



2013

Communicable Disease Unit

Annual Report

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Abbreviations

AEFI: Adverse event following immunization
BCCDC: British Columbia Centre for Disease Control
CD: Communicable disease
CIHS: Community Integrated Health Services
GI: Gastrointestinal infection
HBV/HCV: Hepatitis B/C virus
HIV/AIDS: Human immunodeficiency virus/Acquired immunodeficiency syndrome
HP: Health Protection
HSDA: Health Service Delivery Area
IHA: Interior Health Authority
MHO: Medical Health Officer
MMR: Measles, mumps, rubella
PH: Public health
RI: Respiratory infection
RPEP: Rabies post-exposure prophylaxis
STI: Sexually-transmitted infection
TB: Tuberculosis
TCS: Thompson Cariboo Shuswap
WNV: West Nile virus

1. Executive Summary

1.1 Communicable Disease Unit

The primary focus for the Communicable Disease Unit (CD) Unit for 2013 was on the development of new partnerships and maintenance of existing collaborations. One focus was on TB surveillance including the Central Okanagan TB outbreak, as well as working on a Service Level Agreement between Interior Health Authority (IHA) and BCCDC TB Control. The interdisciplinary team at the CD Unit continues to welcome students and project staff for learning and short term assignments.

Notable 2013 highlights included:

- Revised the IHA gastrointestinal infection outbreak guidelines
- Adopted Panorama application for adverse events following immunization (AEFI) reporting and Medical Health Officer (MHO) recommendations
- Revised respiratory infection outbreak guidelines using standard scenario-based facility risk
- Revised animal contact guidelines
- Implemented provincial enhanced severe influenza surveillance and reporting
- Collaborated in an interprovincial *Escherchia coli* outbreak related to unpasteurized cheese
- Partnered with the development and implementation of the new STOP HIV program
- Hired new regional harm reduction coordinator
- Co-chaired the Provincial TB Strategic Plan Implementation Committee and the Provincial TB Nurse Advisory Committee
- Celebrated retirement of founding manager of the CD Unit, Denise McKay

1.2 Disease Activity Highlights, 2013

- Annual incidence of verotoxigenic *E. coli* infection and mumps significantly increased from historic averages, due to outbreaks in IHA.
- An outbreak of pertussis occurred in Kootenay Boundary, with 51 cases.
- An outbreak of mumps occurred in Thompson Cariboo Shuswap and Kootenay Boundary.
- Compared to last year, there was a significant increase in reported chlamydia cases in Kootenay Boundary.
- Influenza rate significantly increased in 2013, with 171 influenza A(H1N1)pdm09 cases visiting acute care facilities reported in IHA during a period of enhanced surveillance.

2 Communicable Disease Unit

2.1 Introduction

The CD Unit is the centralized reporting centre for all cases of reportable CD within IHA. It was established in 2007 and is responsible for surveillance of reportable CDs, case follow-up, contact and outbreak management, program and policy development, education, research and evaluation, and preventive health promotion.

<p>Vision: <i>Excellence in communicable disease control and management.</i></p> <p>Mission: <i>Promoting health by preventing, controlling and mitigating the effects of reportable communicable diseases.</i></p>

CD prevention and control requires an interdisciplinary team approach. The CD Unit continues to be aligned with the Office of the Medical Health Officers (MHO) under the Vice-President of Medicine and Quality as an independent department. Working in close collaboration with all other IHA portfolios to fulfill its mandate, CD services are provided to IHA residents and physicians, and other IHA programs as required.

2.2 Services

Services to residents include:

- Case investigation for a confirmed or suspect reportable CD
- Contact identification following confirmation of a CD case
- Implementation of public health (PH) measures to mitigate the effects
- Education to prevent further exposures
- Collaboration with primary care provider and other partners for case and contact management

Services to all IHA portfolios include:

- Consultation with Health Protection (HP), Community Integrated Health Services (CIHS), and Occupational Health staff around case definition and risk of transmission
- Education and consultation to maintain CIHS Promotion and Prevention staff and HP capacity to deal with CD case and contact management and outbreaks
- Coordination and management of outbreaks
- Development of protocols and guidelines for use by field staff
- Reporting and MHO recommendations for Adverse Events Following Immunization (AEFI)

Services to primary care practitioners

- Consultation around case reporting and follow-up
- Education and consultation (reporting and referrals)
- Coordination of contact tracing and prophylaxis

Services to Infection Prevention and Control

- Assistance with outbreak surveillance and management
- Development of protocols and guidelines to support mutual responsibilities

2.3 Projects and Initiatives

In 2013, the CD Unit continued to work towards achievement of the goals set out in the 2011 strategic plan.

CD Unit Goals (2011 – 2015)
1. Standardize CD control programs across IHA
2. Mitigate effects attributed to CD cases and outbreaks
3. Reduce risk to IHA population from CDs
4. Efficient and effective use of public health and IHA resources
5. CD Unit and PH staff have the required skills to manage CD
6. IHA CD programs support aboriginal communities programs
7. Reduce the impact of chronic CD infections on individuals and society
8. IHA residents and stakeholders are knowledgeable about emerging communicable disease issues

2.4 CD Unit Team

The CD Unit is comprised of an interdisciplinary team of registered nurses, environmental health officers, a Clinical Manager, a MHO and administration staff. The diversity of the team allows it to respond to cases of reportable CDs such as hantavirus and meningococcal meningitis, or community outbreaks such as measles and Legionnaires disease, with the goal of mitigating the effects of these events on the population of IHA.

2.5 Future Directions

In 2014 and beyond, the CD Unit will enhance current data management flow and processes, continue to focus on surveillance initiatives, process and outcome evaluation, utilize knowledge to inform policy

and program change, support CD specialist portfolio work, and maintain and strengthen internal and external partnerships and collaborations.

3 Analyses of Disease Trends

The CD Unit monitors disease trends and publishes a monthly report of case numbers and variances. Appendix 1 provides a 5-year trend of selected disease rates within IHA and BC. All disease incidence rates reported here are based on passive surveillance and are, therefore, underestimates of the true incidence in the population.

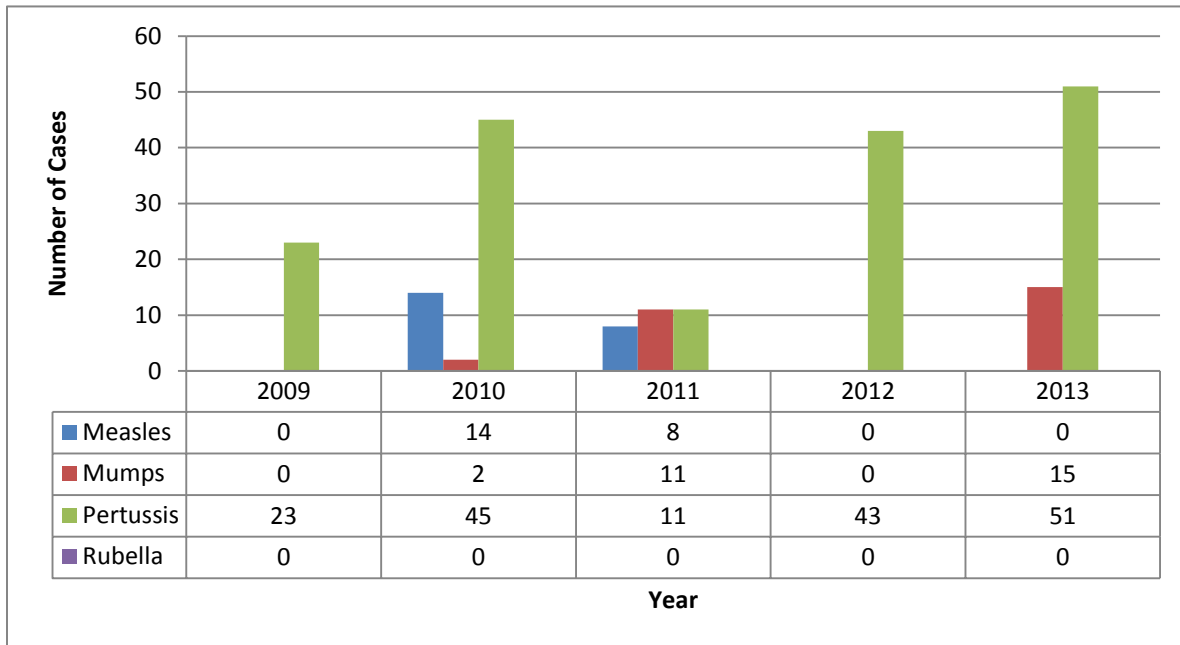
This section includes 2013 summaries of a) communicable diseases relevant to the population within Interior Health, b) select disease prevention programs, and c) GI and RI outbreaks. *Unless otherwise stated, data sources used in the following sections include IHA CD Unit surveillance spreadsheets and BCCDC Cognos data cubes.* Epidemiological reports of a mumps outbreak and a pertussis outbreak that occurred in 2013 are provided in Appendices 2 and 3.

3.2 Vaccine-Preventable Diseases

Vaccine-preventable diseases are diseases for which publicly funded, effective vaccines are readily available and used for disease prevention. In BC, these vaccines include diphtheria, tetanus, pertussis, hepatitis B, polio, *Haemophilus influenza* type B, pneumococcal conjugate C, meningococcal conjugate C, measles, mumps, rubella, varicella, rotavirus, human papilloma virus, and influenza.

While there were no reported cases of measles or rubella in 2013, there were cases of pertussis and mumps (Figure 1). Incidence and outbreaks of these diseases are briefly described below.

Figure 1: Vaccine-Preventable Disease Cases in IHA, by disease, 2009 to 2013



3.2.1 Measles

Following two years of increased measles activity in IHA in 2010 and 2011, there were no reported cases of measles in IHA or BC in 2012 and 2013. The CD Unit continues to monitor for measles activity occurring provincially, nationally, and internationally, due to the ongoing risk of importation of measles from endemic countries or regions where outbreaks are occurring. Measles is a highly contagious disease but can be prevented by immunization.

3.2.2 Mumps

A mumps outbreak affected 3 cities spread out across the region: Salmon Arm, Merritt, and Trail from October 30, 2013 through December 28, 2013. In total, 15 cases were reported, all associated with hockey teams. Most Merritt and Salmon Arm cases and one Trail case played hockey within the same league (9 cases in total). The remaining 6 cases had laboratory confirmation and/or an epidemiological link to other cases. Among the 14 cases that were born after 1970 (assumed to be immune), six of them had two documented measles, mumps, rubella (MMR) vaccination doses prior to the outbreak; the remainder had one documented dose, except for the outbreak index case who reported to have no MMR vaccination. The single case born before 1970 had recalled childhood MMR vaccination but had no documentation. The epidemiological summary of the outbreak is in Appendix 2.

There were no sporadic mumps reported in IHA in 2013. The previous 5-year average incidence of mumps in IHA was 0.5/100,000. This year's incidence of 2.1/100,000 represented a very significant

increase over the previous 5 years ($p < 0.001$), but was not significantly greater than the incidence in BC in 2013.

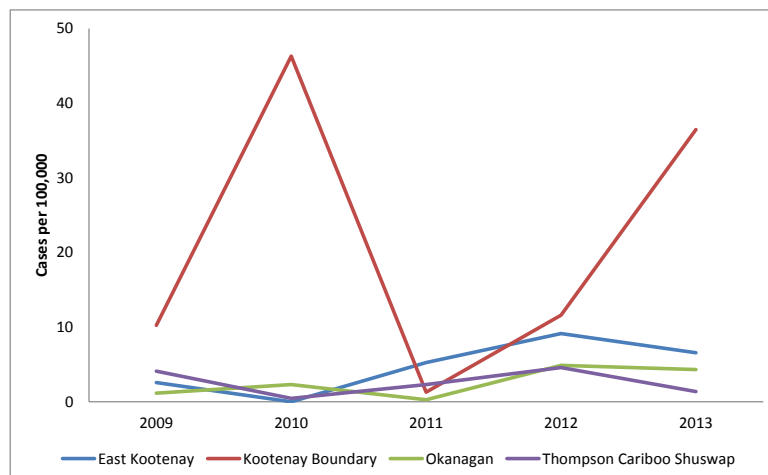
3.2.3 Pertussis

In 2013, the number of pertussis cases remained stable or decreased slightly from the previous year in 3 of the 4 Health Service Delivery Areas (HSDAs) (Figure 2). There were 28 cases reported in an outbreak in Kootenay Boundary from June through November, 2013, which is 55% of the total number of cases in IHA in 2013 ($n = 51$). Seventy-nine percent of the outbreak cases lived in Trail or Rossland and all but one case lived within 100 km of the southern border of IHA. The epidemiological summary of the outbreak is in Appendix 3.

All of the 2013 pertussis cases reported in Kootenay Boundary ($n = 28$) or in East Kootenay ($n = 5$) were reported within the outbreak period (June through November). In contrast, the majority of cases (59% of 18 cases) reported in TCS and the Okanagan occurred between January and March, which is outside of the historical peak months for pertussis in BC (August to November¹).

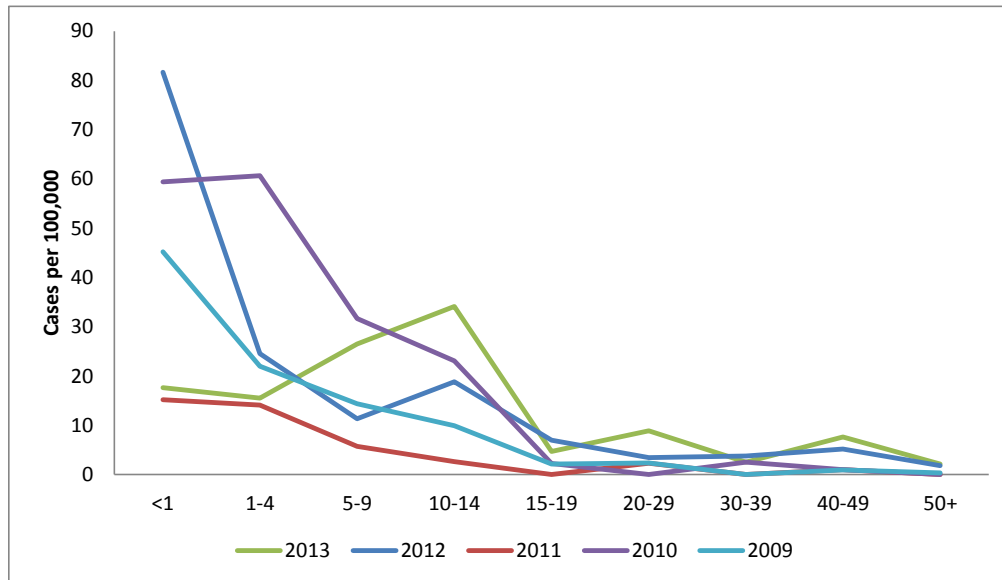
The incidence of pertussis in IHA during 2013 was 7.1/100,000 and the average over the previous 5 years was 3.6/100,000 however this does not represent a significant difference. Furthermore, compared to the BC rate (8.7/100,000), the 2013 pertussis incidence in IHA was not significantly different ($p > 0.05$). During the 6 years from 2008 through 2013, pertussis incidence in IHA has been significantly influenced by the incidence in Kootenay Boundary (correlation $R^2 = 0.70$, $p = 0.04$). In previous years, pertussis has targeted young children < 5 years of age, but in 2013, older children from 5 to 14 years of age were more strongly impacted (Figure 3).

Figure 2: Pertussis incidence by Health Service Delivery Area, Interior Health Authority, 2009 - 2013



¹ Skowronski D, De Serres G, MacDonald D, Wu W, *et al.* 2002. The changing age and seasonal profile of pertussis in Canada. *J Inf Dis.* 185:1448-1453.

Figure 3. Pertussis incidence by age group and year, Interior Health Authority, 2009 – 2013



3.2.4 Rubella

In 2013, there were no cases of rubella reported in IHA or BC overall. The last reported case of rubella in IHA was in 1998.

3.3 Enteric, Foodborne, and Waterborne Diseases

3.3.1 Incidence of Reported Enteric Diseases

The most commonly reported enteric diseases in IHA were campylobacteriosis (33.2/100,000; 95% CI: 29.0 to 37.4/100,000), salmonellosis (14.6/100,000; 95% CI: 11.8 to 17.4/100,000) and giardiasis (11.2/100,000; 95% CI: 8.7 to 13.6/100,000).

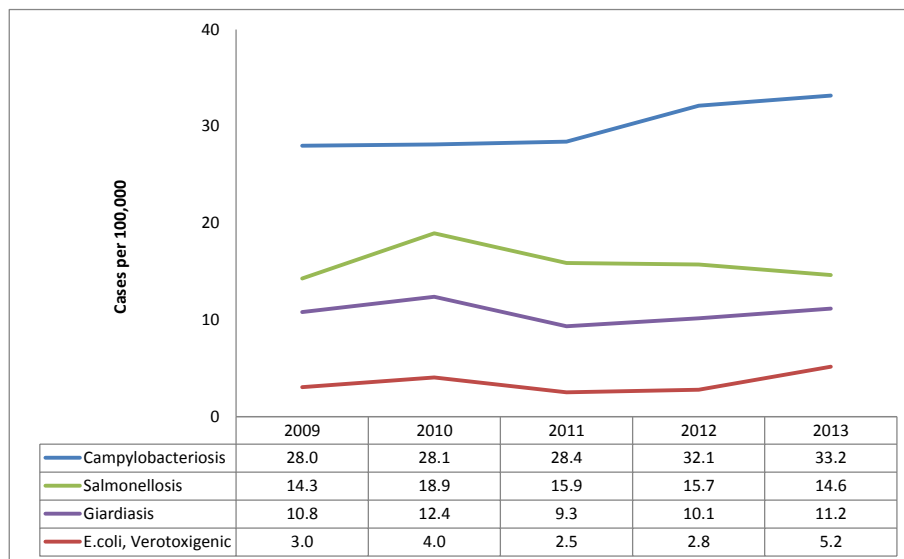
Over the past 5 years, cases and rates have been relatively stable across IHA for salmonellosis and giardiasis (Figure 4). However, there was a notable difference in incidence of verotoxigenic *E. coli* infections between the current and the average incidence in previous years (5.2/100,000 in 2013 versus 2.8/100,000 in 2008-2012, $p = 0.004$).

A multi-provincial outbreak of *E. coli* O157:H7 infections due to contaminated raw milk cheeses produced in Thompson Cariboo Shuswap occurred over the summer and fall months of 2013, which impacted the IHA rate. The 2013 rates of two other enteric diseases were also significantly greater than

the historical rates. From 2008-2012, campylobacteriosis incidence was 28.6/100,000 (difference $p = 0.04$) and cryptosporidiosis incidence was 1.4/100,000 (2013: 2.7/100,000, difference $p = 0.03$).

In comparison to enteric disease reported throughout BC, IHA rates of infection due to *Campylobacter* spp., *Cryptosporidium* spp., *E. coli* O157:H7, *Giardia lamblia*, acute hepatitis B virus, *Salmonella* spp., and *Shigella* spp. were not significantly different ($p > 0.05$). The 2013 IHA rates of enteric disease caused by *Shigella* spp., and *Yersinia enterocolitica* were, however, significantly lower than BC rates ($p < 0.001$). Incidence of these two infections is typically lower in IHA compared to the province.

Figure 4: Incidence of common enteric diseases, Interior Health Authority, 2009 - 2013



3.3.2 Gastrointestinal Infection Outbreaks

Gastrointestinal infection (GI) outbreaks occurring in licensed care and acute care facilities are reported to the CD Unit in accordance with the IHA Health Care Facilities Gastrointestinal Outbreak Guidelines, which were revised and released in March 2013. In total, there were 85 GI outbreaks within licensed care facilities ($n = 38$), schools ($n = 21$), community ($n = 20$), and acute care facilities ($n = 6$) during 2013. This is similar to all GI outbreak counts in 2012, although there were 10 more outbreaks reported in the community this year. Four of the community GI outbreaks were linked to food supplied by two restaurants/caterers in TCS in December. Norovirus was identified as the microbiological cause in all four outbreaks and no specific food item was found to be associated with outbreak.

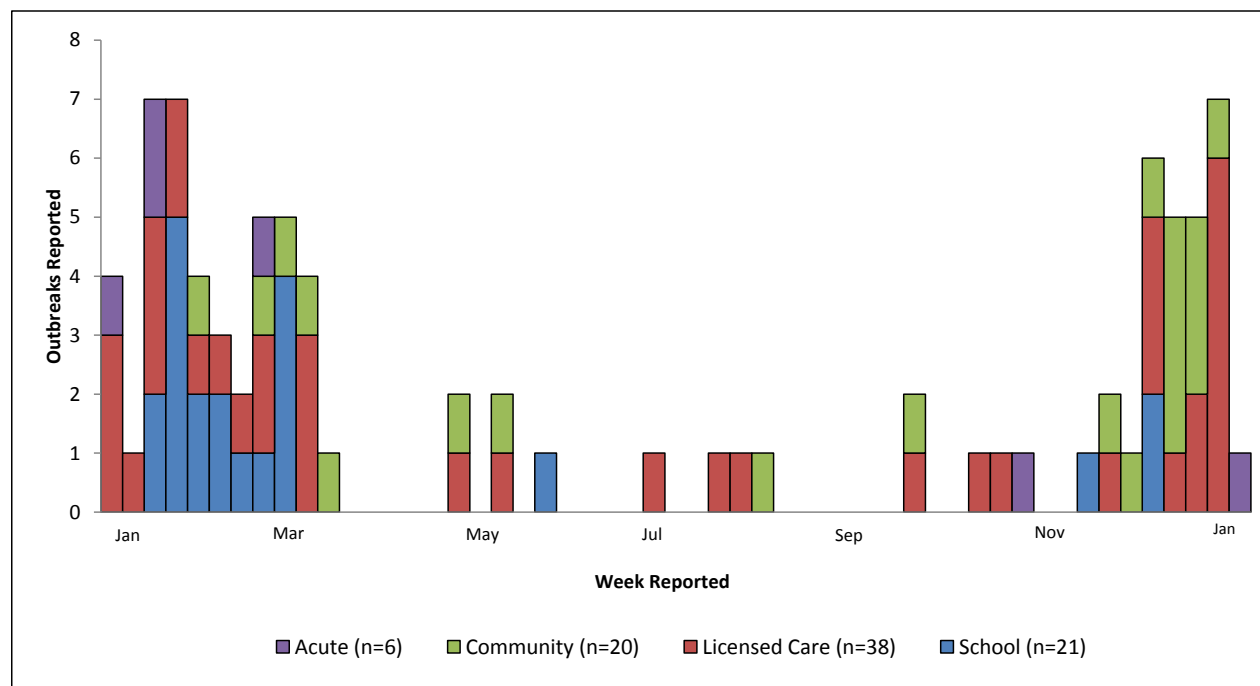
Distribution of outbreaks followed the typical seasonal trend of GI outbreaks, although there were none in April 2013 (Figure 5). Suspected GI outbreaks in school settings were predominantly in February and March. In licensed care facilities, the duration of GI outbreaks in 2013 ranged from 1 to 24 days

(average and median = 10 days). Attack rates among residents ranged from 4% to 67%, the average was 29%, but this was due to 7 outliers with attack rates > 60% (median = 12%).

Norovirus is a key factor in the clinical outcomes of GI outbreaks, and this is particularly apparent in licensed care facility settings. The difference in average duration between outbreaks in which norovirus were identified (12.9 days) and outbreaks in which norovirus were not identified (6.8 days) was highly significant ($p < 0.001$). Furthermore, average attack rates among norovirus outbreaks (35.9%) was significantly higher than among outbreaks where norovirus was not identified (23.0%; difference $p = 0.01$).

There were 2 norovirus outbreaks at Kelowna General Hospital, both in outpatient units. Outbreaks also occurred in inpatient settings: 2 at Royal Inland Hospital and 1 each at Kootenay Lake Hospital and Invermere and District Hospital. Duration of the 6 acute care facility GI outbreaks in 2013 ranged from 1 to 5 days and attack rates ranged from 9% to 67%.

Figure 5: Gastrointestinal outbreaks by week and setting, Interior Health Authority, 2013



3.4 Sexually Transmitted Infections

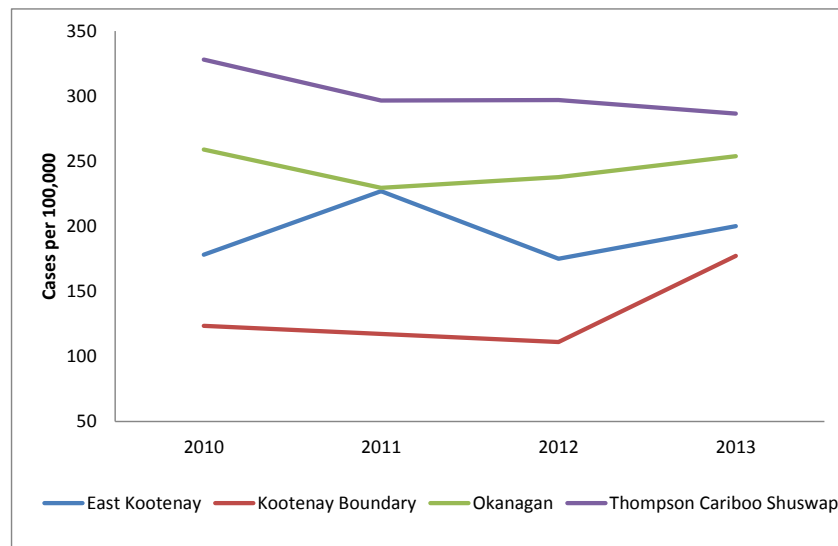
Surveillance of sexually transmitted infections (STI) and follow-up of positive chlamydia and gonorrhea reports are centralized through the CD Unit. The CD Unit will also initiate case follow-up and contact notification at the request of the testing provider. While the majority of STI testing in IHA is done by physicians, positive chlamydia and gonorrhea tests are also reported by nurse practitioners, community

health nurses, STI clinics, and Options for Sexual Health clinics. Women are overrepresented in reports of chlamydia and gonorrhoea, as this is likely attributed to testing that occurs during women's routine health examinations (e.g. Pap smears).

3.4.1 Chlamydia

In 2013, there were 1792 chlamydia cases reported in the IHA resident population, and the incidence was 249.8/100,000 (95% CI 238.2 to 261.3/100,000). There was no significant difference between this year's incidence of chlamydia compared to the rate in 2012 (249.2/100,000 in 2013, $p > 0.05$) or the average rate over the past 3 years (243.3/100,000 in 2010 - 2012, $p > 0.05$). Compared to other HSDAs chlamydia incidence is historically greater in TCS (Figure 6); however, there was a slight decrease to 286.4/100,000 in 2013 in that area. At the same time, there was a significant increase in chlamydia incidence in Kootenay Boundary (177.1/100,000 in 2013, $p = 0.001$)

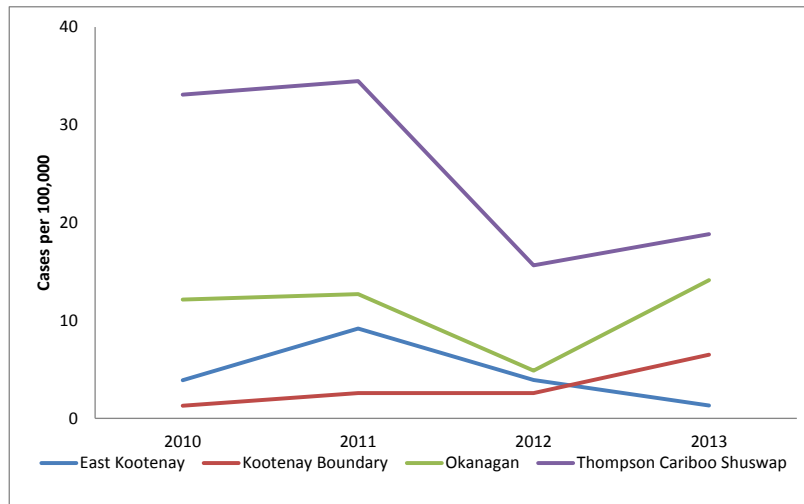
Figure 6: Chlamydia incidence by Health Service Delivery Area, Interior Health Authority, 2010 - 2013



3.4.2 Gonorrhoea

In 2013, there were 96 cases of gonorrhoea reported in IHA and the incidence was 13.4/100,000. This does not represent a significant change from the average rate over the past 3 years (14.0/100,000 in 2010 - 2012, $p > 0.05$), but it was a highly significant increase from the previous year (7.8/100,000, $p = 0.002$). The 2012 rate was unusually low, the decline to a large part due to a significant decrease in TCS that year (Figure 7). There has been year to year fluctuation and different trends across HSDAs. Overall, there appears to be a downward trend within TCS.

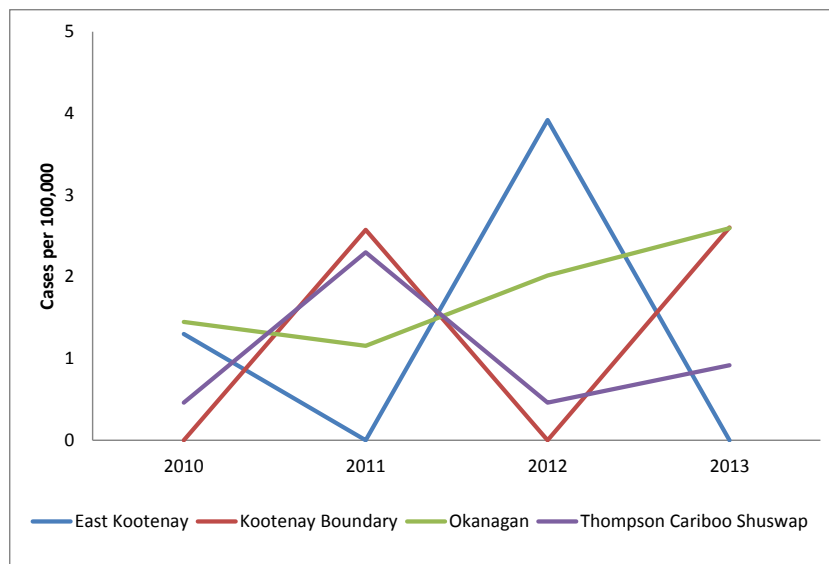
Figure 7: Gonorrhoea incidence by Health Service Delivery Area, Interior Health Authority, 2010 - 2013



3.4.3 Infectious Syphilis

There were 13 cases of infectious syphilis reported in IHA during 2013. The incidence was 1.8/100,000 in 2013 and this was not a significant change from the average rate over the previous 3 years (1.3/100,000 in 2010-2012, $p > 0.05$). Strong year-to-year variation has been evident since 2010 (Figure 8). Provincially, there has been a highly significant increase in the rate of infectious syphilis from 8.1/100,000 in 2012 to 12.2/100,000 in 2013 ($p < 0.001$). In IHA, however, there was no significant change between the 2012 rate (1.5/100,000) and the 2013 rate ($p > 0.05$).

Figure 8: Infectious syphilis incidence by Health Service Delivery Area, Interior Health Authority, 2010 - 2013



3.5 Chronic Infectious Diseases

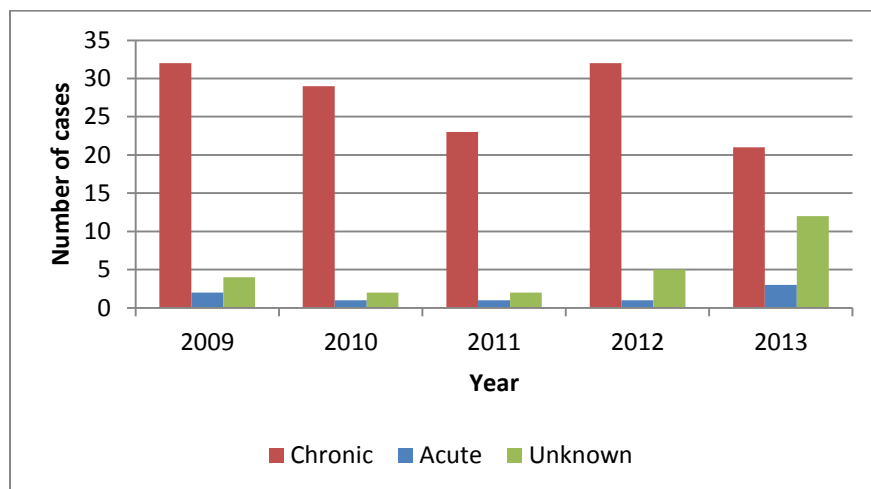
Hepatitis B and Hepatitis C infections are initially acute but can progress to a chronic state. Most Hepatitis B cases do not become chronically infected (90%), while most (75 to 85%) Hepatitis C cases do become chronic cases². Chronic hepatitis can result in scarring of the liver and may lead to cirrhosis and liver cancer. Many individuals chronically infected with hepatitis do not have symptoms but can still spread the infection via blood and body fluids.

Human Immunodeficiency Virus (HIV) is always a chronic infection and can affect all systems in the body. HIV is spread via body fluids, both sexual and blood. Infected individuals may not have noticeable symptoms but may continue to be infectious. Currently the provincially funded STOP HIV program is working to identify new and unknown HIV infections in IHA residents and enabling all positive individuals to be involved in care.

3.5.1 Hepatitis B (HBV)

The number of new chronic hepatitis B cases declined from 2012 by 34% (Figure 9). Acute cases in 2013 have more than doubled when compared to years 2009-2012.

Figure 9: Hepatitis B cases in Interior Health Authority, by case type, 2009-2013



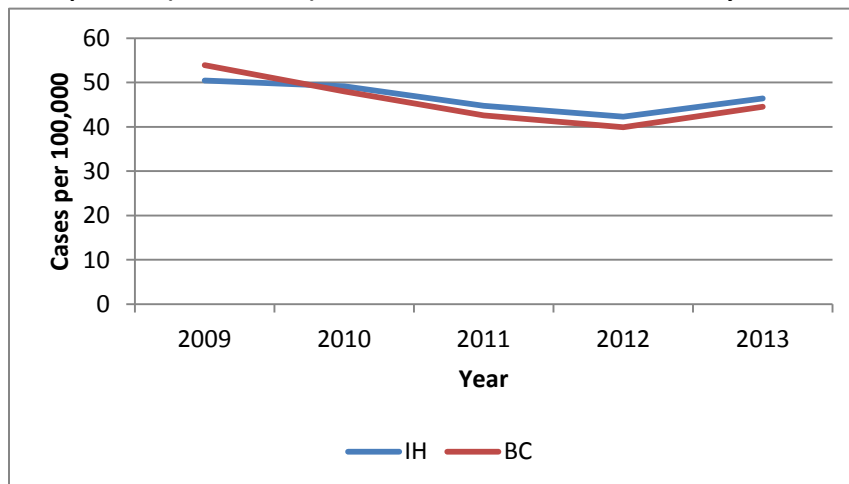
3.5.2 Hepatitis C (HCV)

The rate and number of non-acute HCV cases increased this year in both IHA and BC (Figure 10). In IHA, acute cases in 2013 were at historically low levels. The majority of HCV non-acute cases occur among adults between the ages of 20 and 69 years and males are diagnosed more often than females by

² Division of Viral Hepatitis and National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Hepatitis C FAQs for the Public. <http://www.cdc.gov/hepatitis/c/cfaq.htm>. Accessed June 2, 2014.

a 2:1 ratio. The 5-year rate (2009-2013) of acute HCV cases in IHA is 1.08 per 100,000 (95% CI 0.48-1.69 per 100,000), which is significantly lower than the BC rate of 1.77 per 100,000 (95% CI 1.26-2.28 per 100,000).

Figure 10: Hepatitis C (chronic case) incidence in Interior Health Authority and BC, 2009-2013



3.5.3 HIV/AIDS

In 2013, the number of new HIV and AIDS cases remained steady. There were 13 new cases of HIV in 2013, which is consistent with numbers reported over the past two years (12 in 2012 and 11 in 2011). As is often seen with HIV, the majority of cases diagnosed with HIV are men (10 male: 3 female). Three of the 13 cases had a known risk factor for HIV (men who have sex with men or heterosexual sex with known risk). Four new cases of AIDS were diagnosed in 2013. The number of AIDS cases in IHA have remained stable over the past 5 years and have been declining in BC overall.

When the 5-year (2008-2013) rates were compared, IHA rates were significantly lower than BC rates for HIV and lower for AIDS.

Table 1: 5-year incidence of HIV and AIDS in Interior Health Authority and BC, 2009-2013

	5-year rate, 2009-2013 (cases per 100,000)	
	HIV	AIDS
IHA	1.64 (95% CI 1.42-1.85)	0.56 (95% CI 0.20-0.92)
BC	6.38 (95% CI 5.26-7.50)	1.71 (95% CI 0.85-2.57)

3.5.4 Harm Reduction

Harm reduction aims to promote safer and healthier communities by minimizing the risk of disease transmission (including HIV, Hepatitis B and C), death and injury we associate with substance use and

sexual behaviours. Interior Health provides services to support people using substances, engaged in sex work and riskier sexual behaviours. This includes education, counselling, testing, treatment, referrals, safer sex supplies, safer injection supplies and safer inhalation supplies. These services are delivered through a variety of settings including primary care clinics, public health offices, contracted community agencies and non-contracted community agencies.

Interior Health distributes a multitude of supplies to reduce the risk of issues. This includes needles, syringes, condoms and other equipment for the safer consumption of substances. These supplies are available to sites across the Interior, free of charge, through the BC Centre for Disease Control (BCCDC). In partnership with the BCCDC, Interior Health ensures distribution occurs in all area of the health authority (Table 2). In 2013, a total of 846,900 sterile needles were distributed throughout IHA³. This represents an increase of 21% over the previous year (Figure 11). The biggest increase was seen in the Okanagan HSDA with an increase of over 31%⁴. Throughout the health authority, the number of condoms distributed decreased slightly (Figure 12). Most other harm reduction supplies have seen an increase in distribution over 2012 numbers.

A number of programmatic changes occurred within 2013 as well. The first full time Harm Reduction Coordinator was hired for the program to bring a coordinated approach to harm reduction services throughout the region. This position allows for programs and communities to advance their harm reduction programs and allows for greater and equitable distribution in all communities in IHA. The number of primary distribution sites within Interior Health also expanded with some secondary sites increasing their distribution and becoming primary distribution sites.

More equitable distribution of safer inhalation supplies was also achieved during 2013⁴. Agencies located in communities throughout Interior Health were provided with additional funding in order to purchase glass stems for safer inhalation use. Glass stems fit vinyl mouth pieces provided through existing harm reduction supplies and help prevent issues caused by cuts and burns associated with light bulbs, metal pipes and broken stems. This helps prevent the spread of Hepatitis C and respiratory illness. In 2013, glass stems were provided for the first time to the Salmon Arm and Williams Lake areas. This ensures greater access for supplies for communities located in more rural areas.

³ 2013 data provided by the Regional Harm Reduction Coordinator, Interior Health

Table 2. Numbers of harm reduction supplies distributed in Interior Health Authority, by health service delivery area

Health service delivery area	Primary site	LHA served	2013/2014		2012/2013	
			Needles	Condoms	Needles	Condoms
East Kootenay	Cranbrook Health Unit	Fernie (001)	39,600	93,040	42,200	84,680
		Cranbrook (002)				
		Kimberley (003)				
		Windermere (004)				
		Creston (005)				
	Golden (018)					
East Kootenay Addiction Services Society	Cranbrook (002)					
Kootenay Boundary	Castlegar Health Unit	Nelson (007)	167,500	42,080	172,500	86,500
		Castlegar (009)				
		Trail (011)				
	AIDS Network Kootenay Outreach and Support Society (ANKORS)	Kootenay Lake (006)				
		Nelson (007)				
		Castlegar (009)				
		Arrow Lakes (010)				
		Trail (011)				
Grand Forks (012)						
Kettle Valley (013)						
Okanagan	Penticton Health Unit	South Okanagan (014)	384,400	180,708	292,900	223,768
		Penticton (015)				
		Keremeos (016)				
		Princeton (017)				
		Summerland (077)				
	North Okanagan Youth and Family Services	Armstrong-Spallumcheen (021)				
		Vernon (022)				
	Outreach Urban Health	Enderby (078)				
		Central Okanagan (023)				
Living Positive Resource Centre	Central Okanagan (023)					

Health service delivery area	Primary site	LHA served	2013/2014		2012/2013	
			Needles	Condoms	Needles	Condoms
Thompson-Cariboo-Shuswap	Salmon Arm Health Unit	Revelstoke (019)	255,400	168,380	188,100	157,040
		Salmon Arm (020)				
	Kamloops Health Unit	Kamloops (024)				
		North Thompson (026)				
		Lillooet (029)				
		South Cariboo (030)				
		Merritt (031)				
		Merritt (031)				
	ASK Wellness	Kamloops (024)				
	100 Mile House Health Unit	100 Mile House (025)				
	Williams Lake Health Unit	Cariboo-Chilcotin (027)				

Figure 11. Sterile needles distribution, Interior Health Authority, by health service delivery area

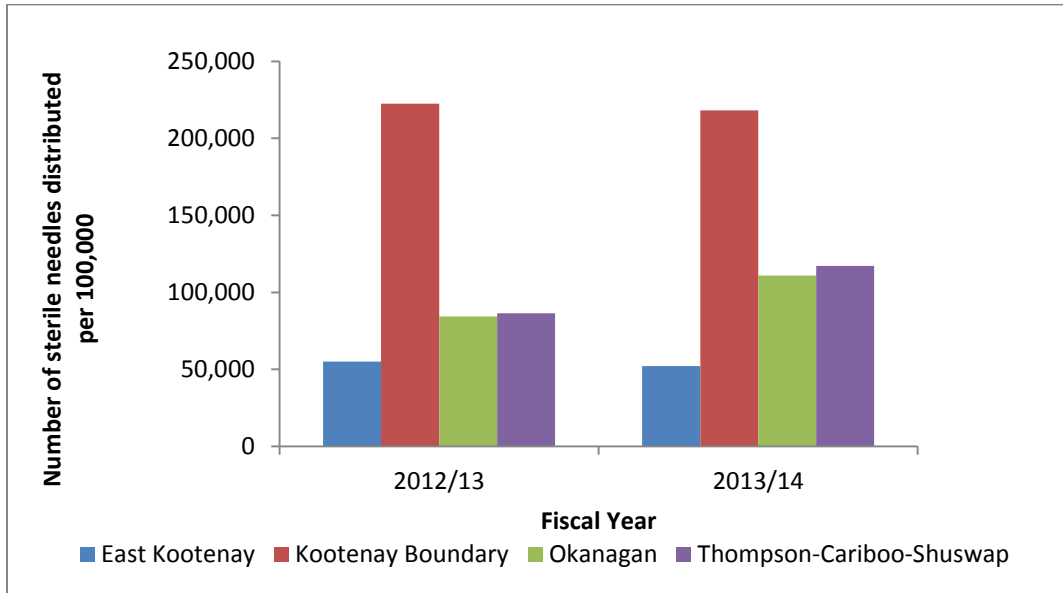
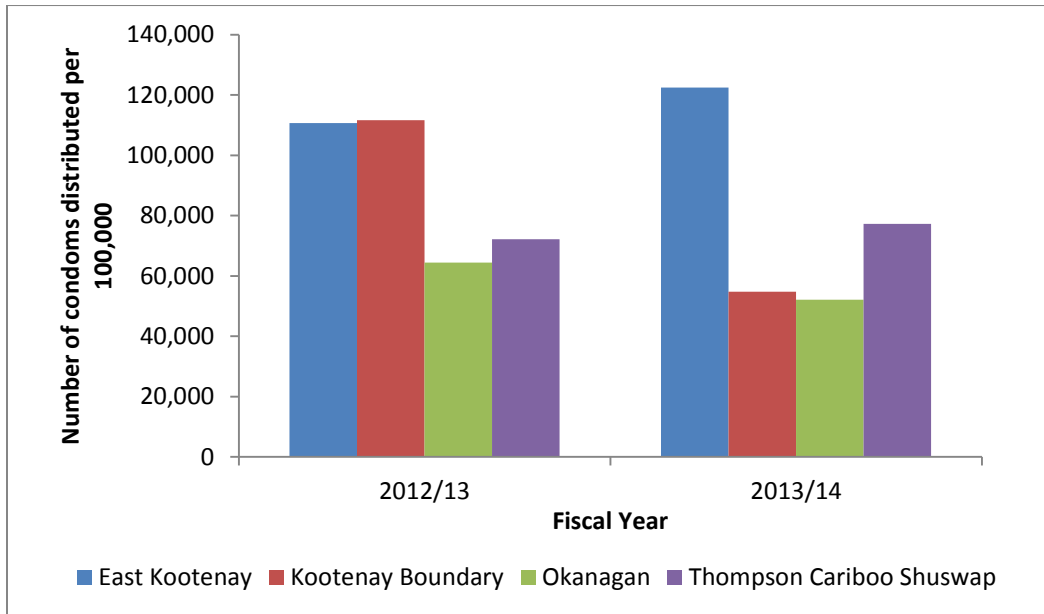


Figure 12. Condom distribution, Interior Health Authority, by health service delivery area



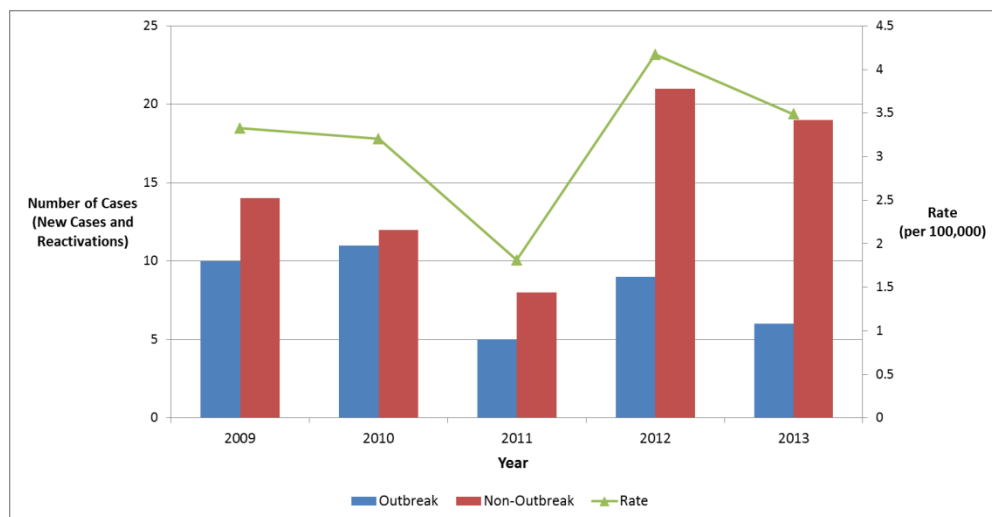
3.6 Diseases with Direct Contact or Respiratory Transmission

3.6.1 Tuberculosis

There were 21 new tuberculosis (TB) cases and 4 reactivations in IHA during 2013. The TB rate for IHA decreased in 2013 to 3.5 per 100,000 from 4.2 per 100,000 in 2012 (Figure 13). The TB outbreak involving the homeless population in Kelowna continued in 2013, however outbreak cases have made up a smaller proportion of total TB cases in 2012 and 2013, and no new outbreak cases were reported in the last 5 months of 2013. Throughout the year, 5 of the new cases and 1 reactivation case were related to the Kelowna outbreak.

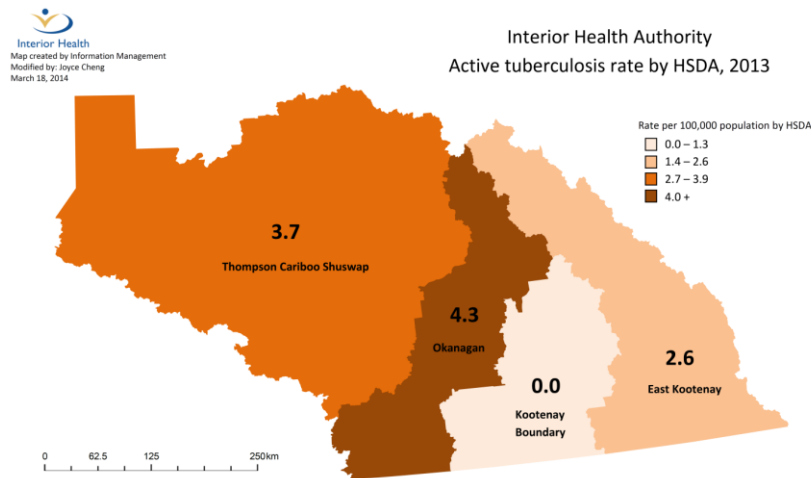
HSDA-level TB rates were the highest in the Okanagan (Figure 14), which may be a reflection of the TB outbreak in the homeless population, immigration patterns to urban centres, and the concentration of health and social services in this area. Among non-outbreak cases in 2013, there was a similar number of females (n=10, 53%) and males (n=9, 47%). Most were adults (16/19, 84%) and there were 3 cases among children 10 years of age or younger. Foreign-born individuals (all originating from the Philippines, India, or China) made up 68% of non-outbreak cases.

Figure 13: Tuberculosis cases by outbreak status and tuberculosis incidence, Interior Health Authority, 2009 - 2013



Source: TB Data Collection 2013 – Epi Report Spreadsheet

Figure 14: Tuberculosis incidence by Health Service Delivery Area, Interior Health Authority, 2013



3.6.2 Respiratory Infection Outbreaks and Influenza

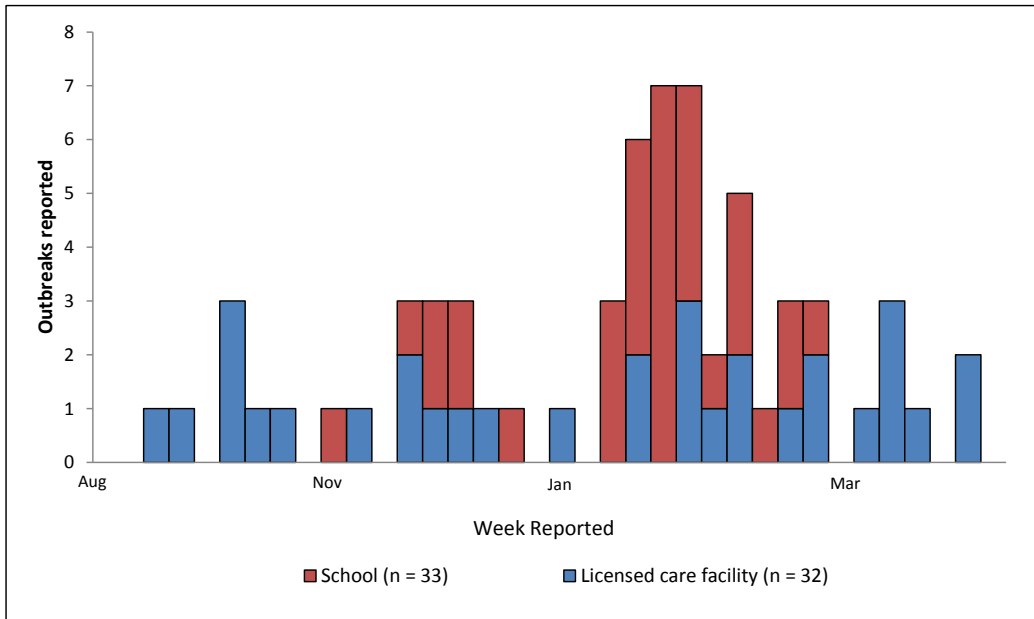
In the 2013-2014 influenza season (August 25, 2013 through April 19, 2014), there were 67 RI outbreaks reported in IHA, 32 in licensed care facilities and 33 in schools (Figure 15). There were no reported RI outbreaks in acute care or in community settings.

The peak in outbreak occurrence was in January and February. In 38% of RI outbreaks, a causative organism was not identified. Influenza A was the most commonly identified organism (19% of outbreaks) and human meta-pneumovirus and coronavirus were the next most common (13% each).

The average duration of RI outbreaks in licensed care facilities was 15.6 days. Although the numbers of events were insufficient to compare statistically, the average duration of outbreaks due to coronavirus (22.5 days) and human metapneumovirus (20.8 days) were longer than the average. Outbreaks in which no causative organism was identified had the lowest average duration (11.9 days).

Attack rates were highest among outbreaks where coronavirus was identified (33%), followed by those where no causal organism was identified (23%), those caused by influenza A (21%), and human meta-pneumovirus (13%).

Figure 15. Respiratory outbreaks by setting, Interior Health Authority, 2013-2014 influenza season



Throughout IHA, the rate of influenza was 36.5/100,000 in 2013. While this was significantly higher than the rate in 2012 (16.5/100,000), it was not significantly different from the average of the previous 5 years, which included the pandemic year 2009. Within IHA, the influenza rate was highest in East Kootenay (69.7/100,000) and lowest in Kootenay Boundary (20.8/100,000).

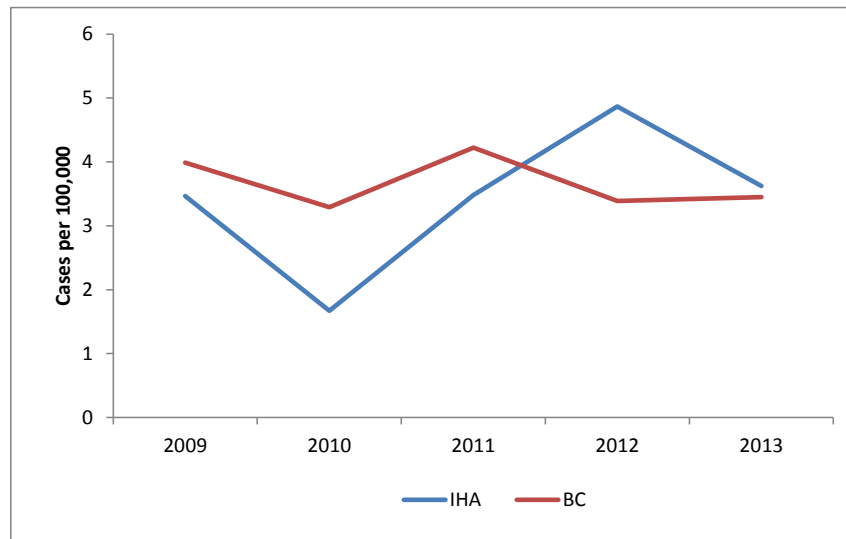
Throughout BC, influenza A(H1N1)pdm09 was the most commonly identified influenza A subtype. From September 29, 2013 through April 21, 2014, 78% of subtyped influenzas were of this subtype. Enhanced influenza surveillance was initiated throughout the province on January 9, 2014, which collected data on influenza cases among hospital admissions in the province. From the beginning of the influenza surveillance season (Aug 25, 2013), 171 influenza-positive cases visited IHA acute care facilities. Of these, 66 required inpatient admission, including 30 who were admitted to intensive care units. All of the ICU admissions had specimens positive for influenza A(H1N1)pdm09. There were 2 deaths attributed to influenza A(H1N1)pdm09. One of these was a resident of the IHA region who died while admitted to hospital outside of IHA, and another died in the Okanagan. Daily updates were provided to the Ministry of Health and IHA senior executive during the 12 weeks of enhanced surveillance.

Influenza illness during December through February was frequent in the community and aligns with the peak season for RI outbreaks. Physician visits for influenza-like illness as a proportion of all submitted BC Medical Services Plan claims in IHA rose above the 10-year maximum in January 2014.

3.6.3 Streptococcal Disease (Invasive) Group A

There were 26 cases of invasive group A streptococcal infection in IHA during 2013, the rate was 3.6/100,000. This is similar to the rate in BC for 2013 (3.7/100,000). Among the 26 cases, 85% were admitted as inpatients to IHA hospitals with their infection. Invasive group A streptococcal infection rates vary considerably across HSDAs and over time in IHA. The area with the highest rate was in Kootenay Boundary (5.2/100,000) and the lowest rate was in East Kootenay (zero), which is opposite to the influenza trend noted above. This does not reflect the reported association between the incidence of influenza and invasive *Streptococcus pyogenes* (independent of seasonal trend similarity)^{4,5}. Furthermore, the year-to-year variability in IHA is not reflective of the relatively stable rates in BC (Figure 16).

Figure 16. Invasive Group A Streptococcus incidence, Interior Health Authority and BC, 2009-2013



3.7 Vectorborne or other Zoonotic Diseases

3.7.1 Animal Contact Events - Rabies

During 2013, among 154 animal contact events investigated, there were no human or animal rabies cases. Animal contacts are investigated and assessed by environmental health officers, then referred to the CD Unit for surveillance and consultation with a MHO if required. If rabies post-exposure prophylaxis

⁴ Allard R, Couillard M, Pilon P, Kafka M, Bedard L. 2011. Invasive bacterial infections following influenza: a time-series analysis in Montreal, Canada, 1996-2008. *Influenza Other Respir Viruses*. 6:268-275.

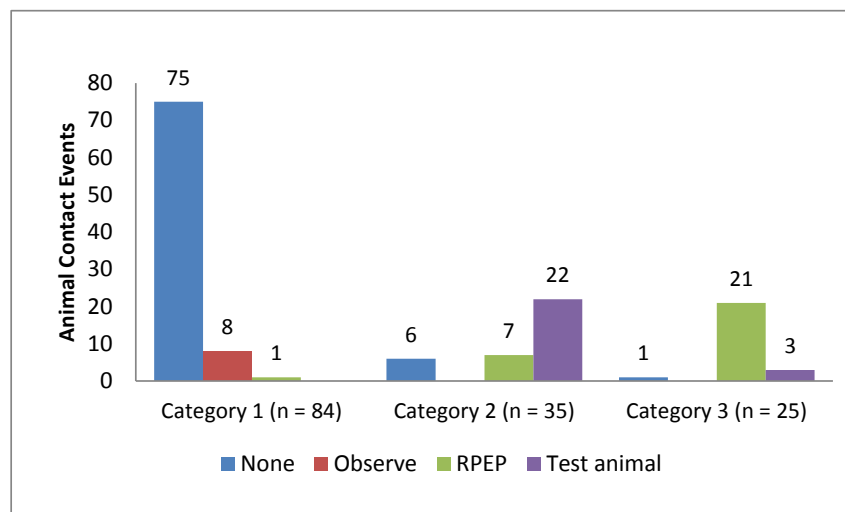
⁵ Tasher D, Stein M, Simones E, Shohat T, Bromberg M, Somekh E. 2011. Invasive bacterial infections in relation to influenza outbreaks, 2006-2010. *Clin Inf Dis*. 53:1199-1207.

(RPEP) is required, the public health nurse will work with the client to ensure RPEP is provided as per MHO recommendations.

Most animal contact events occurred within BC, with only 15% (23/154) of exposures occurring outside the province. Most events in IHA were due to bites from dogs (n = 58), bats, (n = 44), and cats (n = 23). The distribution of exposures across animal types was as follows: 45% in wild animals, 42% in domestic animals, and 12% in feral or stray animals. Among wild animal contact events, bats were the most common animal responsible (63% of 70). Bats are the only animal from which rabies were identified (n = 5) among those submitted from BC to federal laboratories for rabies testing during 2013⁶.

Of the 154 contact events, 144 fit into one of 3 risk categories. The majority of animal contact events fit into risk Category 1, the lowest risk category (Figure 17, 58%). Most Category 1 events resulted in no further action, whereas Category 2 events often required sending the animal for testing. The CD Unit coordinated RPEP immunization service for 32 individuals; however, 41% of those were exposed outside of BC. The MHO was consulted in all of the 19 events with exposure in IHA.

Figure 17: Follow-up actions for animal contact events reported to the Interior Health Authority Communicable Diseases Unit, by risk category, 2013



3.7.2 West Nile Virus

One case of human West Nile Virus (WNV) disease in South Okanagan was reported in IHA in October, 2013. IHA activities to prevent and control WNV include surveillance and education. For the 2013

⁶ Canadian Food Inspection Agency. Positive Rabies in Canada. <http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/rabies/positive-rabies/eng/1356156989919/1356157139999#a2014>. Accessed June 2, 2014.

season, there was 1 WNV-positive sample each from a mosquito pool, bird, and horse in South and Central Okanagan⁶. These were the only WNV-positive samples in BC during 2013.

Mosquito trapping occurred from mid-July to early September 2013 at 13 sites in IHA. Among 290 pools tested, 84,458 mosquitos were collected by Health Protection, IHA⁷. The number of mosquitoes captured per trap catch provides an indication of mosquito populations and these numbers are monitored weekly to measure the mosquito activity levels. Populations of *C. tarsalis* and *C. pipiens* mosquitoes, the two most significant vectors for WNV, began to increase the first week of July and did not return to low levels until the last week of August, as was observed in the previous year.

3.7.3 Lyme Disease

Three cases (two confirmed and one probable) of human Lyme disease were investigated by the CD Unit. *Borrelia burgdorferi* was identified from one specimen submitted from an Okanagan resident. As Lyme disease surveillance in IHA is passive, there may be some underreporting of cases.

One species of Lyme disease-carrying tick, *Ixodes pacificus*, is more often found in the coastal areas of BC. While this type of tick is less common in the BC interior, IHA residents may travel to areas where these ticks are endemic and become ill from tick bites. In IHA, the most common tick species is the wood tick (*Dermacentor andersoni*), which does not carry *B.burgdorferi* bacteria but can cause other diseases such as Rocky Mountain spotted fever.

⁷ BC Centre for Disease Control. West Nile Virus Activity in BC: Surveillance Program Results 2013.

Appendix 1: Case Numbers and Rates for Selected Diseases 2009 to 2013

	2009			2010			2011			2012			2013			2009-2013	
	Cases		Rate	Cases		Rate	Cases		Rate	Cases		Rate	Cases		Rate	Average Rate	
	IH	IH	BC	IH	IH	BC	IH	IH	BC	IH	IH	BC	IH	IH	BC	IH	BC
Campylobacteriosis	202	28.0	39.9	202	28.1	34.9	204	28.4	38.3	231	32.1	40.9	238	33.2	36.1	30.0	38.0
Cryptosporidiosis	8	1.1	1.9	8	1.1	1.2	9	1.3	1.2	13	1.8	1.7	19	2.6	1.6	1.6	1.5
E.coli, Verotoxigenic	22	3.0	3.7	29	4.0	2.4	18	2.5	2.5	20	2.8	3.0	37	5.2	4.0	3.5	3.1
Giardiasis	78	10.8	14.0	89	12.4	14.0	67	9.3	13.8	73	10.1	13.5	80	11.2	13.2	10.8	13.7
Hepatitis A	2	0.3	0.7	2	0.3	0.7	3	0.4	2.4	1	0.1	0.8	3	0.4	0.5	0.3	1.0
Hepatitis B: Acute	2	0.3	0.6	1	0.1	0.2	1	0.1	0.3	1	0.1	0.3	3	0.4	0.2	0.2	0.3
Hepatitis B: Chronic carrier	32	4.4	26.7	29	4.0	26.1	23	3.2	23.5	30	4.2	22.1	21	2.9	23.2	3.8	24.3
Hepatitis B: Unknown/undetermined	4	0.6	3.3	2	0.3	3.2	2	0.3	2.9	8	1.1	2.6	12	1.7	2.4	0.8	2.9
Hepatitis C	364	50.4	54.0	354	49.3	48.1	320	44.6	42.7	304	42.3	39.7	333	46.4	44.5	46.6	45.8
Hepatitis C: Acute	10	1.4	2.5	6	0.8	1.7	8	1.1	1.5	12	1.7	1.6	3	0.4	1.4	1.1	1.8
Influenza	885	122.7	183.7	3	0.4	3.3	80	11.1	18.5	119	16.5	20.4	262	36.5	40.6	37.5	53.3
Measles: Rubeola (Red)	0	0.0	0.0	14	1.9	1.9	8	1.1	0.2	0	0.0	0.0	0	0.0	0.4	0.6	0.5
Meningitis/Encephalitis: Bacterial	7	1.0	0.2	3	0.4	0.1	3	0.4	0.2	2	0.3	0.2	1	0.1	0.1	0.4	0.2
Meningococcal invasive	3	0.4	0.5	4	0.6	0.2	4	0.6	0.4	3	0.4	0.4	2	0.3	0.3	0.4	0.4
Mumps	0	0.0	0.6	2	0.3	0.4	11	1.5	3.8	0	0.0	0.3	15	2.1	1.5	0.8	1.3
Pertussis	23	3.2	3.7	45	6.3	2.9	11	1.5	1.5	43	6.0	15.8	51	7.1	8.7	4.8	6.5
Pneumococcal Meningitis	1	0.1	0.3	1	0.1	0.2	4	0.6	0.2	4	0.6	0.3	4	0.6	0.3	0.4	0.3
Pneumococcal Other	53	7.3	7.2	56	7.8	5.8	59	8.2	7.1	51	7.1	7.5	46	6.4	7.7	7.4	7.1
Rubella (German Measles)	0	0.0	0.0	0	0.0	0.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0.0	0.1
Salmonellosis	103	14.3	20.2	136	18.9	23.0	114	15.9	23.3	113	15.7	19.5	105	14.6	17.7	15.9	20.7
Shigellosis	11	1.5	4.4	21	2.9	4.3	16	2.2	3.6	12	1.7	3.8	4	0.6	3.1	1.8	3.8
Group A strep : Invasive	25	3.5	4.0	12	1.7	3.3	25	3.5	4.2	35	4.9	3.4	26	3.6	3.4	3.4	3.7
West Nile Virus	2	0.3	0.0	1	0.1	0.0	0	0.0	0.0	0	0.0	0.0	1	0.1	0.0	0.1	0.0
Yersiniosis	29	4.0	10.5	38	5.3	9.5	37	5.2	9.0	21	2.9	8.7	23	3.2	9.5	4.1	9.4
HIV	18	2.5	7.6	11	1.5	6.7	11	1.5	6.4	12	1.7	5.2	13	1.8	5.9	1.8	6.4
Chlamydia	1842	251.2	253.8	1842	256.5	265.9	1704	237.3	261.5	1699	236.2	273.3	1792	249.8	267.2	246.2	264.3
Gonorrhoea	126	17.2	30.6	118	16.4	30.6	128	17.8	36.7	56	7.8	31.3	96	13.4	40.2	14.5	33.9
Infectious Syphilis	13	1.8	4.9	7	1.0	3.4	11	1.5	4.2	11	1.5	8.1	13	1.8	12.2	1.5	6.6

Appendix 2: Final Outbreak Report: Mumps in Interior Health Authority, November 2013 – January 2014

Summary

At the end of 2013, an outbreak of mumps occurred in Interior Health that affected hockey players and contacts of cases in 3 separate cities. In total, there were 15 confirmed cases.

Background

Mumps is a vaccine-preventable viral illness with low but wide-spread incidence in Interior Health and in BC. From January 1 through December, 2013 there were 59 mumps cases reported in BC, affecting all 5 regional health authorities. In years 2008, 2009, 2010 and 2012, the numbers of reported mumps cases in Interior Health (IHA) ranged from 0 to 4. There was, however, a mumps outbreak in Interior Health during 2011 in which there were 11 reported cases. Epidemiological links were established for 8 of the 11 cases and all cases were temporally clustered within 3 weeks.

BC residents born before 1957 are considered to be immune. One dose of mumps-containing vaccine is recommended for BC residents born between 1957 and 1969, and 2 doses are recommended for those born in 1970 or later.

Epidemiology

In the 2013 mumps outbreak, there were 15 confirmed mumps cases in Kootenay Boundary and Thompson Cariboo Health Service Delivery Areas, with parotitis onset between Oct 30, 2013 and December 28, 2013 (60 days from first case onset to last, see Figure 1). Confirmation required mumps-compatible symptoms and one of the following: a) detection of mumps by PCR (virus or mumps RNA), b) seroconversion or a significant rise in mumps IgG titre, c) detection of mumps IgM antibody and epidemiological link with a laboratory-confirmed mumps case or has recently travelled to an area of known mumps activity, d) epidemiological link with a laboratory-confirmed mumps case.

Outbreak cases were limited to players, coaches, or contacts of players in local hockey teams playing in Merritt, Salmon Arm, and Trail. Many cases were living in those communities temporarily during the hockey season, with permanent residence elsewhere in Canada and the US. Among all cases, 7 (46.7% of 15) lived in Merritt, 4 (26.7%) in Salmon Arm and 4 in Trail. Nine of the 15 cases were members of BC Hockey League (BCHL) teams in Merritt, Salmon Arm, and Trail (8 players and 1 coach). Three were members of a BC Minor Hockey league team in Trail (2 players and 1 coach). The remaining 3 cases were epidemiologically linked to the Merritt team (friends or family of BCHL cases). As shown in Figure 1, new cases affected each affiliation group (type of case) in a sequential manner, starting with BCHL members, then

contacts of BCHL members, and finally, to Minor Hockey members.

While the onset dates of all cases in Salmon Arm were tightly clustered within a 13-day period, Merritt cases were distributed throughout a 37-day period. Of note is the wide time interval of 34 days between the onset dates of first and second cases in Trail. BCHL and BC Minor Hockey League teams in Trail play in the same arena, so transmission from the initial BCHL case in Trail to the second Minor Hockey case was possible, as the time interval meets the maximum incubation period (25 days) and period of communicability (9 days).

The median age of confirmed cases was 20.6 years (range 12.1 to 49.5 years) and all cases but one were male (93.3%). Six cases born after 1970 had documented 2 valid doses of measles-mumps-rubella (MMR) immunization (40% of 15) and 6 more had documented 1 valid dose of MMR immunization. Among the 2 cases born before 1970, one had one documented dose of MMR vaccine and received the second dose after her exposure period, the other case had undocumented immunization status. The index case born after 1970 reported having no MMR vaccination.

Figure 1

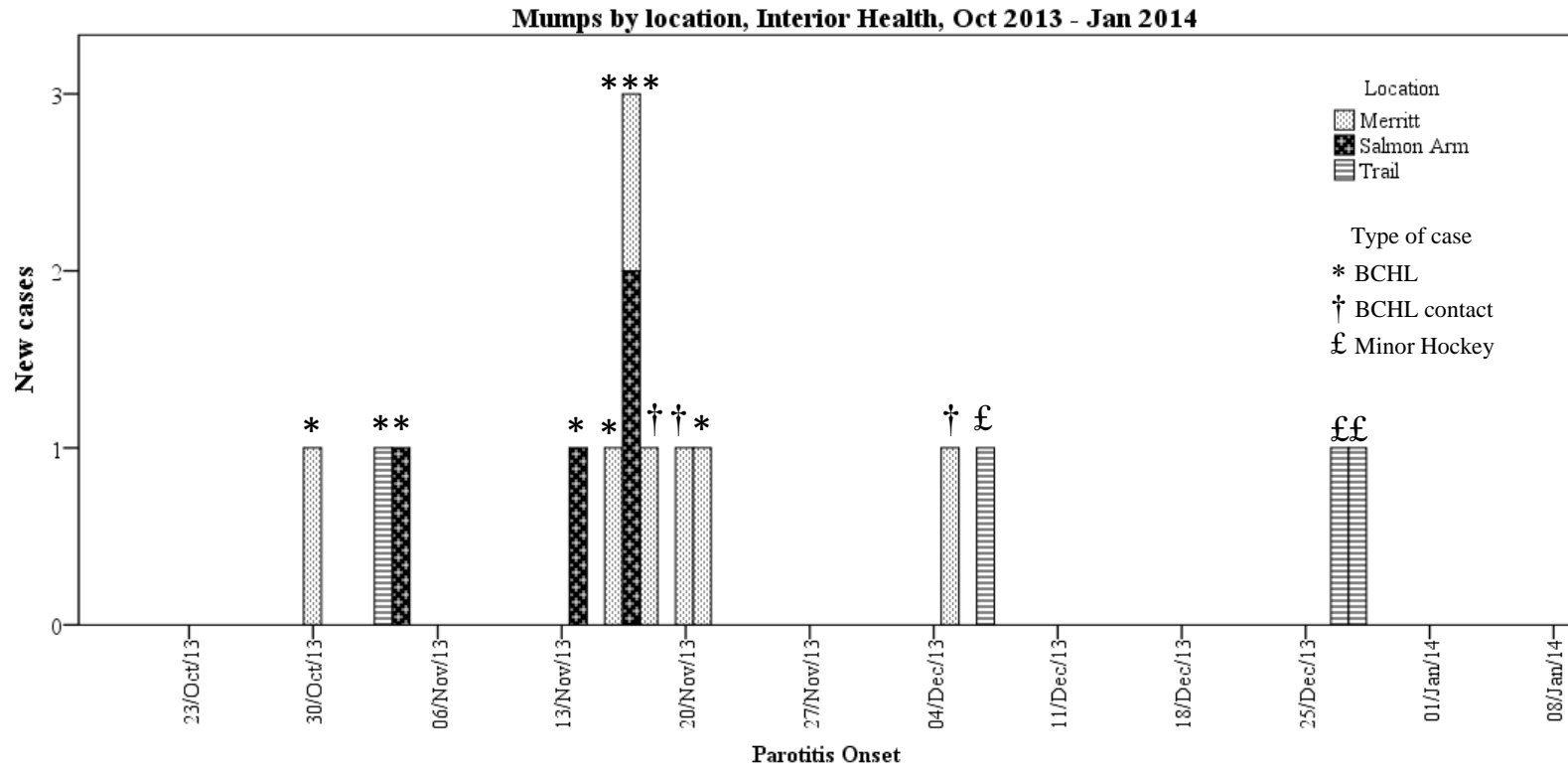
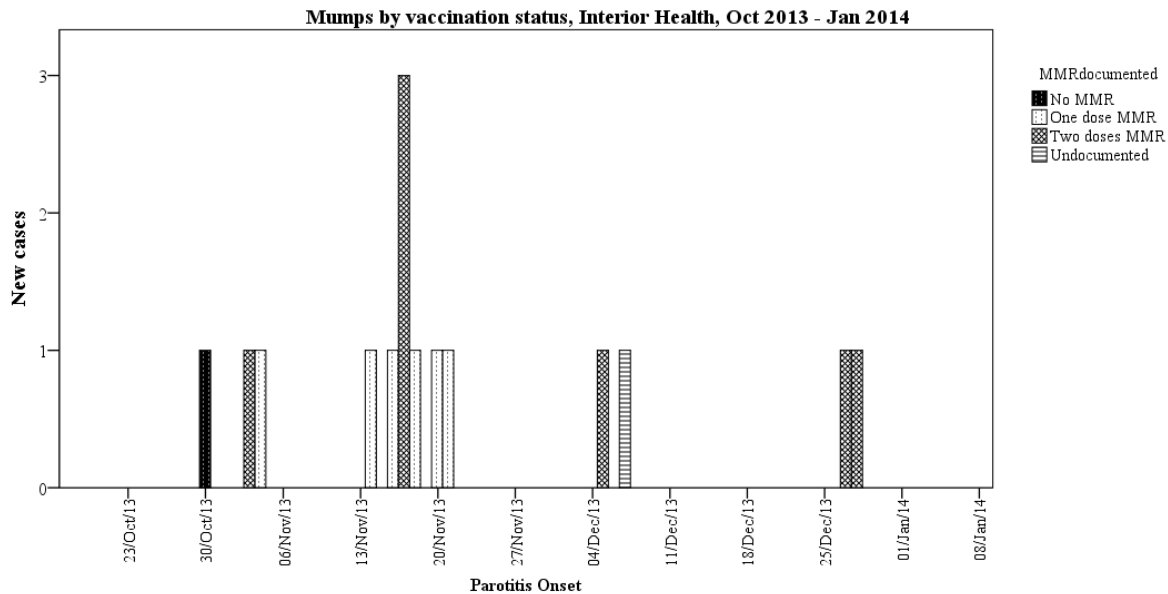


Figure 2



Public Health Interventions

Outbreak Management

The outbreak management team was led by the Interior Health Medical Health Officer, and included representatives from the Communicable Disease Unit, Epidemiology, Community Integrated Health Services, Communications and BC Centre for Disease Control (BCCDC). Northern Health (NH) participated ad hoc to discuss a possible link between IHA and NH outbreaks. Meetings were held on November 9, 15, 22 and December 9, 2013.

Case and contact management

Case and contact management was implemented based on the BCCDC Communicable Disease Control Mumps Guidelines. The CD Unit interviewed all suspect and probable cases. These cases were reported by a health care provider, junior hockey team manager or coach or by the case themselves. Suspect cases were sent to a health care provider and direction was provided regarding collecting specimens for both virus detection and serology (acute and convalescent). Cases were instructed regarding the infectious period of mumps disease. During this outbreak, an infectious period of 2 days before through 9 days after onset of parotid swelling was used. Cases were excluded from school, work, hockey practices and games during this period. The CD Unit requested immunization records from Junior Hockey League players and staff on the Merritt and Salmon Arm teams. Immunization records were not requested from the Trail league because the initial Trail case was not confirmed as mumps until the outbreak was over.

During the case interviews, contacts were identified. The CD Unit interviewed contacts to assess susceptibility to mumps and possible mumps illness. Those susceptible contacts were offered MMR vaccine through public health clinics. All cases and contacts were provided with education about the signs and symptoms of mumps

Immunization

Immunization interventions included:

- Requesting and documenting immunization records from mumps cases and close contacts
- Offering measles, mumps and rubella (MMR) immunizations to susceptible contacts - in response to the outbreak, three MMR doses were given in Trail, twenty doses were given in Merritt and zero doses were given in Salmon Arm.

Communications

IHA issued a number of communications to the public and medical community as efforts to control the outbreak.

- Letters to hockey team players, parents, and BCHL hockey Commissioners regarding the outbreak
- Letters to hockey team parents and BC Minor Hockey League
- Letter to Merritt Secondary School regarding possible exposure through hockey players who attended classes during infectious period of illness
- MHO newsletter and Update for Physicians (November 26, 2013)
- Briefing note to CIHS Public Health Nursing
- Mumps media lines November 22nd and December 13th
- 811 phone line to provide public information on mumps
- BCCDC mumps 2013 epidemiology summary

Recommendations

After declaring the outbreak over a debrief meeting with team members was held to review the outbreak process and make recommendations to improve it. The recommendations included:

- Ensure notifications of outbreaks and Briefing Notes are sent to P & P Managers and Team Leaders
- Consistent outbreak team membership for all outbreaks
- Monthly disease epidemiology summaries available on the Interior Health InsideNet site
- Offer public health staff education sessions on outbreak management and contact tracing
- Continue to provide lab testing protocols in *Medical Health Officer Updates* to health care providers

Appendix 3: Final Outbreak Report: Pertussis in Kootenay Boundary, Interior Health Authority, June – November 2013

Summary

In early June 2013, three cases of pertussis from Kootenay Boundary (KB) were reported to the CD Unit in one week; data from the last five years shows this region has an average of 11 cases reported per year (range 0 – 36 cases). By August 20, there were 19 confirmed cases and an outbreak investigation was initiated with representation from the CD Unit, CIHS public health nursing and administration, Medical Health Officer (MHO), and Communications. Outbreak measures ended on November 5 following a decline in cases. A post-outbreak debrief was held November 26, 2013.

Background

Historically, pertussis rates in the KB area have been higher than other regions of IHA (excluding KB) and outbreaks have occurred every three to four years among unimmunized or partially immunized populations. From 2008-2012, the pertussis rate for KB was 13.6 per 100,000; large outbreaks occurred in 2006 and 2010 and several clusters were investigated in 2012. By comparison, the rest of IHA had a pertussis rate of 2.4 per 100,000 for 2008-2012 with no major outbreaks. During this time frame, the proportion of children with their fourth or fifth dose of DaPTP after age four ranged from 67-71% in KB, compared to 73%-82% in other HSDA's in IHA.

Epidemiology

A total of 29 cases of pertussis (24 laboratory confirmed and five epidemiologically linked) were reported in KB from June 6 to November 5, 2013. Dates of paroxysmal cough onset ranged from May 11 to October 15, 2013. The age range of cases was two to 79 years (median = 20 years), with 15 adults and 14 children. Rates of infection were highest among the 10-14 year age group (Figure 2), followed by the five to nine year age group. Seventeen of the cases were female (59%). The cases occurred in Rossland (n=11), Trail (n=11), Nelson (n=2), Castlegar (n=2), Montrose (n=1), Fruitvale (n=1), Kaslo (n=1). There were five separate family clusters in this outbreak in Rossland (3 clusters), Trail (1 cluster), and Nelson (1 cluster) with two to four cases each. Of the 14 cases under the age of 20 years, seven were fully immunized for age, two were partially immunized, and five had no immunizations.

Figure 1

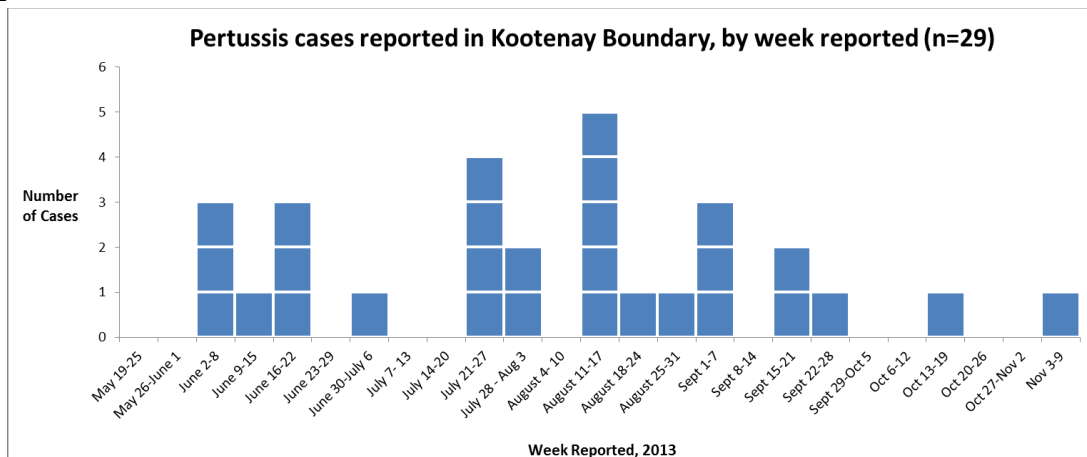


Figure 2

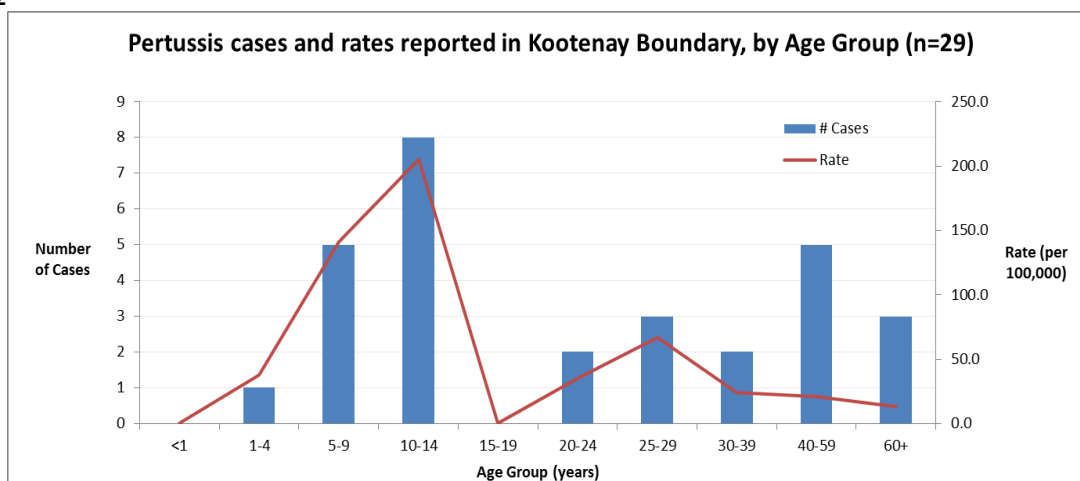
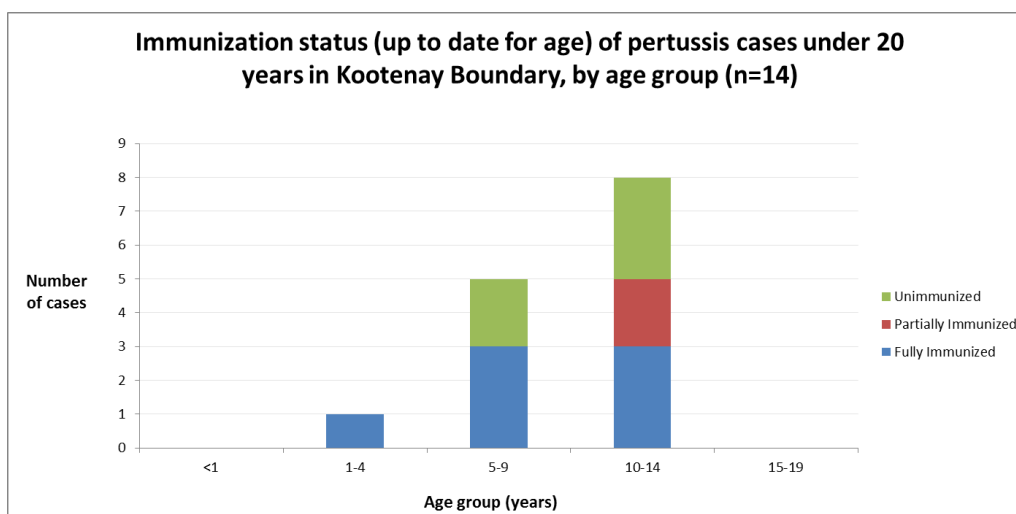


Figure 3



Public Health Interventions During the Outbreak

Immunization

Immunization interventions included:

- audits to identify infants and young children behind on their immunizations and arranging appointments to vaccinate these children;
- scheduling infant immunization appointments closely to the recommended schedule;
- immediate rescheduling of any cancelled or missed appointments;
- offering grade 9 Tdap immunization clinics earlier in the school year; and
- offering pregnant women in their third trimester and postpartum women free pertussis - containing vaccinations.

Communications

Communication interventions included letters and newsletters to parents of children who attended elementary and secondary schools in the Trail area; letters to daycares; letters to parents of youth who attended scout camps; an IHA media release (August 2013); pertussis cases posted on IHA website; MHO Physician Alert (July 2013); posters in emergency rooms and urgent care areas; updates to perinatal committees; and a MHO Update for physicians, pharmacists, midwives and travel medicine clinics (September 2013).

Recommendations

After declaring the outbreak over a debrief meeting with team members was held to review the outbreak process and make recommendations to improve it. The recommendations included:

- The CD Unit to use the upper prediction limit of incidence to support the MHO to trigger the outbreak response earlier
- Ensure all outbreak team members understand their roles and responsibilities
- Ensure CIHS public health (PH) staff receive communications about the outbreak
- Continue to call local media outlets after news releases to promote maximum media pick up
- Early connection with the media during an outbreak
- Establish a communication network for reaching midwives and pharmacists in local areas
- Develop an outbreak summary report and distribute to CIHS PH staff.