

## Invasive Group A Streptococcal Disease (iGAS) in British Columbia 2018 Quarter 1: January 1 – March 31, 2018

### Background

In 2017, BC experienced the highest observed provincial incidence of iGAS since iGAS became notifiable in 1997.<sup>1</sup> No unusual clustering by date of onset or age group was identified in the provincial data set based on reporting from health authorities. *Emm* type 1 was the most frequently identified in 2017; however, no single *emm* type explained the increased incidence and *emm* type distribution varied over the span of the year.

Epidemiologic summaries are being prepared quarterly to monitor iGAS trends in BC. This epidemiologic summary for the quarter from January 1 to March 31, 2018 was prepared with data reported to the BCCDC by April 17 and National Microbiology Laboratory data available to April 19, 2018. Rate calculations are annualized without adjustment for seasonality in order to provide an incidence estimate which can be related to annual rates of reported iGAS in prior years.

### Surveillance Data

#### **Confirmed Case Reports**

In the first quarter of 2018, 143 confirmed iGAS cases were reported in BC. The year-to-date (YTD) incidence rate was 11.8 cases per 100,000 population per year (Figure 1). In the previous ten years, 36-103 (median = 51) cases were reported in the first three months of the year and the annual incidence rates ranged from 3.1 to 8.7 (median = 3.9) case per 100,000 population.

#### **Geographic distribution**

In the first quarter of 2018, the Health Authority YTD incidence rates ranged from 11.1 to 13.2 cases per 100,000 population (Figure 2).

#### **Age distribution**

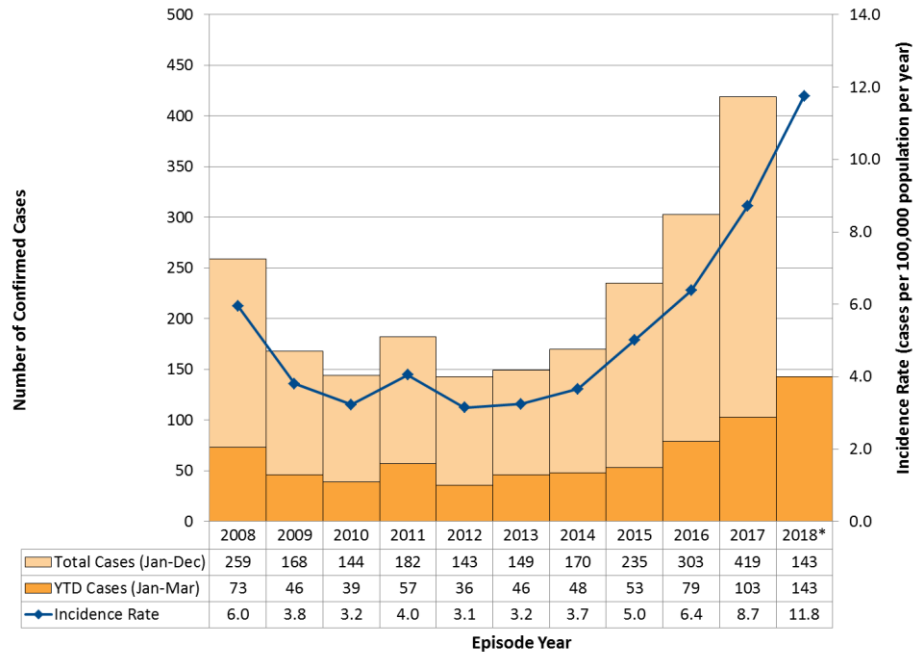
To date in 2018, cases ranged in age from 3 to 95 years (median 47 years). In the previous ten years, the age range of cases was 0-104 years (median 47 years). The largest proportions of cases were in the 40-59 and 60+ year age groups (Figure 3). The age distribution of cases in 2018 is similar to the age distribution of cases in prior years; however, there are slight increases in the proportions of cases in the 1-4 year and 10-14 year age groups and all age groups over 30 years.

To date in 2018, the highest age-specific incidence rates are in the 40-59 year and 30-39 year age groups (Figure 4).

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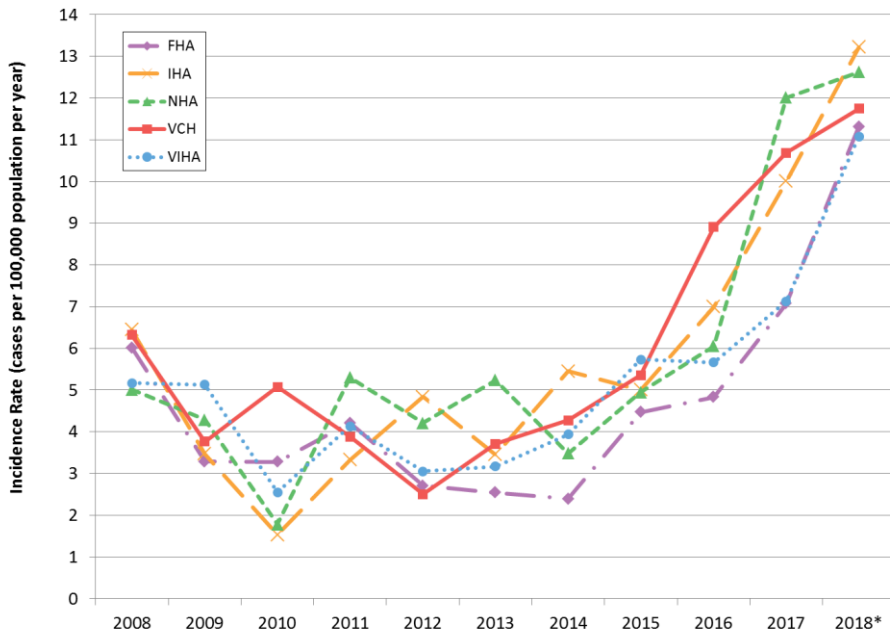
<sup>1</sup> BC Centre for Disease Control. Invasive Group A Streptococcal Disease (iGAS) in British Columbia, 2017 Annual Summary. Available online at: <http://www.bccdc.ca/resource-gallery/Documents/Statistics%20and%20Research/Statistics%20and%20Reports/Immunization/Coverage/BC%20iGas%202017%20Epi%20Summary.pdf> [Accessed: April 20, 2018].

**Figure 1. Invasive group A streptococcal disease cases and incidence rates\* by year, British Columbia, 2008–2018 (January 1 – March 31)**



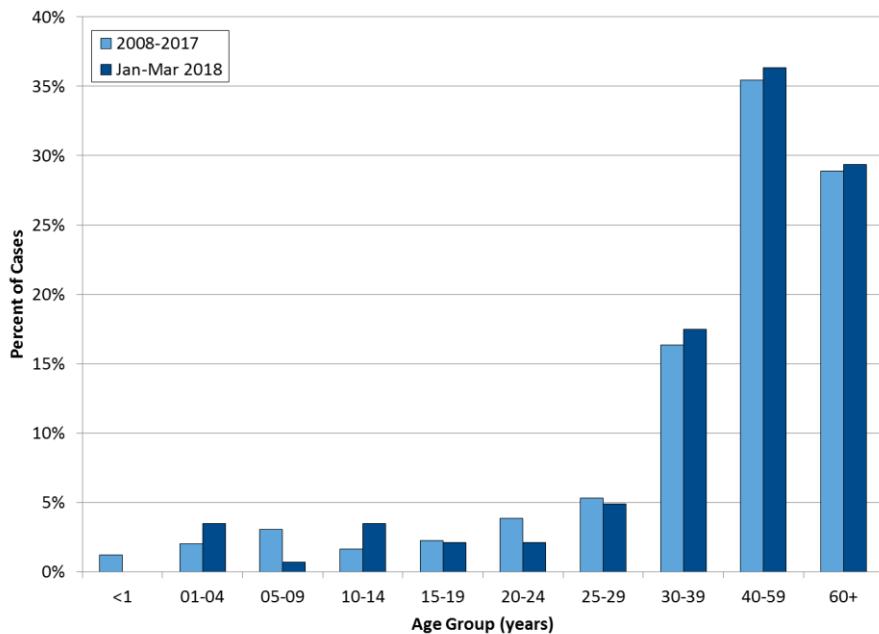
\* The 2018 incidence rate has been calculated as an annual incidence rate, without adjusting for seasonality.

**Figure 2. Invasive group A streptococcal disease incidence rates\* by health authority and year, British Columbia, 2008-2018**

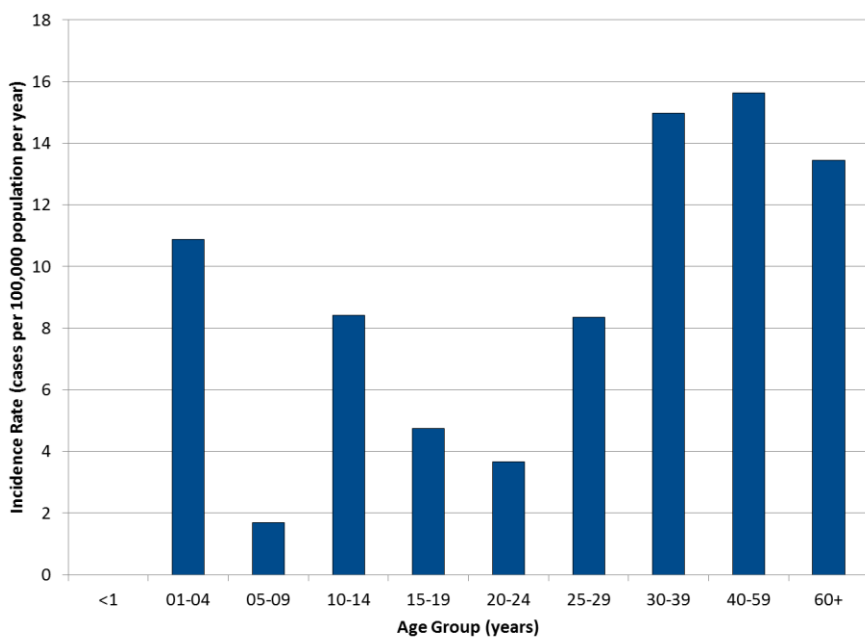


\* The 2018 incidence rates have been calculated as annual incidence rates, without adjusting for seasonality.

**Figure 3.** Age distribution of invasive group A streptococcal disease cases, British Columbia, 2008-2017 and January-March 2018



**Figure 4.** Invasive group A streptococcal disease incidence rates\* by age group, British Columbia, January-March 2018

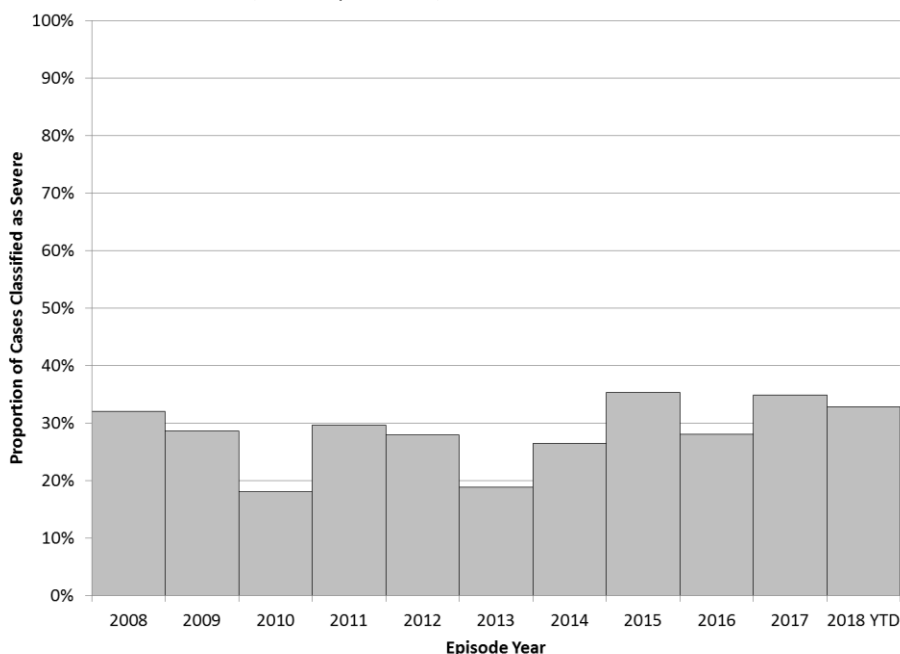


\* The 2018 incidence rates have been calculated as annual incidence rates, without adjusting for seasonality.

### Severity

Severe cases were defined as those reported with toxic shock syndrome, soft tissue necrosis (necrotizing fasciitis/myositis/gangrene), GAS pneumonia, meningitis or death. Attribution of death to GAS infection could not be determined from the surveillance data; all cases where death was reported as the outcome were included. To date in 2018, 33% of cases were classified as severe; in the previous decade, 29% were severe, with annual severity rates ranging from 18% to 35% of cases (Figure 5).

**Figure 5.** Proportion of invasive group A streptococcal disease cases classified as severe, British Columbia, 2008-2018 (January-March)



Eleven cases were reported with death as the outcome (case fatality rate=7.7%). In the previous decade, annual case fatality rates ranged from 4.1% to 13.7% (median 7.4%). Case fatality rates vary by age group (Table 1).

**Table 1.** iGAS case fatality rates by age group, British Columbia, 2018 (January-March) and 2008-2017

Age Group (years)	2018 YTD			2008-2017
	Cases	Deaths	Case Fatality Rate	Case Fatality Rate
<5	5	0	0%	10%
05-09	1	0	0%	8%
10-19	8	2	25%	7%
20-39	35	0	0%	3%
40-59	52	3	6%	7%
60+	42	6	14%	11%
<b>Total</b>	<b>143</b>	<b>11</b>	<b>8%</b>	<b>7%</b>

Two confirmed case of puerperal fever due to group A streptococcus have been reported to date in 2018. One case followed a spontaneous abortion; the other was associated with a live birth.

***Risk Factors and Predisposing Conditions***

Larger proportions of 2018 cases reported the following risk factors and predisposing conditions compared to cases in the previous ten years: alcoholism, chronic cardiac condition, diabetes, homelessness/under-housing, injection drug use, and skin infections (Table 2). It is unclear whether these increases may reflect more complete reporting, as prior to January 2017, this information was reported through completion of a single ‘tick box’. Since January 2017 reporting requires selection of one of the following responses for each risk factor and predisposing condition: yes/ no/ asked but unknown/declined to answer/not assessed. More than one condition can be reported for a case.

**Table 2.** Risk factors and predisposing conditions reported for iGAS cases, British Columbia, 2008-2017 and 2018 (January-March)

Risk Factor / Predisposing Condition	2008-2017	2018 YTD
Alcoholism	11.8%	12.6%
Chronic Cardiac Condition	13.6%	18.2%
Diabetes	12.7%	18.2%
Homeless/under-housed	10.4%	22.4%
Injection Drug Use	19.8%	22.4%
Immunocompromised	13.9%	8.4%
Skin Infection	21.6%	23.8%
Wound	32.8%	25.9%

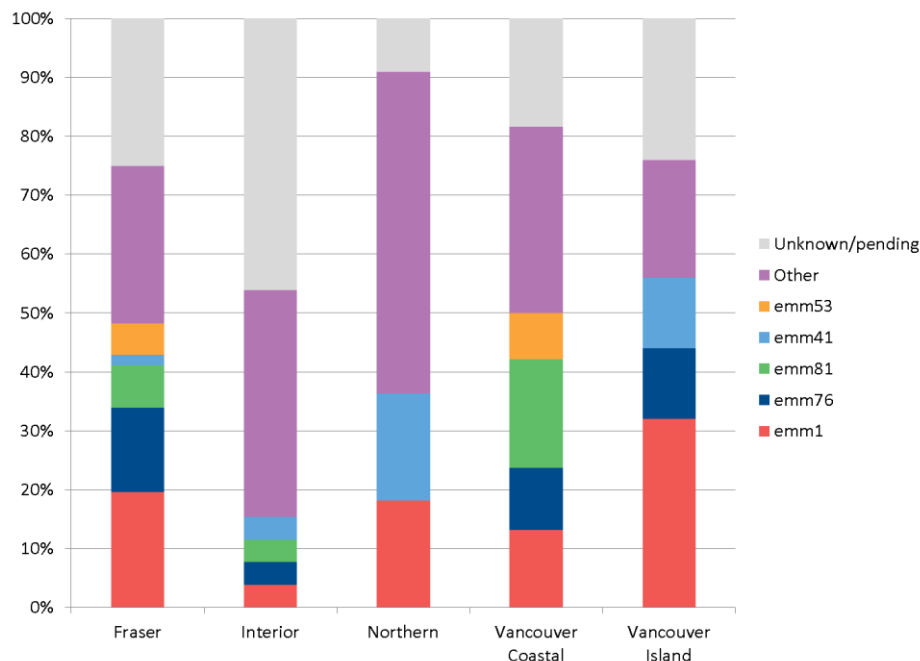
***Clusters and Investigations***

No defined clusters or outbreaks have been notified to BCCDC.

### Emm Typing

The BCCDC Public Health Laboratory provided National Microbiology Laboratory *emm* typing results for 103 of the cases reported to date in 2018. The three most common *emm* types in 2018 are *emm1* (n=27; 26% of known *emm* types), *emm76* (n=16; 16%) and *emm81* (n=12; 12%). The *emm* distribution varies by Health Authority (Figure 6).

**Figure 6.** iGAS *emm* type distribution by health authority, British Columbia, 2018 (January-March)



Case risk factor profiles varied by *emm* type. Large proportions of *emm76* cases reported homelessness/under-housing, injection drug use, wounds and skin infections (Table 3). Large proportions of *emm81* cases reported homelessness/under-housing, injection drug use and chronic cardiac conditions. Over one quarter of *emm1* cases had no underlying risk factors or predisposing conditions.

**Table 3.** Proportions of iGAS cases reporting risk factors and predisposing conditions by *emm* type, British Columbia, 2018 (Jan-March)

Risk Factor / Predisposing Condition	<i>emm1</i>	<i>emm76</i>	<i>emm81</i>	Other	Unknown	Total 2018
Alcoholism	11.1%	6.3%	0.0%	18.8%	12.5%	12.6%
Chronic Cardiac Condition	11.1%	18.8%	41.7%	22.9%	10.0%	18.2%
Diabetes	14.8%	31.3%	8.3%	20.8%	15.0%	18.2%
Homeless/under-housed	3.7%	50.0%	58.3%	18.8%	17.5%	22.4%
Injection Drug Use	3.7%	43.8%	58.3%	18.8%	20.0%	22.4%
Immunosuppressive condition	3.7%	18.8%	8.3%	12.5%	2.5%	8.4%
Chronic respiratory/pulmonary condition	7.4%	6.3%	8.3%	8.3%	10.0%	8.4%
Wound	14.8%	43.8%	16.7%	27.1%	27.5%	25.9%
Skin Infection	11.1%	56.3%	25.0%	31.3%	10.0%	23.8%
Responded “No” for all risk factors and predisposing conditions	26.4%	0.0%	0.0%	3.6%	7.7%	8.7%

Cases with *emm1* were more likely to have severe presentations, including toxic shock syndrome and death, with a case fatality rate of 22% (Table 4).

**Table 4.** Indicators of severity by *emm* type, British Columbia, 2018 (Jan-March)

	<i>emm</i> Type										Total	
	<i>emm1</i>		<i>emm76</i>		<i>emm81</i>		Other		Unknown			
	n= 27	n= 16	n= 12	n= 48	n= 40	n= 143						
	#	%	#	%	#	%	#	%	#	%	#	%
Death	6	22.2%	0	0.0%	0	0.0%	3	6.3%	2	5.0%	11	7.7%
Soft tissue necrosis	2	7.4%	1	6.3%	1	8.3%	1	2.1%	2	5.0%	7	4.9%
Toxic shock syndrome	12	44.4%	1	6.3%	0	0.0%	6	12.5%	4	10.0%	23	16.1%
Any severe presentation*	16	59.3%	3	18.8%	4	33.3%	13	27.1%	11	27.5%	47	32.9%

\* Severe cases are defined as those with toxic shock syndrome, soft-tissue necrosis (including necrotizing fasciitis, myositis or gangrene), meningitis, pneumonia, or an outcome of death. No cases of meningitis were reported in this time period.

### Laboratory Data

As of April 19, 2018, the National Microbiology Laboratory had provided *emm* typing for 138 British Columbia *Streptococcus pyogenes* isolates from cases reported in 2018. The most common *emm* types in 2018 were *emm1* (n=22; 16%), *emm76* (n=12; 9%), and *emm81* (n=10; 7%) (Figure 7). The most common *emm* types in 2011-2017 were *emm1* (20%), *emm89* (8%) and *emm101* (8%).

The age distribution of cases varied by *emm* type with a larger proportion of *emm1* cases among young children and the 60+ year age group, a larger proportion of *emm76* cases in the 60+ year age group, and a larger proportion of *emm81* cases in the 40-59 year age group (Figure 8).

Since the beginning of 2016, the *emm* type distribution has varied month to month (Figure 9).

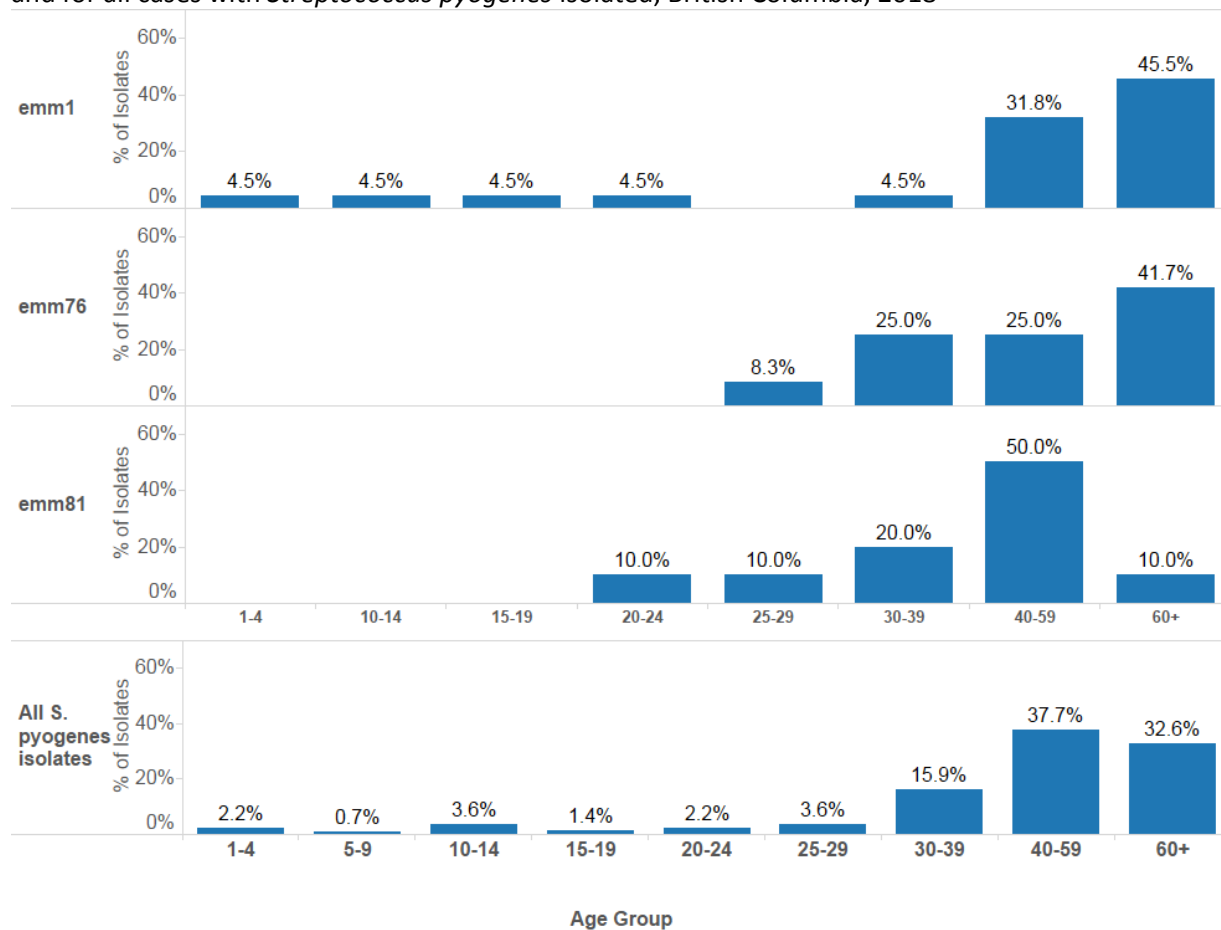
**Figure 7. *Streptococcus pyogenes* emm types by year, British Columbia, 2011-2018\***

emm Type	Date Specimen Collected							
	2011	2012	2013	2014	2015	2016	2017	2018
1	56	42	27	28	19	28	72	22
101	1	1	1	13	11	38	39	8
102	1		2		2		1	
11	1	3	7	11	11	8	5	
12	22	8	11	6	12	12	23	5
2	7	3	3	3	2	7	9	4
22	3		8	2	4	1	1	
28	14	14	14	14	14	6	8	1
3	1			3	7	9	7	4
4	4	10	10	12	11	10	9	2
41				1	1		10	6
53	3			2		3	12	4
58	2	2	1	1			2	
59	7	1		1	1	1	5	
6	5	2	1	4	1	1	3	1
73		1		2	1	1	1	
74					6	12	2	
75	3	1	1	2		1	3	2
76	1		1	2	2	2	50	12
77	6	5	10	2	8	10	9	
80	5	2	12	12	8	3	1	1
81		3	1	3	8	9	28	10
82	2			4	15	45	25	4
83	2	4	1	4	3	6	11	
87	3	3	5	6	6	10	5	
89	18	11	20	20	13	10	20	4
9	1			1			4	
91						1	2	2
92				1			6	1
93		1			1	4	2	

\* The top 30 *emm* types (by count) since 2011 are included. Data for specimens collected in 2018 are as of April 19, 2018.



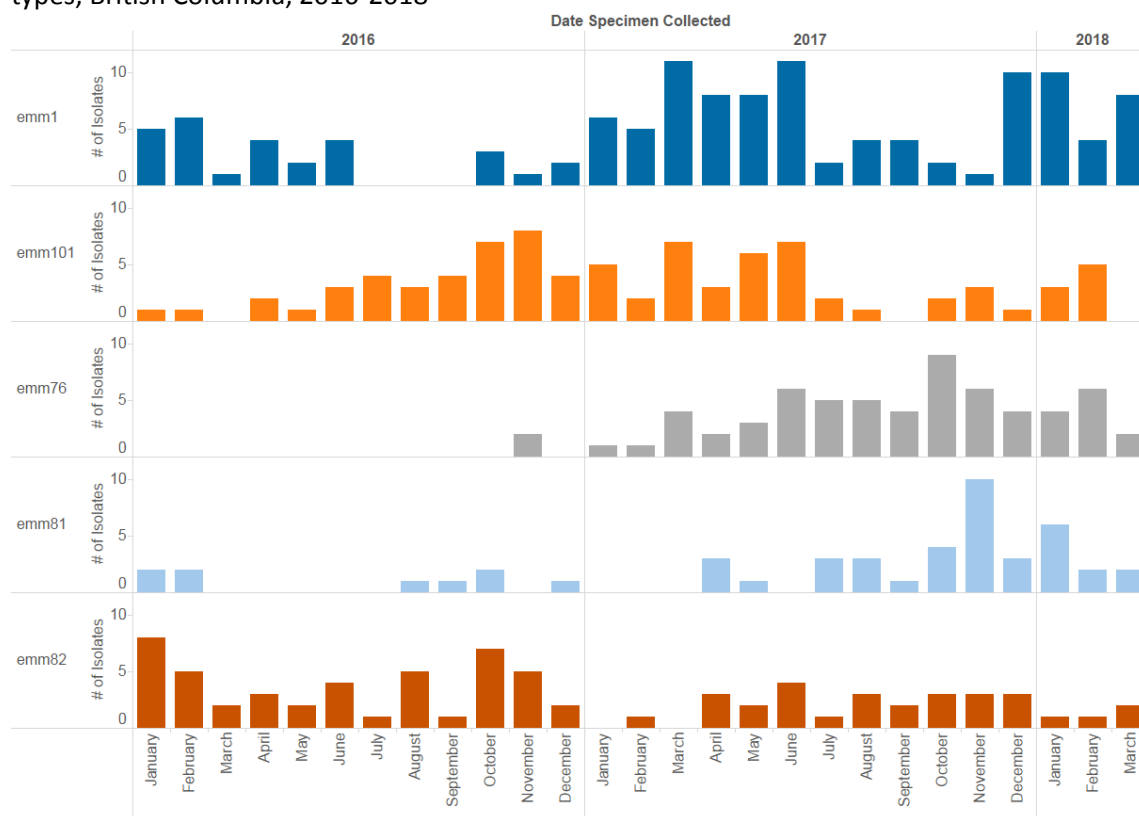
**Figure 8.** Age distribution of cases for the most frequently identified *Streptococcus pyogenes* emm types and for all cases with *Streptococcus pyogenes* isolated, British Columbia, 2018\*



Note: The number of isolates was 138 for all *S. pyogenes*, 22 for *emm1*, 12 for *emm76*, and 10 for *emm81*.

\*Data for specimens collected in 2018 are as of April 19, 2018.

**Figure 9.** Number of *Streptococcus pyogenes* isolates by *emm* type and month collected, top 5 *emm* types, British Columbia, 2016-2018\*



\*Data for specimens collected in 2018 are as of April 19, 2018.

### Conclusions

- The high incidence rates observed in 2016-17 have continued into the first part of 2018, with incidence rate surpassing those observed previously in BC.
- No unusual clustering by date of onset or age group was identified in the provincial data set.
- Injection drug use and/or homelessness/under-housing were reported risk factors among a large proportion of cases, particularly among cases with *emm76* and *emm81*.
- *Emm* type 1 is the most frequently identified in Q1 of 2018, particularly in pediatric cases; however, it is not as common in the homeless/under-housed and injection drug using populations.
- No single *emm* type explains the increased incidence; *emm* type distribution varies month to month.

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