CATMAT) members mourn C. William (Bill) Jeans

Dr, Bill Jeanes, CATMAT Emeritus Member, died on July 1, 2014. He was one of the founding members of CATMAT and attended CATMAT meetings for 24 years. His depth and breadth of experience and vision will be missed.

<http://www.legacy.com/obituaries/ottawacitizen/obituary.aspx?n=c-william-l-jeanes-bill&pid=171615810>