

## Invasive Group A Streptococcal Disease (iGAS) in British Columbia 2018 Annual Summary

### Background

In 2017, BC experienced the highest observed provincial incidence of iGAS since this disease became notifiable in 1997.<sup>1</sup> No unusual clustering by date of onset or age group was identified in the provincial data. *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.

During 2018, epidemiologic summaries were prepared quarterly to monitor the increase.<sup>2</sup> This annual epidemiologic summary was prepared with data reported to the BCCDC by April 30, 2019, and includes National Microbiology Laboratory data.

### Confirmed Case Reports

In 2018, 413 confirmed cases of iGAS cases were reported in BC and the annual incidence rate was 8.3 cases per 100,000 population (Figure 1). In the previous ten years, 143-420 (median = 176) cases were reported annually and annual incidence rates ranged from 3.1 to 8.5 (median = 3.9) case per 100,000 population.

The 2018 annual incidence rate is slightly lower than the 2017 incidence rate (8.5 cases per 100,000 population). In the first quarter of 2018, the numbers of cases reported each month exceeded the maximum numbers reported during the same months in the previous ten years (Figure 2). In eight of the following nine months, the monthly numbers of cases reported were below the historic maximums; however, these remained above the medians.

### Geographic Distribution

The 2018 annual incidence rates in the five BC regional health authorities ranged from 7.7 to 13.2 cases per 100,000 population (Figure 3). Compared to the 2017 incidence rates, the 2018 annual incidence rates increased in the Vancouver Island and Northern Health Authorities, and decreased in the Fraser, Interior and Vancouver Coastal Health Authorities.

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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/health-professionals/data-reports/communicable-diseases> [Accessed: May 2, 2019].

<sup>2</sup> BC Centre for Disease Control. Invasive Group A Streptococcal Disease (iGAS) in British Columbia, 2018 Quarterly Reports. Available online at: <http://www.bccdc.ca/health-professionals/data-reports/communicable-diseases> [Accessed May 2, 2019].

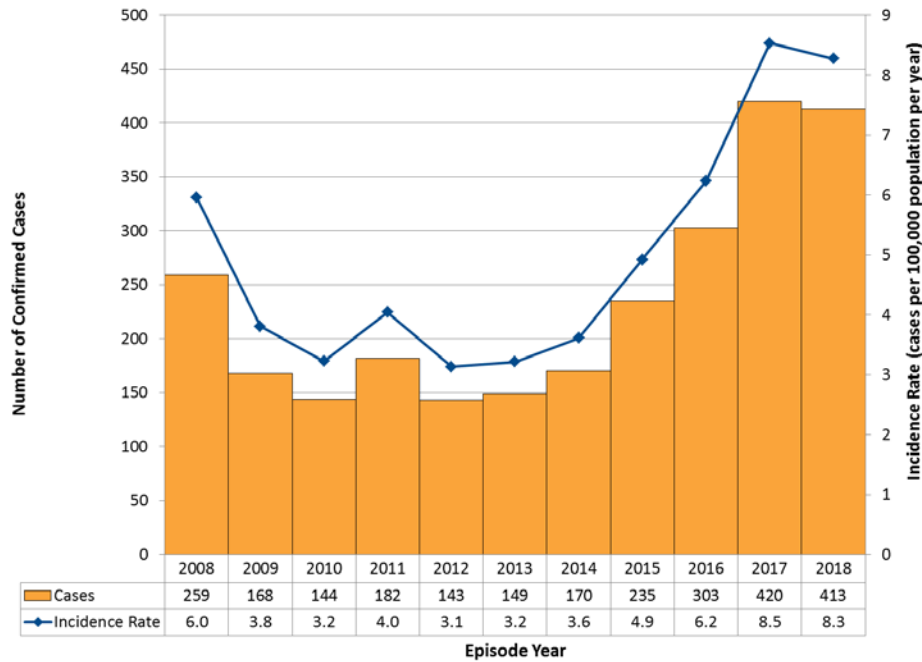


Figure 1. Invasive group A streptococcal disease cases and incidence rates by year, British Columbia, 2008–2018

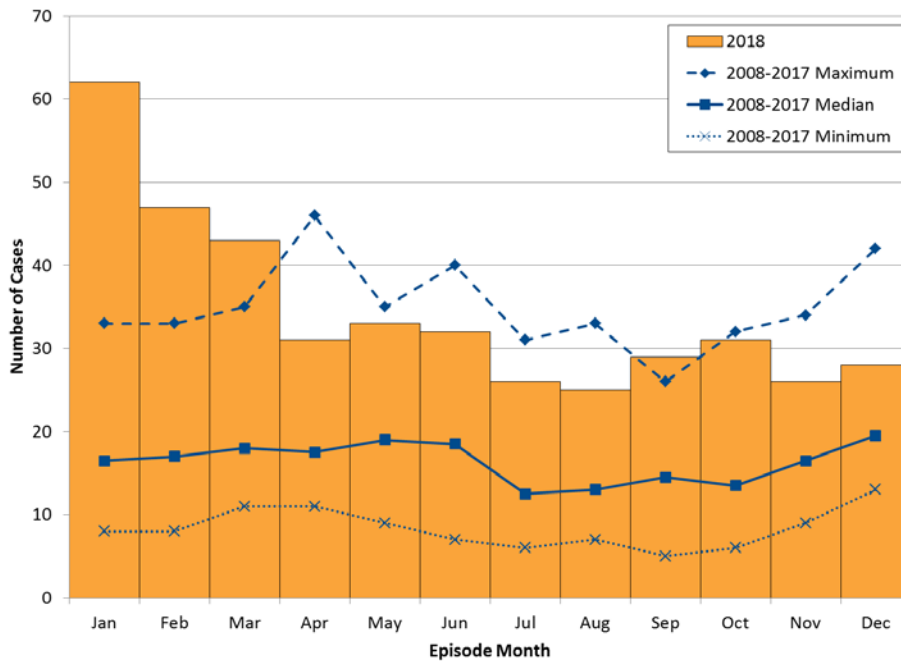
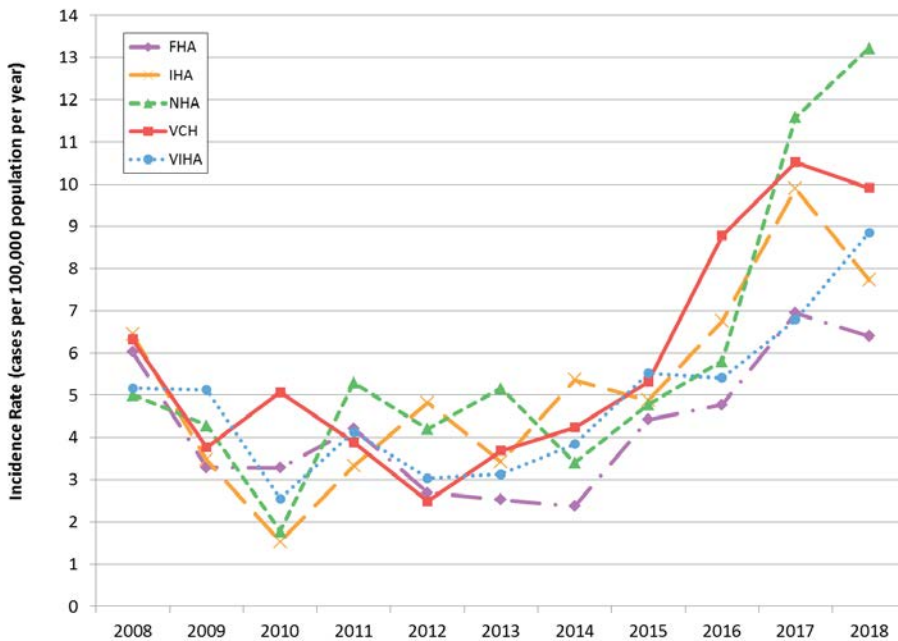


Figure 2. Invasive group A streptococcal disease case counts by month, British Columbia, 2008-2017 and 2018



**Figure 3.** Invasive group A streptococcal disease incidence rates by health authority and year, British Columbia, 2008-2018

### Age distribution

In 2018, cases ranged in age from 2 to 101 years (median 49 years). In the previous ten years, the age range of cases was 0-104 years (median 47 years). Similar to previous years, the largest proportions of cases were in the 40-59 and 60+ years age groups (Figure 4). The age distribution of cases in 2018 was similar to the age distribution of cases in prior years; however, there were slight increases in the proportions of cases in the 30-39 and 60+ years age groups.

In 2018, the highest age-specific incidence rates were in the 30-39 years age group, followed by the 60+ and 40-59 years age groups (Figure 5).

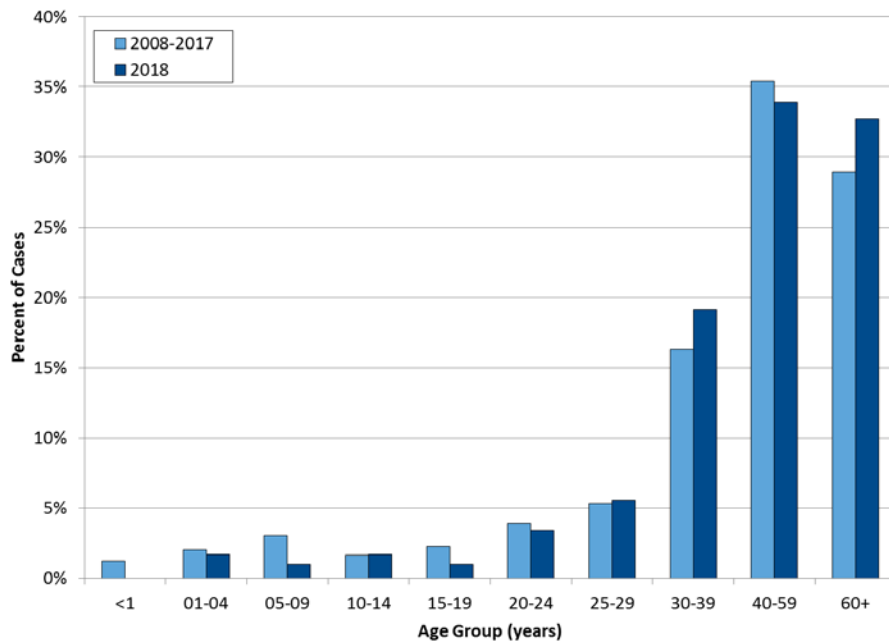


Figure 4. Age distribution of invasive group A streptococcal disease cases, British Columbia, 2008-2017 and 2018

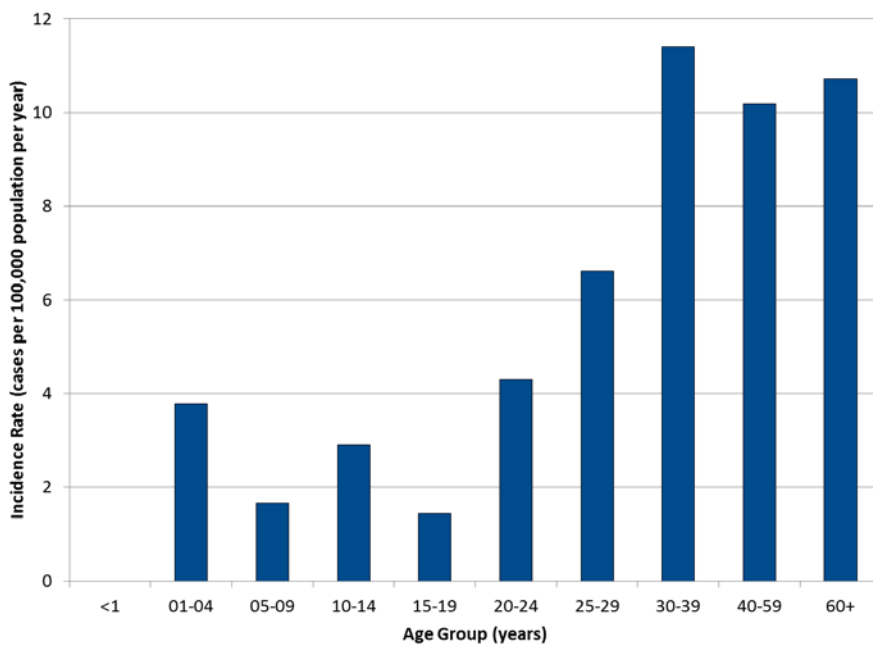
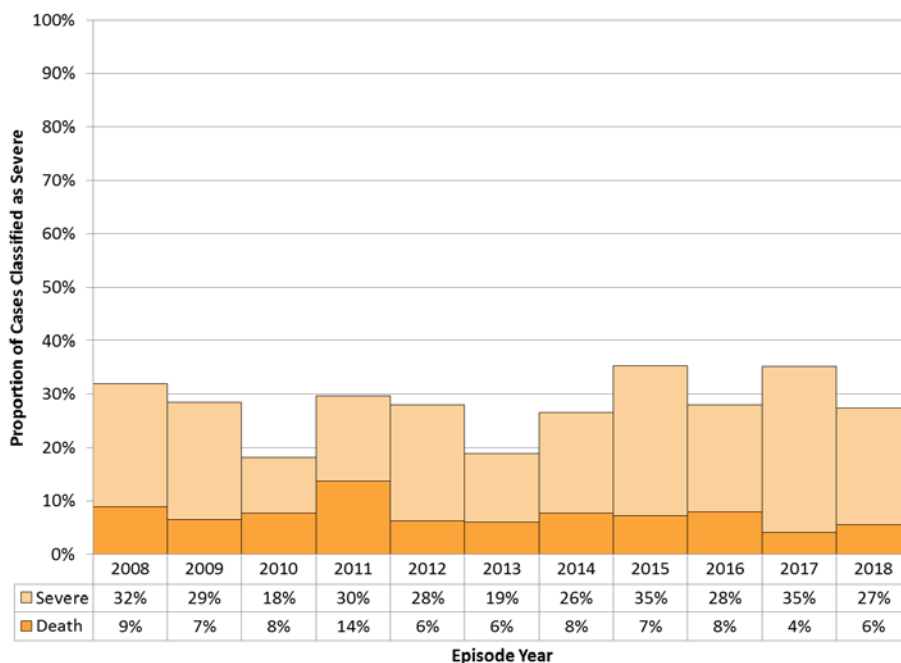


Figure 5. Invasive group A streptococcal disease incidence rates by age group, British Columbia, 2018

## Severity

Severe cases are defined as confirmed cases reported with toxic shock syndrome, soft tissue necrosis (necrotizing fasciitis/myositis/gangrene), group A streptococcal pneumonia, meningitis or death due to iGAS. Attribution of death to iGAS could not be determined from the surveillance data because cause of death was not reported, or it was reported as “unknown”, for over 40% of fatal cases. For this analysis, all cases where the outcome was reported as death were classified as severe. In 2018, 27% 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 6).



**Figure 6.** Proportion of invasive group A streptococcal disease cases classified as severe, British Columbia, 2008-2018

In 2018, a larger proportion of cases were reported with toxic shock syndrome (12%) compared to the previous decade (Table 1). There are no other temporal trends in reports of the severe presentations (data not shown).

**Table 1.** Severe presentations of iGAS cases, British Columbia, 2008-2017 and 2018

Presentation	2018		Median	Minimum	Maximum
	#	%			
Soft tissue necrosis	29	7%	8%	4%	10%
Toxic shock syndrome	49	12%	7%	2%	11%
Pneumonia	54	13%	11%	5%	18%
Meningitis	1	0%	1%	0%	2%
Death	23	6%	7%	4%	14%
Any severe presentation	113	27%	28%	18%	35%

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.

The 2018 case fatality rate was 6%. In the previous ten years, the annual case fatality rate ranged from 4% to 14% (median=7%). The 10-19 years age group had the highest case fatality rate in 2018 (Table 2).

**Table 2.** iGAS case fatality rates by age group, British Columbia, 2018 and 2008-2017

Age Group (years)	2018			2008-2017
	Cases	Deaths	Case Fatality Rate	Case Fatality Rate
<5	7	0	0%	10%
5-9	4	0	0%	8%
10-19	11	2	18%	7%
20-39	116	2	2%	3%
40-59	140	8	6%	7%
60+	135	11	8%	11%
Total	413	23	6%	7%

Four confirmed cases of puerperal fever due to group A streptococcus were reported in 2018. One case followed a spontaneous abortion; three were associated with live births. In the previous ten years, 1-5 (median=3) confirmed cases of puerperal fever due to group A streptococcus were reported each year.

### Risk Factors and Predisposing Conditions

Larger proportions of 2018 cases reported all risk factors and predisposing conditions, except “immunocompromised”, when compared to cases in the previous ten years (Table 3). It is unclear whether these increases reflect more complete reporting, as prior to January 2017, this information was reported through completion of a single ‘tick box’ per risk factor. 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 3.** Risk factors and predisposing conditions reported for iGAS cases, British Columbia, 2008-2017 and 2018

Risk Factor / Predisposing Condition	2008-2017	2018
Alcoholism	11.8%	13.6%
Chronic Cardiac Condition	13.5%	25.4%
Diabetes	12.6%	20.1%
Homeless/under-housed	10.4%	26.6%
Injection Drug Use	19.8%	25.7%
Immunocompromised	13.9%	10.9%
Chronic respiratory/pulmonary condition	6.3%	11.6%
Skin Infection	21.6%	32.2%
Wound	32.7%	36.6%

### Clusters and Investigations

No outbreaks were notified to BCCDC in 2018. None of the cases reported in 2018 reported prior contact with a known iGAS case. In the previous ten years, 0-3 cases annually (median=0.5 cases) reported prior contact with a known iGAS case.

### Emm Typing

As of 30 April 2019, the BCCDC Public Health Laboratory provided National Microbiology Laboratory *emm* typing results for 363 of the cases from 2018. The three most common *emm* types in 2018 were *emm76* (n=65; 18% of known *emm* types), *emm1* (n=61; 17%) and *emm81* (n=47; 13%). The *emm* distribution varied by Health Authority (Figure 7).

The age distribution of cases varied by *emm* type with a larger proportion of *emm1* cases among children, a larger proportion of *emm76* cases in the 30-39 years age group, and a larger proportion of *emm81* cases in the 40-59 years age group (Figure 8).

Case risk factor profiles varied by *emm* type. Larger proportions of *emm76* cases reported predisposing wounds and skin infections, homelessness/under-housing and injection drug use (Table 4). Larger proportions of *emm81* cases reported injection drug use, homelessness/under-housing and wounds. Almost one in five *emm1* cases had no underlying risk factors or predisposing conditions.

Cases with *emm1* were more likely to have severe presentations (particularly toxic shock syndrome) with a case fatality rate of 18% (Table 5).

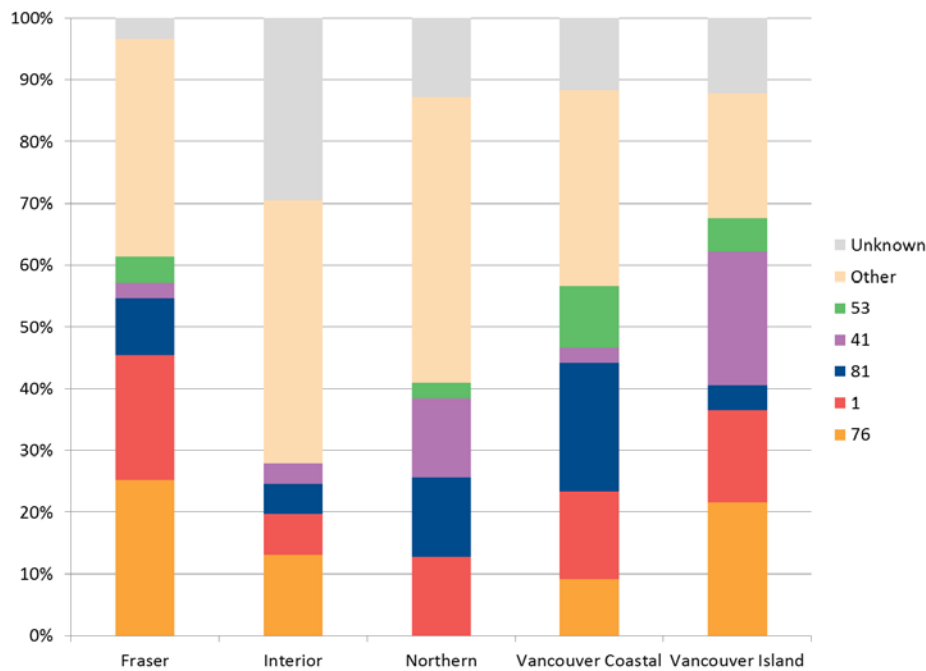


Figure 7. iGAS emm type distribution by health authority, British Columbia, 2018

Table 4. Proportions of iGAS cases reporting risk factors and predisposing conditions by emm type, British Columbia, 2018

Risk Factor / Predisposing Condition	emm1 (n=61)	emm41 (n=29)	emm53 (n=22)	emm76 (n=65)	emm81 (n=47)	Other (n=139)	Total (n=413)
Alcoholism	7%	21%	18%	14%	13%	15%	14%
Chronic Cardiac Condition	20%	48%	23%	26%	32%	25%	25%
Diabetes	21%	28%	18%	20%	21%	21%	20%
Homeless/under-housed	11%	41%	59%	31%	47%	22%	27%
Injection Drug Use	11%	28%	59%	38%	49%	18%	26%
Immunocompromised	10%	10%	18%	11%	11%	12%	11%
Chronic respiratory/pulmonary condition	8%	21%	9%	11%	15%	12%	12%
Wound	26%	34%	45%	40%	40%	39%	37%
Skin Infection	15%	52%	41%	51%	30%	31%	32%
Responded "No" for all risk factors and predisposing conditions	18%	0%	0%	0%	2%	5%	5%



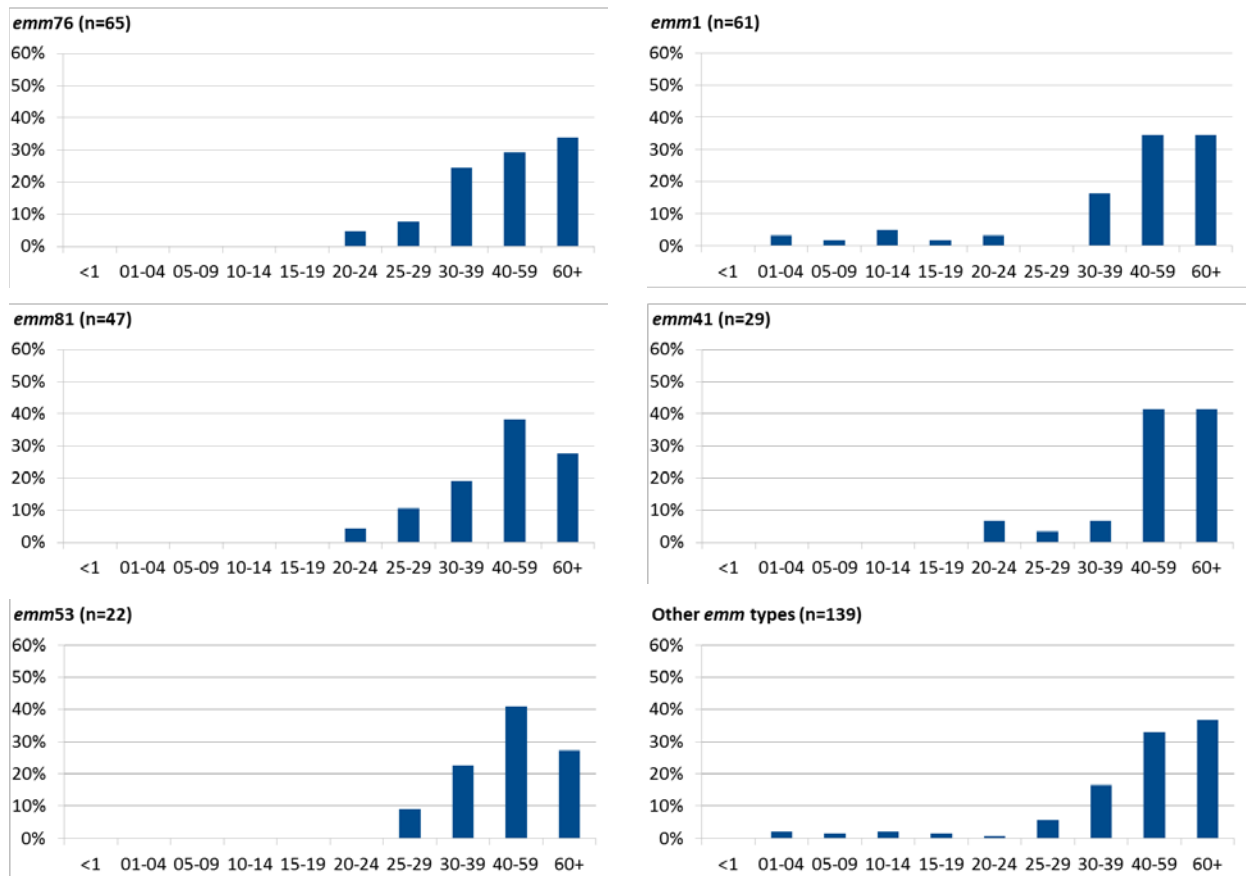


Figure 8. Age distribution of cases by *Streptococcus pyogenes* emm type, British Columbia, 2018

Table 5. Indicators of severity by emm type, British Columbia, 2018

	emm Type												Total	
	1		41		53		76		81		Other			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Death	11	18%	1	3%	2	9%	0	0%	0	0%	7	5%	23	6%
Soft tissue necrosis	7	11%	1	3%	0	0%	6	9%	4	9%	6	4%	29	7%
Toxic shock syndrome	23	38%	3	10%	3	14%	6	9%	1	2%	10	7%	49	12%
Pneumonia	12	20%	2	7%	4	18%	5	8%	8	17%	17	12%	54	13%
Meningitis	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	1	0%
Any severe presentation	32	52%	5	17%	6	27%	13	20%	13	28%	30	22%	113	27%

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.

## Conclusions

- The high incidence rates observed in 2016 and 2017 have levelled off in 2018.
- 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 *emm53*, *emm81*, and *emm76*.
- *Emm* type 1 was more frequently identified in pediatric cases; however, it is not as common in the homeless/under-housed and injection drug using populations. It is associated with the highest case fatality rate and severe clinical presentations.
- No single *emm* type explained the increased incidence; *emm* type distribution varies by health region.

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