Vaccine Preventable and Invasive Bacterial Diseases Quarterly Report 2019 Quarter 1: January 1 – March 31, 2019

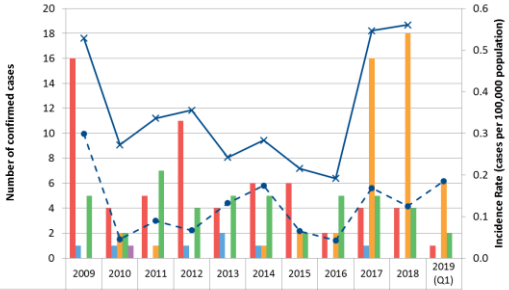
Highlights

- Serogroup W continues to predominate among invasive meningococcal disease cases
- Fewer invasive group A streptococcal disease cases reported than in the first quarter of 2017 and 2018
- The highest number of confirmed measles cases reported since 2014
- The invasive pneumococcal disease incidence rate decreased for the first time since 2015

Invasive Meningococcal Disease

Nine confirmed cases of invasive meningococcal disease (IMD) were reported in the first quarter of 2019. Six cases were serogroup W, two serogroup Y, and one serogroup B (Figure 1).

In the previous ten years, 2-13 (median=5) cases were reported between January 1 and March 31. The IMD incidence rate for the first quarter of 2019 was 0.18 cases per 100,000 population. In the previous ten years, the January-March IMD incidence rates ranged from 0.04 to 0.30 case per 100,000 population (median=0.11 cases per 100,000 population).



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019 (Q1)
Serogroup B	16	4	5	11	4	6	6	2	4	4	1
Serogroup C	1	1	0	1	2	1	0	0	1	0	0
Serogroup W	0	2	1	0	0	1	2	2	16	18	6
Serogroup Y	5	2	7	4	5	5	2	5	5	4	2
Unknown	0	1	0	0	0	0	0	0	0	0	0
Annual Incidence	0.53	0.27	0.34	0.36	0.24	0.28	0.22	0.19	0.55	0.56	
Quarter 1 Incidence	0.30	0.05	0.09	0.07	0.13	0.17	0.06	0.04	0.17	0.12	0.18

Figure 1. IMD case counts by serogroup and incidence rates, BC, 2009-2019 March 31

All cases were over 20 years of age (Figure 2). One case (serogroup W, 30-39 years age group) was fatal.

Four of the nine cases resided in Interior Health Authority (all serogroup W), two in Vancouver Coastal Health Authority (both serogroup W), two in Fraser Health Authority (both serogroup Y), and one on Vancouver Island (serogroup B).

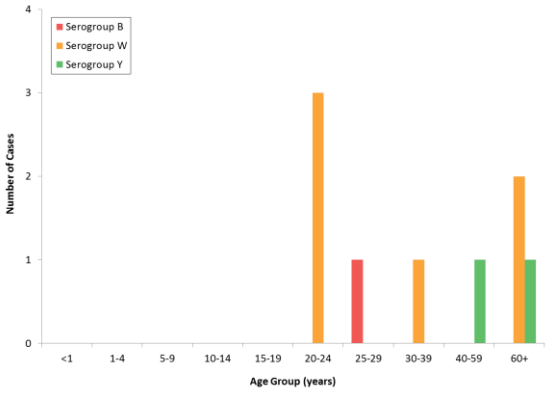


Figure 2. IMD cases by serogroup and age group, BC, January-March 2019

In late 2017, BC experienced an increase in serogroup W IMD, with an outbreak among adolescents in the Interior Health Authority. The outbreak strain was the ST-11 clonal complex (ST-11cc). In addition to the five outbreak cases, there were ten serogroup W ST-11cc cases in three health authorities in 2017.

High counts of serogroup W disease continued in 2018. Eight of the 18 serogroup W cases in 2018 had clonal complex information available; 7 were ST-11cc and one was ST-22cc. The ST-11cc cases were from four health authorities. Typing for the serogroup W cases in 2019 is not yet available.

None of the cases in 2019 reported risk factors for invasive meningococcal disease which warrant consideration of meningococcal immunization. One of the nine cases (serogroup B) reported travel during the exposure period. Two cases (serogroup W) were household contacts; none of the other cases were epidemiologically linked.

* 2019 incidence rates marked with an asterisk have been annualized based on the first quarter of the year without adjustment for seasonality.

Invasive Group A Streptococcal Disease

Eighty-nine cases of invasive group A streptococcal disease (iGAS) were reported in the first quarter of 2019. The year-to-date (YTD) incidence rate* was 7.2 cases per 100,000 population (Figure 3). This was slightly lower than the 2017 and 2018 annual incidence rates, which were the highest incidence rates ever observed in BC.

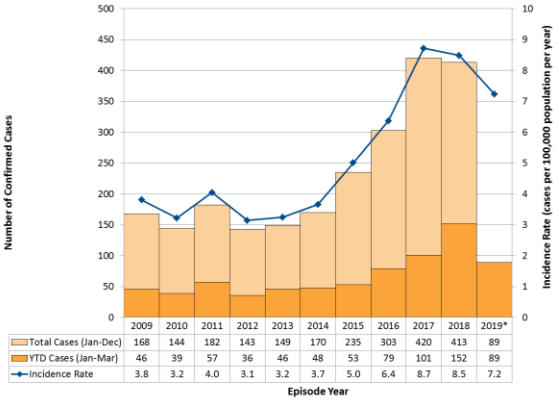


Figure 3. iGAS case counts and incidence rates by year, BC, 2009–2019 March 31*

Eight (9%) cases were under 10 years of age; the rest were over 25 years old. The highest YTD age-specific incidence rate* was in the 30-39 years age group (Figure 4).

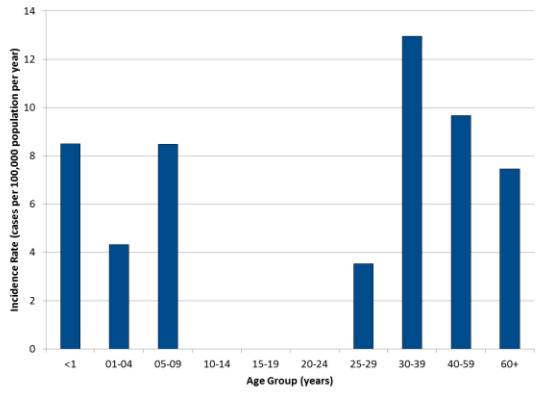


Figure 4. iGAS incidence rates* by age group, BC, 2019 (Jan-Mar)

Twenty-four cases (27%) were classified as severe (involving streptococcal toxic shock syndrome, soft tissue necrosis, meningitis, pneumonia, and/or death); three (3%) were fatal. In the previous ten years, 28% of cases (annual range 18-35%) were severe and 7% (annual range 4-14%) were fatal.

Two confirmed case of puerperal fever due to group A streptococcus have been reported to date in 2019. One case resulted in fetal death (miscarriage/ stillbirth) and the other in a live birth.

The most commonly reported risk factors or predisposing conditions were skin infections, wounds, and homelessness/under-housing (Table1).

Table 1. Risk factors and predisposing conditions reported by iGAS cases, BC, 2009-2018 and Quarter 1 of 2019

Risk Factor / Predisposing Condition	2009-2018	2019 Quarter 1
Skin Infection	24.3%	38.2%
Wound	32.5%	37.1%
Alcoholism	12.2%	12.4%
Chronic Cardiac Condition	16.4%	15.7%
Diabetes	14.2%	12.4%
Homeless/under-housed	14.4%	31.5%
Injection Drug Use	20.3%	29.2%
Immunocompromised	13.5%	6.7%
Chronic respiratory/ pulmonary condition	7.8%	15.7%

One case reported prior contact with a known iGAS case; these paired cases were siblings under 10 years of age. No other unusual clustering by onset date or age group was identified in the provincial dataset.

The BCCDC Public Health Laboratory provided National Microbiology Laboratory *emm* typing results for 45 (51%) of the cases reported to date in 2019. Seventeen different *emm* types have been identified this year. The most common *emm* types were *emm*81 (6 cases), *emm*77 (5 cases) and *emm*41 (5 cases).

* 2019 incidence rates marked with an asterisk have been annualized based on the first quarter of the year without adjustment for seasonality.

Measles

There were 26 confirmed cases of measles reported in the first quarter of 2019 (YTD incidence=2.12 cases per 100,000 population*), already higher than the annual number of cases reported in each of the previous four years (Figure 5).

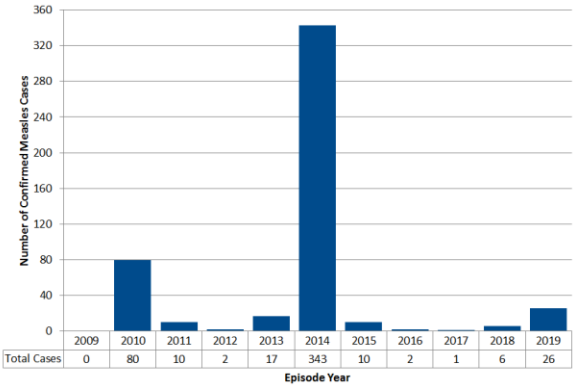


Figure 5. Measles case counts per year, BC, 2009-2019 March 31*

Five of the 26 cases were unrelated, sporadic travel-associated importations from the Philippines (n=4) or the United States (n=1). Two secondary cases resulted from these sporadic travel cases, one likely from a community exposure and one from household contact. Genotype B3 was identified in the Philippines-associated cases and genotype D8 in the United States-associated cases (Figure 6).

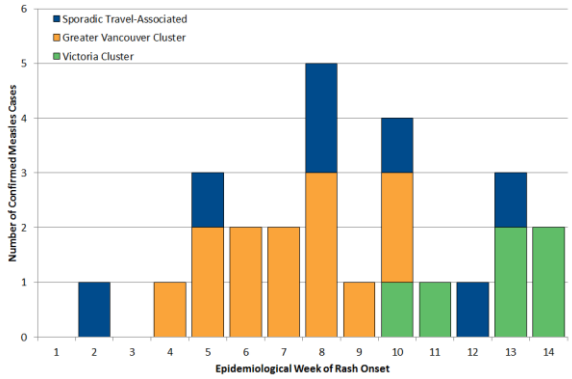


Figure 6. Measles case counts grouped by cluster per epidemiological week, BC, 2019 (Jan-Mar)

There were two larger clusters of cases noted during this time period (Figure 6). The first began in late January in Vancouver when three school-aged individuals developed measles following travel to Vietnam. Secondary transmission occurred in a school setting resulting in four additional cases. Subsequent to this, six more cases were confirmed in household contacts and individuals exposed in medical settings. Genotype D8 was associated with this cluster.

The second cluster also resulted from importations following travel to Vietnam. In this instance, two adult travellers returned to Victoria from Vietnam in March. Genotype D8 was isolated from one of the cases. Four additional cases, including one infant, were reported in the following three weeks in the same region. None of the secondary cases had recent travel or a confirmed epidemiological link to the primary cases. However, genotype D8 was also identified in all four individuals. No links to the Vancouver outbreak were identified.

Of the 26 confirmed cases, nine (35%) had not been vaccinated with the measles, mumps, and rubella (MMR) vaccine (Table 2). Eight cases (31%) were fully immunized with two documented doses of MMR, an expected finding in a population with high vaccination coverage.[1]

Table 2. MMR vaccination history for confirmed measles cases, BC, January-March 2019

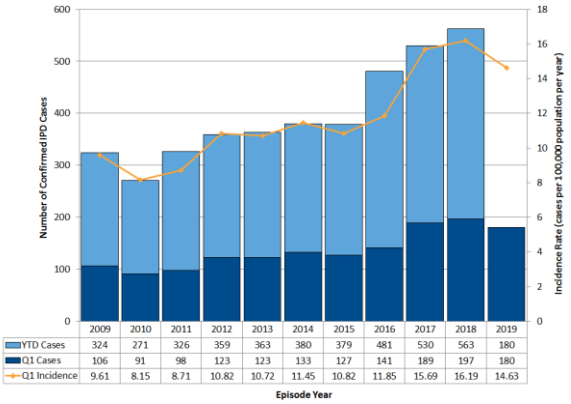
MMR Vaccination History	Confirmed Cases	
	N	(%)
0 doses	9	(35)
1 dose undocumented	2	(8)
2 dose undocumented	5	(19)
1 dose documented	2	(8)
2 doses documented	8	(31)

[1] WHO. Six common misconceptions about immunization: https://www.who.int/vaccine_safety/initiative/detection/immunization_misconceptions/en/index2.html

* 2019 incidence rates marked with an asterisk have been annualized based on the first quarter of the year without adjustment for seasonality.

Invasive Pneumococcal Disease

There were 180 cases of invasive pneumococcal disease (IPD) in the first quarter of 2019 giving a YTD incidence rate* of 14.6 cases per 100,000 population (Figure 7). This was a slight decrease from the first quarter counts recorded in 2017 and 2018 but still higher than 2016 when an increasing trend in IPD cases was first observed.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
YTD Cases	324	271	326	359	363	380	379	481	530	563	180
Q1 Cases	106	91	98	123	123	133	127	141	189	197	180
Q1 Incidence	9.61	8.15	8.71	10.82	10.72	11.45	10.82	11.85	15.69	16.19	14.63

Figure 7. IPD case counts and incidence rates per year, BC, 2009-2019 March 31*

The majority of cases were adults, with 57% of cases between 17 and 64 years. Thirteen cases (7%) were aged 16 years and younger. Compared to the previous ten years, a higher proportion of 2019 cases were aged 17 to 64 while lower proportions were seen for all other age groups (Figure 8).

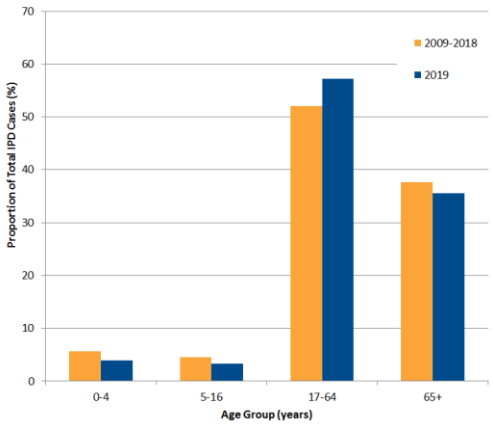
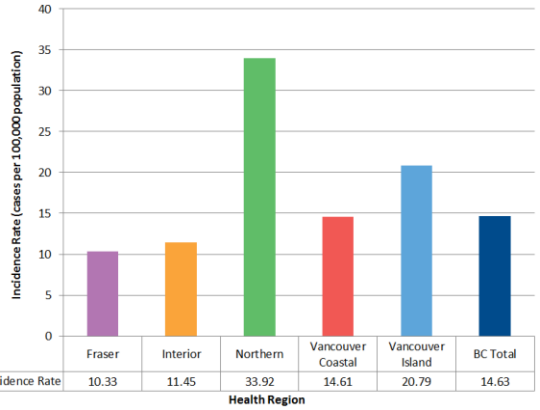


Figure 8. Age distribution of IPD cases, BC 2009-2018 and 2019 (Jan-Mar)

The highest YTD incidence rates* were observed in the Northern Health region at 33.9 IPD cases per 100,000 population followed by Vancouver Island at 20.8 IPD cases per 100,000 population (Figure 9).



	Fraser	Interior	Northern	Vancouver Coastal	Vancouver Island	BC Total
Incidence Rate	10.33	11.45	33.92	14.61	20.79	14.63

Figure 9. IPD incidence rates by health region, BC, 2019*

The BCCDC Public Health Laboratory provided National Microbiology Laboratory serotype results for 161 (89%) of the cases from 2019. Consistent with 2018, serotype 4 was the most common serotype in BC, accounting for 20% of 2019 cases with serotype information available (Table 3).

Additional BCCDC Reports

Influenza Surveillance Reports:
http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases/influenza-surveillance-reports

Invasive Group A Streptococcal Disease (iGAS) in British Columbia, 2018 Quarterly reports:
http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases see Respiratory Diseases

Measles and Mumps Epidemiological Summaries:
http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases see Vaccine Preventable Diseases

Reportable Diseases Dashboard:
http://www.bccdc.ca//health-professionals/data-reports/reportable-diseases-data-dashboard

* 2019 incidence rates marked with an asterisk have been annualized based on the first quarter of the year without adjustment for seasonality.

Table 3. Serotype distribution of confirmed invasive pneumococcal disease (IPD) cases, by age group, BC, 2019

		Quarter 1 (January 1 – March 31, 2019)				
Serotype	**Vaccine type†**	**<5 years**	**5-16 years**	**17-64 years**	**65+ years**	**Q3 Total**
4	PCV13	-	-	27	5	32
7F	PCV13	1	-	13	1	15
3	PCV13	-	-	5	8	13
20	PPV23	-	-	10	2	12
19A	PCV13	-	1	3	5	9
11A	PPV23	3	-	1	4	8
12F	PPV23	-	-	6	2	8
22F	PPV23	1	-	3	4	8
9N	PPV23	-	-	4	4	8
16F	NVT	-	-	5	2	7
Other‡	-	1	1	18	21	41
Unknown	-	1	4	8	6	19

‡ The top ten serotypes of 2019 shown, all other known serotypes are grouped as "Other". For this report other includes: 19F, 8, 6C, 23B, 15A, 23A, 31, 33F, 35F, 14, 15B, 17F, 28A, 34
†Serotypes in both PCV13 and PPV23 (4, 6B, 9V, 14, 18C, 19F, 23F, 1, 5, 7F, 3, 19A) are denoted as PCV13. NVT = Non-vaccine serotype.

Data Notes

Data for invasive meningococcal disease, invasive group A streptococcal disease, measles, and mumps are sourced from reporting by BC health authorities using forms specifically designed for each disease, and sometimes reconciliation with laboratory data. Data for all other diseases are sourced from the health authorities' investigation reports in Panorama.

To calculate incidence rates, population numbers were from the BC Stats Population Estimates for years prior to 2018, and from the BC Stats P.E.O.P.L.E. (Population Extrapolation for Organizational Planning with Less Error) Projection for 2018 and 2019 (https://www2.gov.bc.ca/gov/content/data/about-data-management/bc-stats). The Population Estimates were updated April 2017 and the P.E.O.P.L.E. Projections were updated September 2018.

Numbers in this report were generated April 15-17, 2019 and are subject to change due to possible late reporting and/or data clean up.

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Summary Table of Select Reportable Diseases

Disease		Quarter 1 (January 1-March 31, 2019)					
		FHA	IHA	NHA	VCHA	VIHA	BC
Diphtheria - carrier	*Count*	1	-	-	-	-	1
	*Incidence**	0.2	-	-	-	-	0.08
Haemophilus influenzae, type a	*Count*	1	-	-	-	-	1
	*Incidence**	0.2	-	-	-	-	0.1
Haemophilus influenzae, type f	*Count*	-	1	1	-	-	2
	*Incidence**	-	0.5	1.4	-	-	0.2
Haemophilus influenzae, non-typeable	*Count*	4	3	1	3	1	12
	*Incidence**	0.9	1.6	1.4	1.0	0.5	1.0
Haemophilus influenzae, type unknown	*Count*	1	-	-	-	-	1
	*Incidence**	0.2	-	-	-	-	0.1
Invasive group A streptococcal disease	*Count*	22	20	3	32	12	89
	*Incidence**	4.7	10.4	4.2	10.6	5.9	7.2
Invasive pneumococcal disease	*Count*	48	22	24	44	42	180
	*Incidence**	10.3	11.5	33.9	14.6	20.8	14.6
Invasive meningococcal disease	*Count*	2	4	-	2	1	9
	*Incidence**	0.4	2.1	-	0.7	0.5	0.7
Measles	*Count*	8	2	-	10	6	26
	*Incidence**	1.7	1.0	-	3.3	3.0	2.1
Mumps	*Count*	2	-	-	5	1	8
	*Incidence**	0.4	-	-	1.7	0.5	0.7
Pertussis	*Count*	22	15	4	9	31	81
	*Incidence**	4.7	7.8	5.7	3.0	15.3	6.6

* Quarterly incidence rates are calculated as annual incidence rates (cases per 100,000 population per year), without adjusting for seasonality.

Note: No cases were reported for the following diseases: diphtheria - acute case, tetanus, poliomyelitis, rubella, and *Haemophilus influenzae* types b, c, d and e. Influenza surveillance data are provided in the British Columbia Influenza Surveillance Reports.