Invasive Group A Streptococcal Disease (iGAS) in British Columbia
Based on reporting to July 10, 2017

Background

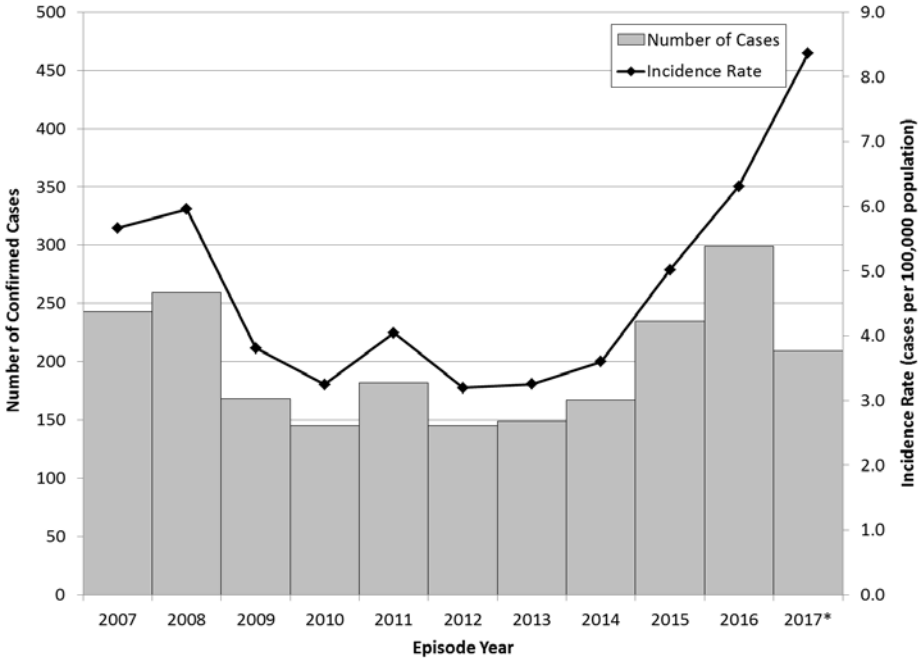
In 2016, BC experienced a higher incidence of iGAS than observed in 2009 through 2015, with a rate surpassing the incidence observed in the prior peak year of 2008. No unusual clustering by date of onset, severity or age group was identified in the provincial data set. High incidence rates have continued in the first part of 2017. Epidemiologic summaries are being prepared regularly to monitor iGAS trends in BC.

Surveillance Data

Confirmed Case Reports

As of July 10, 209 confirmed iGAS cases have been reported in 2017 (Figure 1). In the previous ten years, 73-162 (median = 160) cases were reported by July 10, and 145-299 cases (median =175) cases were reported annually.

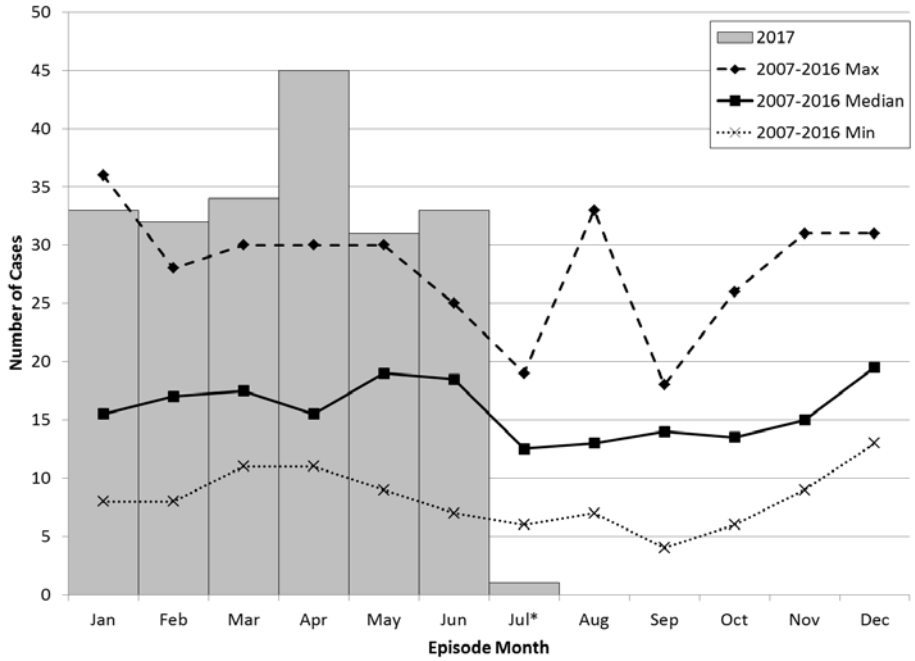
Figure 1. Invasive Group A Streptococcal disease cases and incidence rate, British Columbia, 2007-2017*



*2017 incidence rate has been adjusted to an annual rate, assuming cases continue to occur at the same frequency over the remainder of 2017, and without adjustment for observed seasonality.

The numbers of cases reported by month in February through June 2017 exceeded the maximum numbers reported in those same months during the previous ten years (Figure 2).

Figure 2. Number of Invasive Group A Streptococcal disease cases by month, British Columbia, 2007-2016 and 2017 (to July 10)



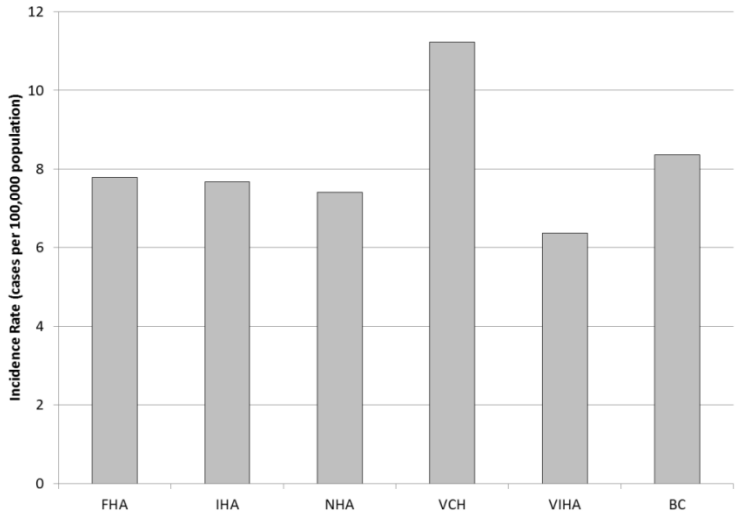
*Cases reported to July 10, 2017.

The adjusted (annual) incidence rate for 2017 is 8.4 cases per 100,000 population. In the previous ten years, annual incidence rates ranged from 3.2 to 6.3 (median=3.9) cases per 100,000 population (Figure 1).

Geographic distribution

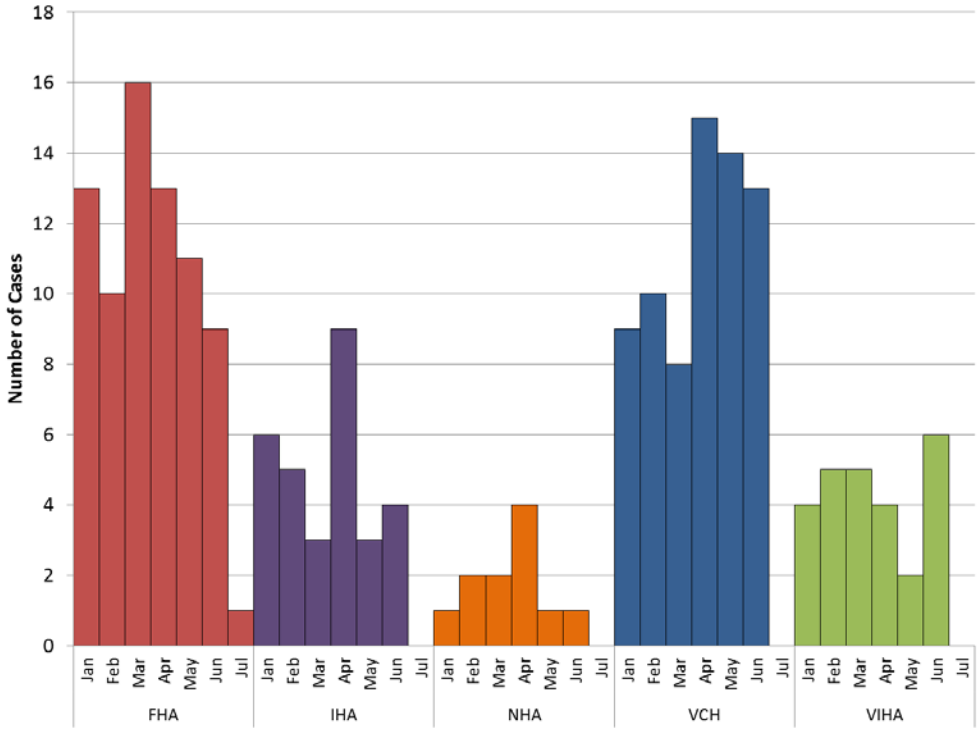
The Health Authorities' adjusted incidence rates for 2017 ranged from 6.4 to 11.2 cases per 100,000 population (Figure 3). The numbers of cases reported by month in each Health Authority varies (Figure 4).

Figure 3. Invasive Group A Streptococcal disease incidence by Health Authority, British Columbia, 2017*



*2017 incidence rate has been adjusted to an annual rate, assuming cases continue to occur at the same frequency over the remainder of 2017.

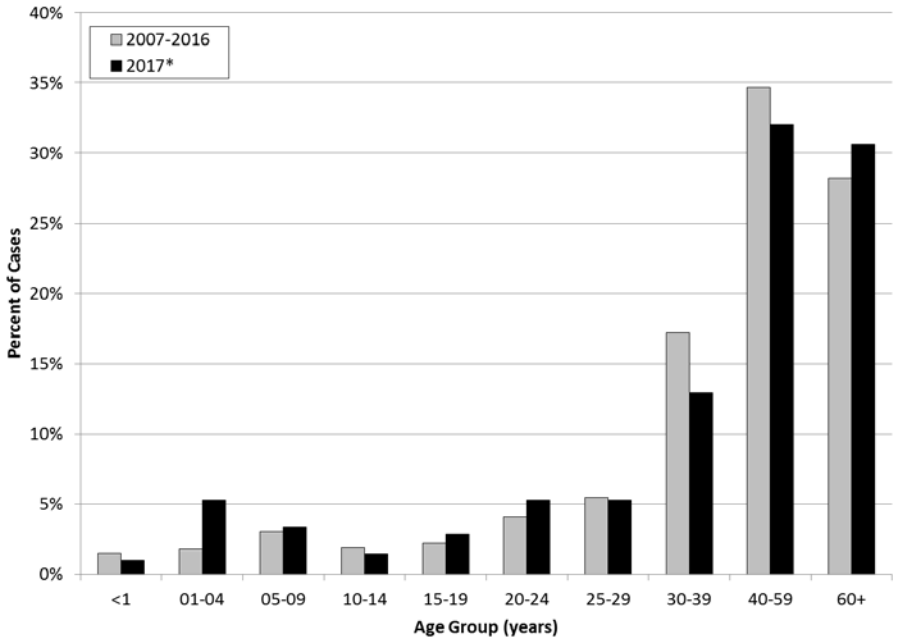
Figure 4. Number of Invasive Group A Streptococcal disease cases by month and Health Authority, British Columbia, 2017 (to July 10)



Age distribution

For 2017 to date, cases ranged in age from 0 to 95 years (median 47 years). In the previous ten years, the age range of cases was 0-104 years (median 46 years). The largest proportions of cases were in the 40-59 and 60+ year age groups (Figure 5). The age distribution of cases in 2017 is very similar to the age distribution of cases in prior years; however there is an increase in the oldest age group, the 1-4 year age group and slight increases in the 15-19 and 20-24 years age groups.

Figure 5. Age distribution of invasive Group A Streptococcal disease cases, British Columbia, 2007-2016 and 2017*



*Cases reported to July 10, 2017.

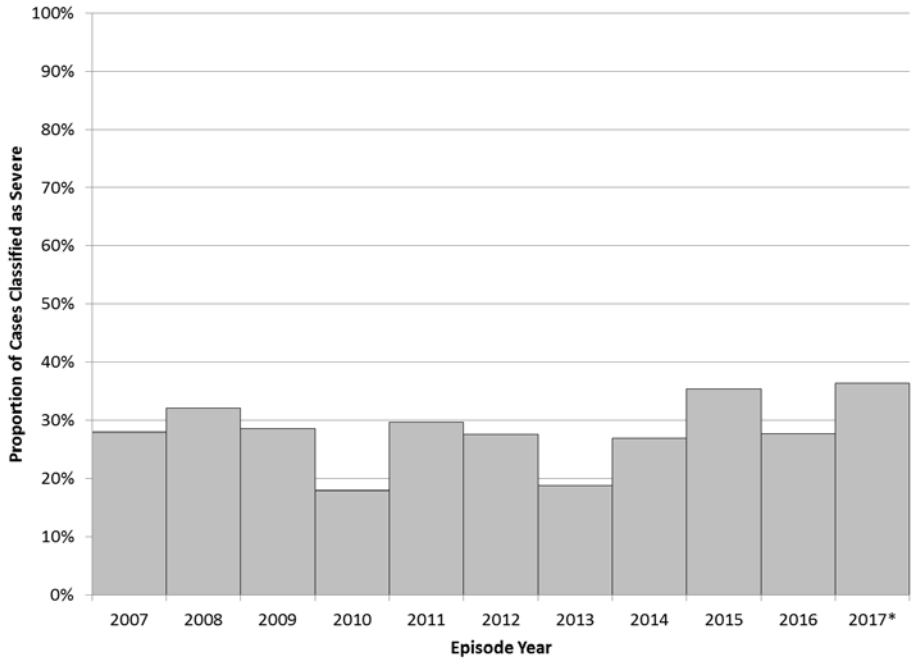
Severity

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 2017, 36% of cases were classified as severe; in 2007-2016, 28% (annual range 18-35%) were severe.

Seven cases were reported with death as the outcome (case fatality rate 3.3%). In the previous ten years, annual case fatality rates ranged from 6.0% to 13.7% (median 7.4%). Case fatality rates vary by age group (Table 1).

Two cases of puerperal fever have been reported to date in 2017. Data on whether the infants were affected were not reported.

Figure 6. Proportion of Invasive Group A Streptococcal Disease Cases Classified as Severe, British Columbia, 2007-2017*



*Cases reported to July 10, 2017.

Table 1. iGAS case fatality rates by age group, British Columbia, 2017* and 2007-2016

Age Group (years)	2017*			2007-2016
	Cases	Deaths	Case Fatality Rate	Case Fatality Rate
0-9	20	2	10%	8%
10-19	9	0	0%	7%
20-39	49	0	0%	3%
40-59	67	1	1%	8%
60+	64	4	6%	12%
Total	209	**7**	3.3%	**8%**

*Cases reported to July 10, 2017.

Risk Factors and Predisposing Conditions

Larger proportions of cases from 2017 reported alcoholism, chronic cardiac conditions, diabetes, being homeless/underhoused, injection drug use, immunocompromising conditions, skin infections and wounds than in previous years (Table 2). It is unclear whether these increases represent true increases, or improved reporting.

Table 2. Risk Factors and Predisposing Conditions Reported for iGAS Cases, British Columbia

Risk Factor / Predisposing Condition	2007-2016	2017*
Alcoholism	10.2%	15.8%
Chronic Cardiac Condition	11.8%	17.2%
Diabetes	11.5%	12.9%
Homeless/underhoused	6.4%	19.1%
Injection Drug Use	19.4%	23.9%
Immunocompromised	13.5%	14.8%
Skin Infection	18.2%	34.4%
Wound	32.5%	37.8%

*Cases reported to July 10, 2017.

Clusters and Investigations

Two pediatric cases of iGAS were identified in children from the same elementary school classroom in Vancouver Coastal Health. Isolates from both cases were typed as *emm* 1 and were determined to be related to each other, and different from other iGAS isolates, by whole genome sequence analysis.

The Interior Health Authority investigated increased iGAS rates between November 2016 and January 2017. While a large proportion of cases reported homelessness or contact with shelters in Kelowna or Kamloops, multiple *emm* types have been detected among cases.

Laboratory Data

As of June 1, The National Microbiology Laboratory has provided *emm* typing for 150 British Columbia *Streptococcus pyogenes* isolates from 2017 (Figure 7). The most common *emm* types in 2017 are *emm* 1 (n=37; 25%), *emm* 101 (n=20; 13%), *emm* 12 (n=13; 9%), and *emm* 89 (n=10; 7%). The most common *emm* types in 2011-2016 were *emm* 1 (n=200; 20%), *emm* 89 (n=90; 9%) and *emm*28 (n=76; 8%).

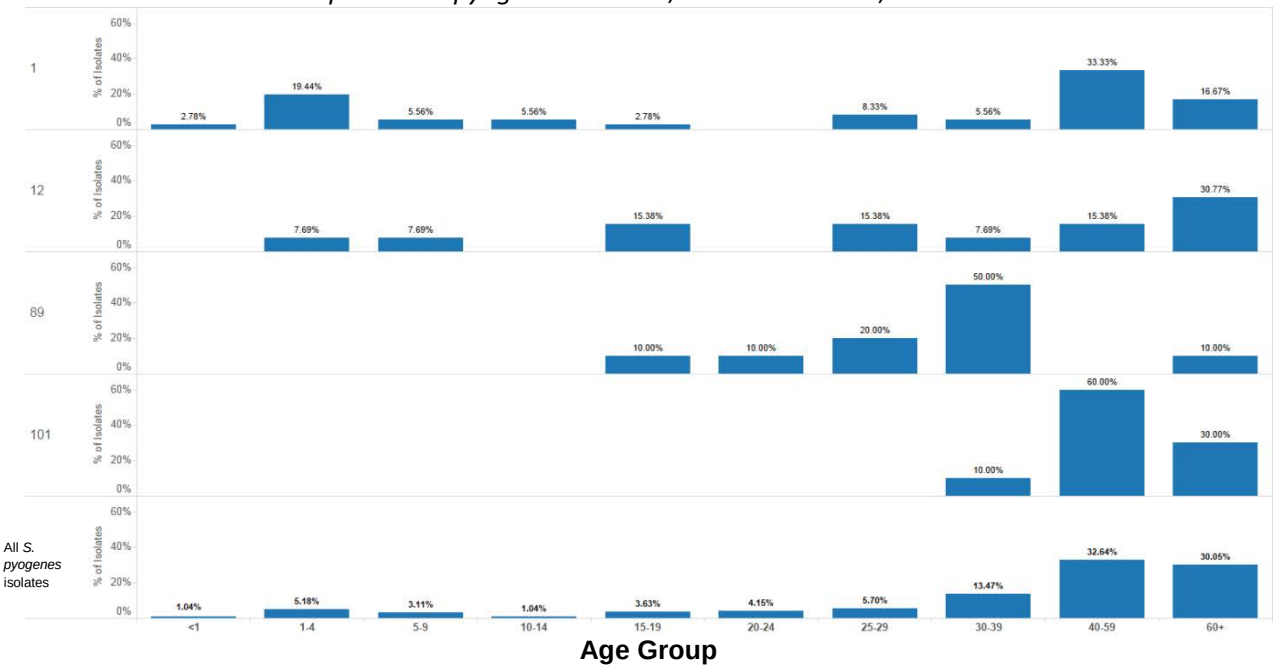
Figure 7. *Streptococcus pyogenes* emm types by year*, British Columbia, 2011-2017

Date Specimen Collected

emm Type	2011	2012	2013	2014	2015	2016	2017
1	56	42	27	28	19	28	37
101	1	1	1	13	11	38	20
102	1		2		2		
11	1	3	7	11	11	8	3
114	1	2					
12	22	8	11	6	11	12	13
169			2		1		
2	7	3	3	3	2	6	4
22	3		8	2	4	1	
27G	2	1					
28	14	14	14	14	14	6	5
3	1			3	7	9	4
4	4	10	10	12	11	10	5
41				1	1		2
44	1	2	1				1
48	1				2		
53	3			2		3	6
58	2	2	1	1			1
59	7	1		1	1	1	1
6	5	2	1	4	1	1	
73		1		2	1	1	1
74					6	9	
75	3	1	1	2		1	1
76	1		1	2	2	2	9
77	6	5	10	2	8	10	1
80	5	2	12	12	8	3	1
81		3	1	3	8	9	4
82	2			4	15	45	6
83	2	4	1	4	3	6	5
87	3	3	5	6	6	10	2
89	18	11	20	20	12	9	10
9	1			1			3
90				1	2		
93		1			1	4	1

* Only emm types identified three or more times since 2011 are included. Data for 2017 are to July 10.

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, 2017*



* Data for 2017 are to July 10.

Conclusions

- The high incidence rate observed in 2016 has continued in 2017, with a rate exceeding the incidence observed in the prior peak year of 2008.
- No unusual clustering by date of onset or age group was identified in the provincial data set.
- A higher proportion of cases reported severe presentation in 2017 (compared to previous years); however the case fatality rate is lower.
- A number of risk factors and predisposing conditions were reported in greater frequency in 2017. It is not clear whether this is a reporting artifact.
- *Emm* type 1 is the most frequently identified to date in 2017, particularly in pediatric cases. This is a shift from 2016, when *emm* 82 and 101 were predominant.