Hepatitis A in British Columbia, 2010 – 2011

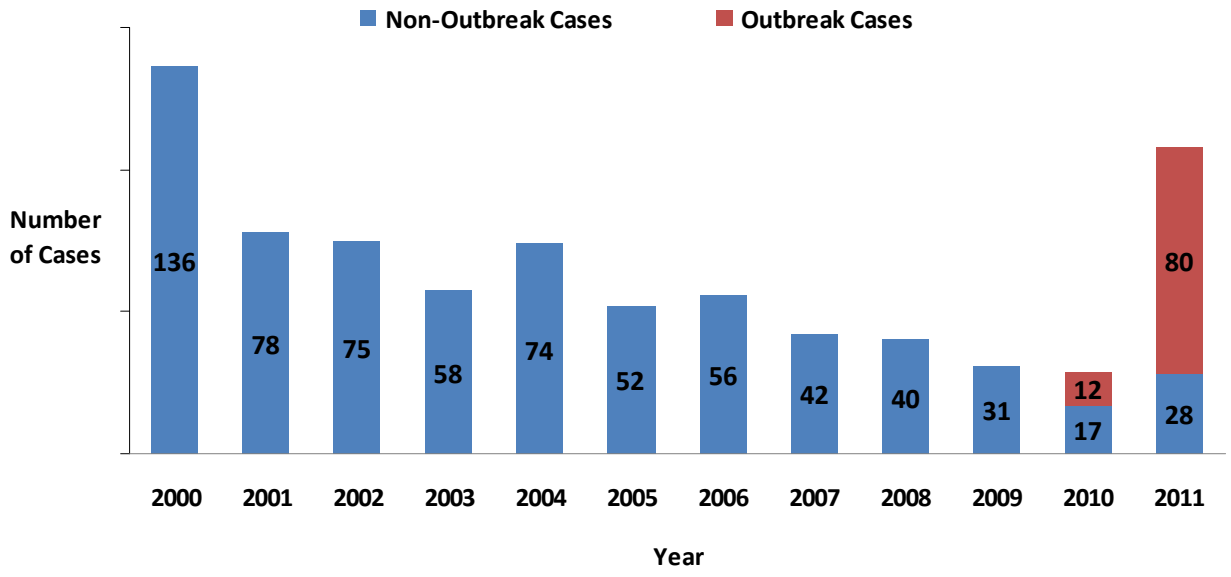
This report summarises confirmed cases of acute hepatitis A infection reported in British Columbia (BC) in 2010 and 2011. There was a large outbreak on Vancouver Island which began in July 2010 in and was declared over in March 2012. This report mainly focuses on those cases not associated with the Vancouver Island Health Authority (VIHA) outbreak, and/or will consider the outbreak cases separately.

There has been an overall downward trend in the incidence of reported hepatitis A in BC over the last decade (Figure 1). The sharp increase in incidence seen in 2011 is due to the large outbreak in VIHA. There were 92 confirmed and probable cases of hepatitis A related to this outbreak reported between July 1 2010 and December 31 2011. Cases occurred across all three Health Service Delivery Areas on Vancouver Island. Twelve cases occurred between July and December 2010 and 80 from January to December 2011.

In contrast, there were 17 and 28 reported cases of hepatitis A in BC in 2010 and 2011, respectively that were not epidemiologically or genotypically linked to the VIHA outbreak. Thus, for the non-VIHA outbreak cases in 2010 and 2011, hepatitis A incidence has remained low.

Data were obtained from the integrated Public Health Information System (iPHIS) (extracted May 2012); line lists were kept at the British Columbia Centre for Disease Control (BCCDC); communications with individual Health Authorities; and PEOPLE 36 (extracted May 2012). For the purposes of this report, the 92 cases from the VIHA outbreak will be referred to as *outbreak cases* and all other cases reported in BC, including other clusters, as *non-outbreak cases*.

Figure 1. Cases of Hepatitis A Reported in iPHIS, BC, 2000-2011



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Age & Gender Data for 2010-2011

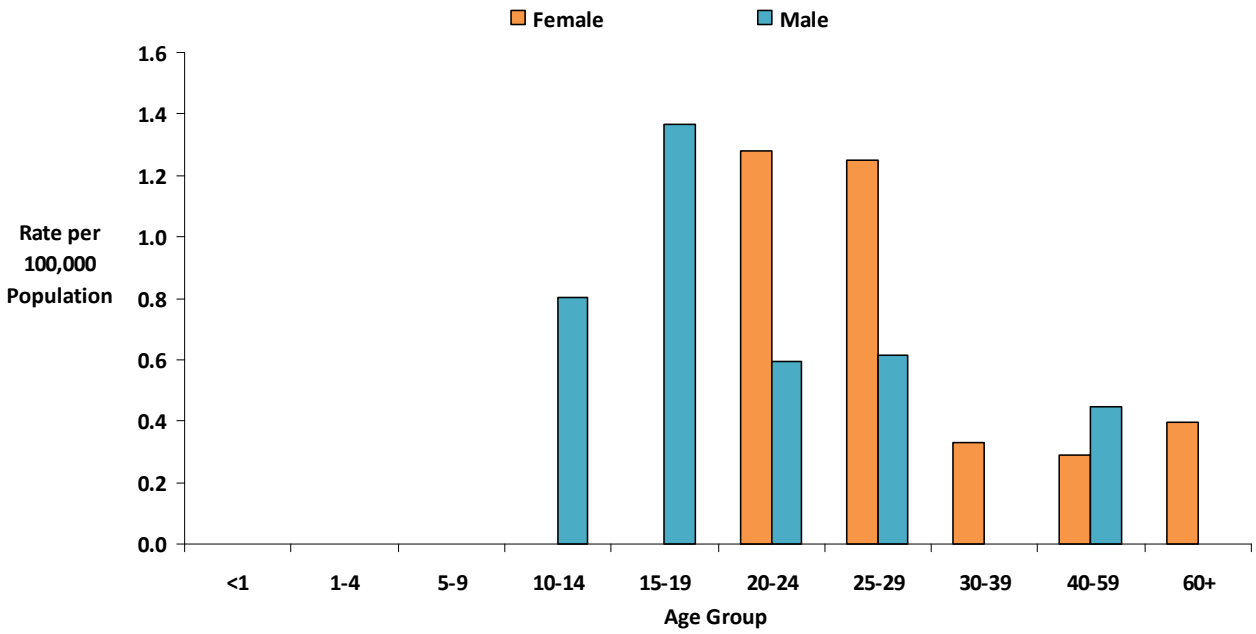
Table 1 lists basic summary statistics on gender and age for 2010 and 2011 non-outbreak cases.

Table 1. Age Distribution among Hepatitis A Cases (non-outbreak cases), Total and by Sex, BC, 2010 – 2011 (N=17 in 2010 and N=28 in 2011)

	2010 Females	2010 Males	2010 Total		2011 Females	2011 Males	2011 Total
Number (%) of Cases	9 (53%)	8 (47%)	17 (100%)		14 (50%)	14 (50%)	28 (100%)
Mean Age (years)	42	29	36		29	31	30
Median Age (years)	36	25	27		24	28	26
Range (years)	20-73	14-47	14-73		2-60	10-67	2-67
Number (%) ≤ 19 years	0	3 (100%)	3 (100%)		5 (56%)	4 (44%)	9 (100%)

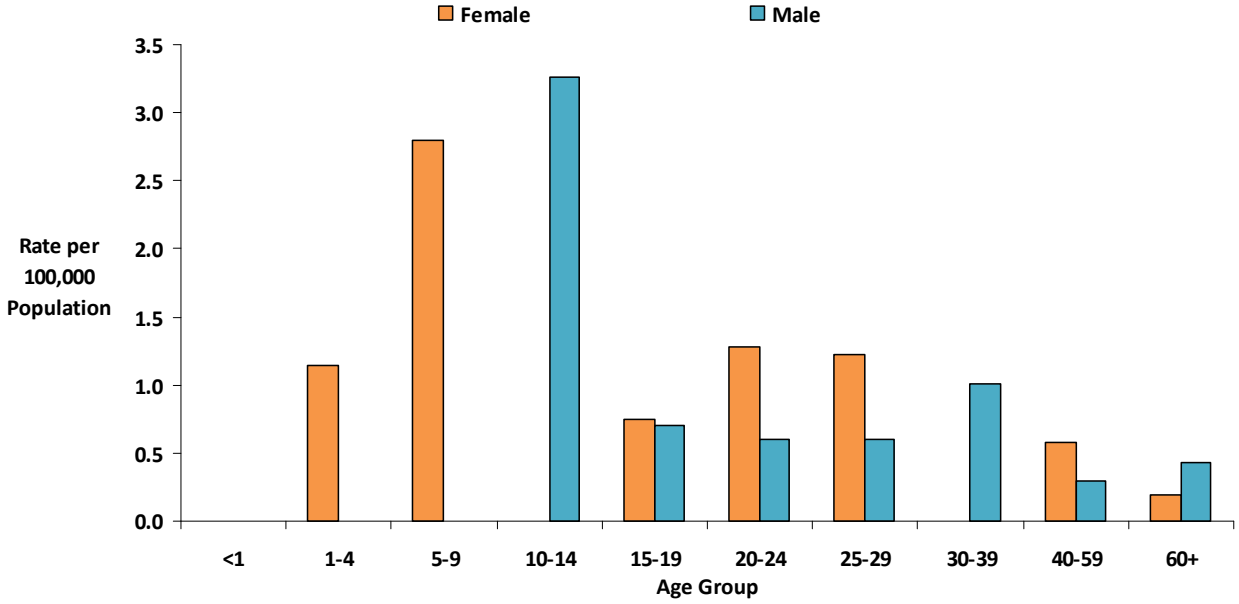
The non-outbreak cases are typically adults with an even distribution of males and females in both years. Outbreak cases have a similar sex distribution in which 53% of cases were female (data not shown). Individuals 19 years old or younger made up 18% of the non-outbreak cases in 2010 and 32% in 2011.

Figure 2. Incidence of Hepatitis A (non-outbreak cases), by Age Group and Sex, BC, 2010 (N=17)



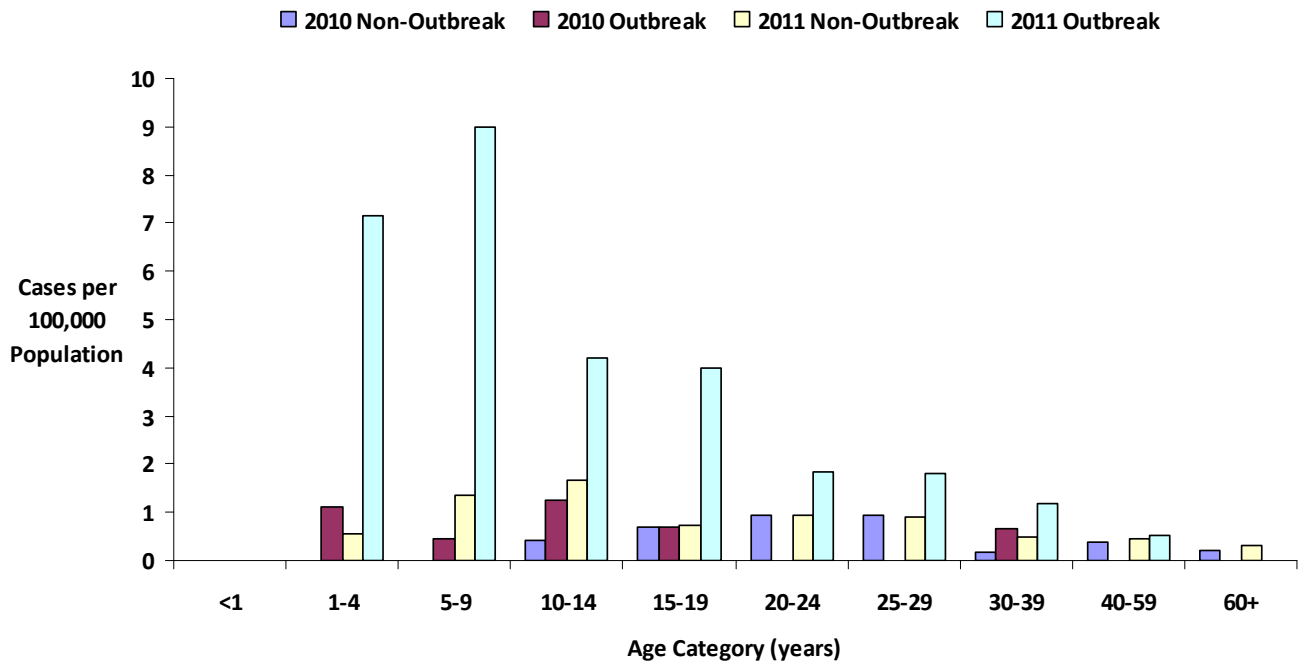
Overall, hepatitis A incidence in 2010 is highest among teen males, 15-19 years, and young adult females, 20-29 years. In 2010, there are no cases under 10 years of age. Those aged 10-19 years make up 18% of cases in 2010.

Figure 3. Incidence of Hepatitis A (non-outbreak cases), by Age Group and Sex, BC, 2011 (N=28)



In 2011, male incidence is highest among those aged 10-14 years and female incidence was highest in children 5-9 and 1-4 years old with a smaller peak in young women 20-29 years. Those under 20 years of age make up 32% of cases in 2011.

Figure 4. Hepatitis A Rates, by Age Group, Year, and Category, BC, 2010 – 2011



Figures 4 demonstrates the incidence rates in 2010 and 2011 of both outbreak and non-outbreak cases, per 100,000 population, according to age group.

Symptoms of hepatitis A infection are often mild or asymptomatic in children, thus, illness may go undetected. Children may be viremic for longer than adults and settings with diaper change requirements are of increased risk. These factors may play a role in disease transmission. Among the non-outbreak cases in 2010, there are no reported cases under 10 years of age. In 2011, incidence is highest among those aged 10-14 years, followed by 1-4 years and young adults 20-29 years.

Among the outbreak cases in 2010, incidence peaks among children 1-4 and 10-14 years. Among the outbreak cases in 2011, incidence is very high, 9 cases per 100,000 population, among 5-9 year olds and >7 cases per 100,000 population among 1-4 year olds.

Of the 92 VIHA outbreak cases reported in 2010 and 2011 combined, 62 (69%) were in persons less than 20 years old. This is significantly higher than the BC historical average, from 2000-2009, in which 23% of cases were less than 20 years of age.

Health Authority Data for 2010-2011

Figure 5. Number of Hepatitis A Cases (non-outbreak), by Health Authority and Year, BC, 2010 – 2011 (N=17 in 2010 and N=28 in 2011)

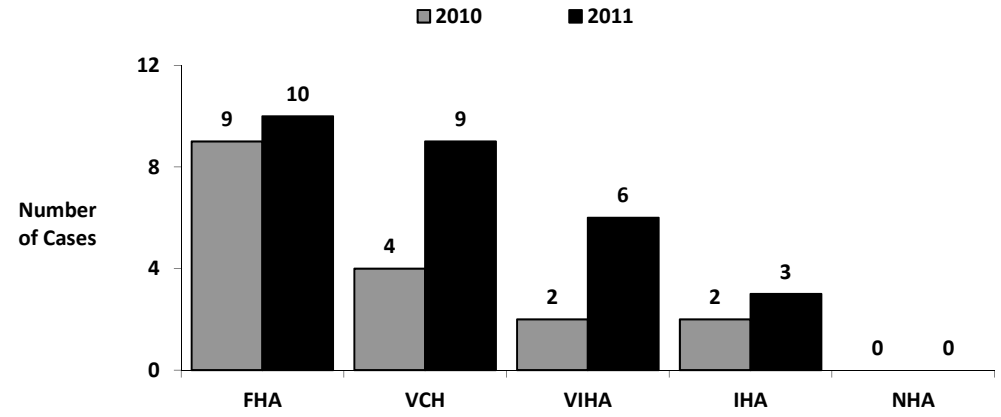
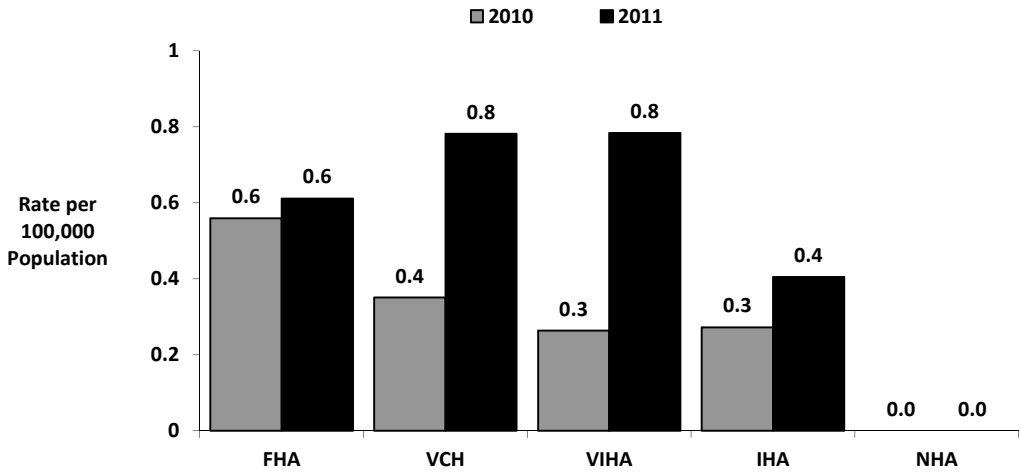


Figure 6. Incidence of Hepatitis A (non-outbreak), by Health Authority and Year, BC, 2010 – 2011 (N=17 in 2010 and N=28 in 2011)



While the rates for Fraser, Interior and Northern were relatively stable over the two year period of 2010 – 2011, the 2011 rate in Vancouver Coastal was 2x that of 2010 and Vancouver Island's 2011 rate was 2.7x over that of 2010. This may be accounted for by proximity to and/or communication with the VIHA outbreak region, perhaps increasing awareness of the disease by both health staff and general public, leading to more reporting of the disease. However, overall numbers are small and therefore rates can be unstable.

Exposure & Travel Data for 2010-2011

Figure 7 demonstrates case exposure categories, among 2010 and 2011 non-outbreak cases, as follows:

1. *Foreign Travel (Endemic Country)* includes those cases who traveled to a country in which hepatitis A is considered endemic and for whom this travel was considered to be their exposure to the disease (n=25).

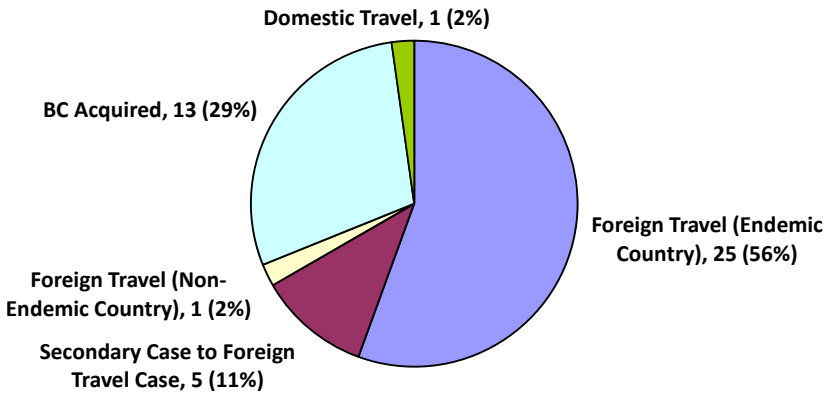
    a. *Secondary Case to Foreign Travel Case* refers to persons who became ill in BC and for whom their only exposure was household contact with a person with confirmed foreign travel-related hepatitis A (n=5). In all cases this was a traveller to an endemic country.

2. *Foreign Travel (Non-Endemic Country)* includes those cases who traveled to a non-endemic location outside of Canada, and for whom no other possible exposure was identified (n=1). This case travelled to the US.

3. *Domestic Travel* includes those cases who traveled outside BC but within Canada and for whom no other exposure was identified (n=1). This case travelled to Saskatchewan.

4. *BC Acquired* includes those cases who spent the exposure period within BC and for whom no other exposures were identified (n=13). This includes a cluster of four cases linked to each other by geography and viral genetics in which a common original exposure is likely but was not identified.

Figure 7. Hepatitis A Cases by Exposure Category*, BC, 2010 – 2011 (N=45, 17 in 2010 and 28 in 2011) (*as defined in 1-4 above)

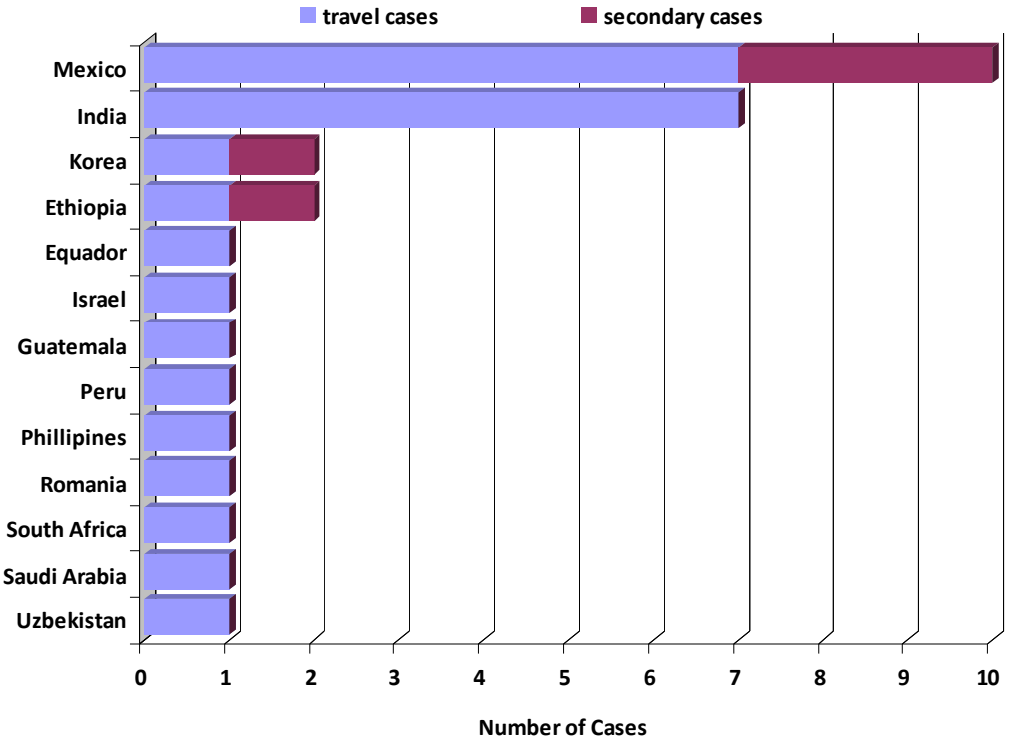


From 2010-11, 29% of cases spent their exposure period in BC with no other exposures identified, so are considered BC acquired. Some misclassification is still possible if, for example, BC acquired cases were unknowingly exposed to a travel case or contaminated food from an endemic country. Travel to an endemic country is the most common exposure, with 56% of cases having travelled to an endemic country and another 11% exposed through household contact with those cases after return to BC.

Among the thirteen BC acquired cases, there was a cluster of four cases identified in a South Vancouver Island community in 2011 (three cases with the identical viral genotype and sequence and one case without genotyping/sequencing data, but epidemiologically- linked) for whom no specific shared exposure was identified. This cluster was likely identified due to the increased attention to sequencing during the VIHA outbreak. Cases secondary to travel cases were also confirmed by genotyping and sequencing. Another cluster of four cases with potential epidemiologic links to the VIHA outbreak was ruled a travel case with secondary transmission to household members based on sequencing results.

Figure 8 demonstrates the endemic countries in which cases in 2010 and 2011 were reported to have travelled during their exposure period. Mexico and India, were the two countries most commonly reported in both years.

Figure 8. Hepatitis A Cases Related to Foreign Travel to an Endemic Country (Travel Cases and Secondary Cases), 2010 & 2011, BC (N=30, 25 travel cases and 5 secondary cases)



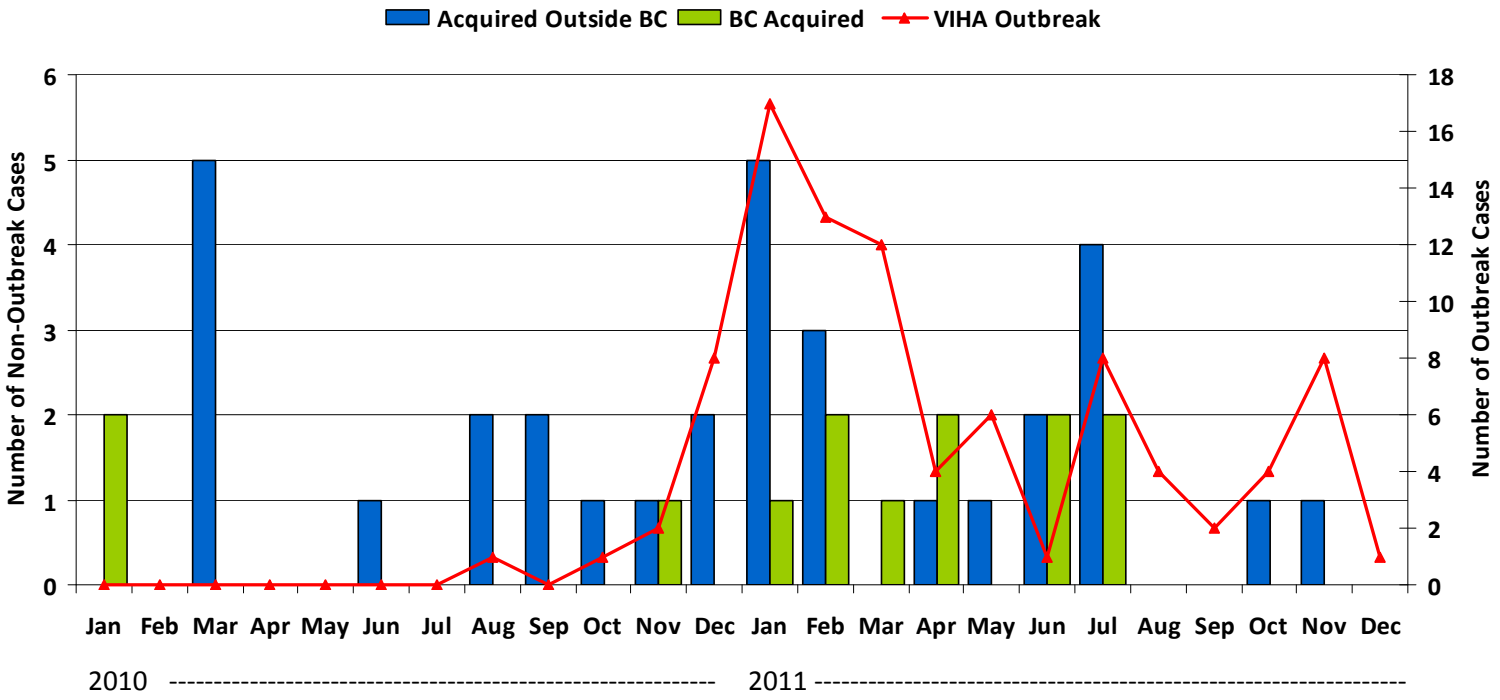
While available follow-up data showed some of the travel cases occurred among vacationers, others were families visiting, or having visitors from, their country of origin. However, this data is not consistently collected. For the seven cases visiting India during their exposure period, three were under 19 years and six were visiting family. Among the seven cases visiting Mexico during their exposure period, six were vacationing at resorts. Two Mexico travel cases in 2011 were found to have the same genotype and genetic sequence. The cases were from different health authorities, travelled on non-overlapping dates, but stayed in the same resort in Mexico.

Very little seasonal variation was seen in across the low number of 2010 cases. However, 2011 travel cases occurred in the typical pattern with summer (Jun-Aug) and winter (Dec-Feb) peaks. 75% of the winter cases were related to travel to Mexico and India (not shown).

2010 & 2011 Cases by Month

Figure 9 shows hepatitis A cases by month from January 2010 to Dec 2011. Cases are divided into: 1) those acquired in BC, for whom no other exposure was identified (n=13); 2) those acquired outside of BC or secondary to a travel case (n=32); 3) and those epidemiologically linked to the VIHA outbreak (n=92).

Figure 9. Number of Hepatitis A Cases, by Month and Category, BC, 2010 – 2011



Cases that spent their exposure period outside of BC (blue) peaked in March 2010 and again in January and July 2011. Cases that spent their exposure period in BC (green) only occurred in January and November of 2010 and in 2011 during the first half of the year. The first reported case in the VIHA outbreak occurred in the summer of 2010 and continued until a clear peak in January of 2011 with cases persisting throughout 2011. The last VIHA outbreak case occurred in December 2011 and the outbreak was declared over in March 2012.

Summary

2010 – 2011 Cases

Excluding the VIHA outbreak cases, rates of hepatitis A continued to be low in BC with 17 cases in 2010 and 28 in 2011. Travel to countries with endemic hepatitis A is the most commonly reported exposure with Mexico and India as the most commonly reported countries.

It is important to note that hepatitis A cases may be underreported by a factor of up to seven times [1], so increased awareness of the disease, such as during the VIHA outbreak, may increase the number of reported cases. This phenomenon may partly explain the increase in the number of cases in 2011 over 2010.

Vancouver Island Outbreak

2010 and 2011 have differed from the several preceding years in terms of overall hepatitis A incidence because of the large, extended outbreak occurring on Vancouver Island. There are 92 confirmed and probable cases epidemiologically-linked to this outbreak between July 2010 and December 2011. In response to this outbreak, hepatitis A vaccination was made available in January 2011 to Aboriginal individuals aged 6 months to 18 years of age who lived in VIHA. In January 2012, a province-wide hepatitis A immunization program was introduced for Aboriginal individuals from 6 months to 18 years of age.

Among the VIHA outbreak cases, incidence in children under 10 years is very high while the peak incidence among non-outbreak cases tends towards older children and adolescents and young women, suggesting differences in transmission dynamics between the outbreak cases and the non-outbreak cases.

Data Limitations and Recommendations

The data analysis presented above was limited by missing or incomplete data entry in the electronic (iPHIS) records. The following points outline challenges that were encountered in gathering and analysing data for this report, and make suggestions on how these challenges could be avoided or reduced:

- Reporting of travel information (type of travel, country of travel and dates of travel) into iPHIS for enteric diseases including hepatitis A has been agreed upon by the BC Enteric Policy Working Group, which has representation from all Health Authorities. However data relating to the travel exposures was missing or not specific for about half of the non-VIHA outbreak cases. For example, some cases were coded as 'TRAVEL – OUT OF COUNTRY', without further details on which country or countries were visited. Travel details are necessary to identify patterns in the incidence of hepatitis A in travellers returned from endemic countries, and cases who report no travel in order to identify non-travel related clusters early. Where this information was obtained by communication with individual health authorities it was requested that missing information be entered into the iPHIS.

- All relevant potential local exposures should be listed in the primary database to allow directed and expedient investigation of clusters of cases. In some cases, no epidemiological link between cluster cases was listed, even though such data was available and sometimes found in other databases (separate line lists or PARIS database).

- Data relating to an identified case should be recorded in iPHIS in a timely manner to allow effective surveillance and intervention programmes as needed. Furthermore, care is needed to ensure that all cases of hepatitis A, and no cases of other viral hepatitides or influenza A are entered into iPHIS as hepatitis A in error.

Discussion

The incidence of reported hepatitis A in British Columbia has dramatically declined since 1999. This has been attributed to identification of groups at risk for hepatitis A and offering immunisation to high-risk groups, including men who have sex with men, persons who inject drugs, and those with hepatitis C [2-4]. Due to the increased immunisation coverage of high-risk groups, the epidemiology of hepatitis A has changed. Travel to hepatitis A endemic countries by unimmunised people is now the most common exposure.

Furthermore, from the data for 2010 and 2011 we found cases occur among both vacationers returning from endemic areas and individuals returning from visiting their country of origin / family's country of origin. Although pre-travel immunisation is recommended for unimmunised people traveling to hepatitis A endemic countries, it is not publicly funded. Therefore barriers to immunisation may be financial or due to lack of awareness of risk, perhaps based on the misconception of immunity due infection in childhood.

The World Health Organisation classifies many countries as being areas where hepatitis A is endemic, therefore, it is important that hepatitis A education and promotion of pre-travel immunisation become part of routine travel preparation, pointedly including those who are traveling to their endemic countries of origin.

Education and promotion may include public health announcements and educational bulletins through multiple avenues of communication, including the traditional media, travel-related websites and travel agents. Further work related to improving messages and resources for travelers to prevent enteric infections is currently underway in BC.

Viral genotyping and sequencing capacity for hepatitis A virus has increased in recent years. Currently in BC, 75% of all positive hepatitis A samples are analyzed by the National Microbiological Laboratory (NML). During 2010 and 2011, there was increased focus on the viral genotyping and sequencing data as an adjunct to the epidemiologic data available. Some clusters and cases secondary to travel cases were confirmed based on genotype and sequence matches. However, communication of viral typing and sequencing data is largely ad-hoc and, going forward, processes need to be developed for effective communication of results to the Health Authorities and documentation in iPHIS.

References

1) Armstrong GL, Bell BP. Hepatitis A virus infections in the United States: model-based estimates and implications for childhood immunization. Paediatrics 2002;109:839-45.

2) Pollock SL, Sheikholeslami A, Edgar B, David ST, Buxton JA. The changing epidemiology of hepatitis A in British Columbia: using Health Authority follow-up data to inform policy and practice. CCDR 2006; Vol. 32(20). http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/dr3220b-eng.php

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4) HealthLinkBC. Hepatitis A Vaccine information page. File #33, January 2012. http://www.healthlinkbc.ca/healthfiles/hfile33.stm