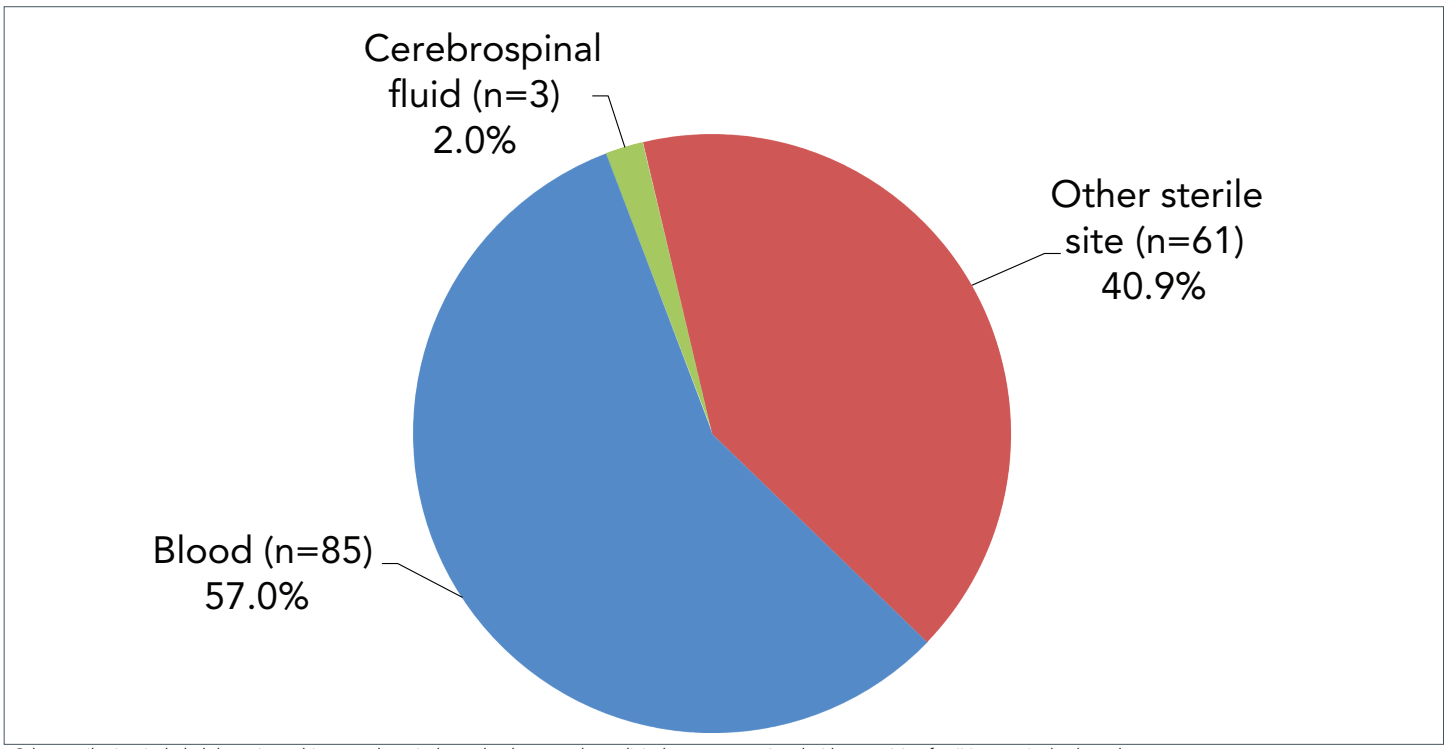
Supplemental material

Table S1: Annual incidence rates of invasive *Streptococcus pyogenes* cases in Canada by age group, 2009–2019[a]

Year	Age group (years)										
	<1	1–4	5–9	10–14	15–19	20–24	25–29	30–39	40–59	60 and older	All ages
2009	9.5	3.7	2.7	1.7	1.2	1.7	3.3	4.5	4.0	6.6	4.0
2010	8.5	4.1	3.9	1.4	1.2	1.9	2.6	4.5	4.0	7.0	4.2
2011	9.8	5.8	4.3	2.3	2.0	2.2	2.5	5.2	4.7	7.5	4.8
2012	9.0	4.9	2.9	1.5	1.4	2.3	3.0	4.9	5.0	7.4	4.7
2013	9.7	4.6	3.3	2.0	1.0	2.2	3.3	5.3	5.1	7.2	4.8
2014	9.2	5.2	3.6	1.4	1.3	2.5	3.7	5.3	5.1	8.7	5.2
2015	13.9	4.4	3.6	1.1	1.5	2.7	4.0	5.6	5.4	8.4	5.3
2016	7.3	6.4	3.6	1.8	1.3	2.8	5.1	7.5	6.2	8.7	6.0
2017	8.7	6.2	3.1	1.7	1.8	3.5	5.1	8.3	7.8	9.5	6.8
2018	10.6	6.6	4.4	2.3	2.2	3.9	7.0	9.4	9.9	12.7	8.6
2019	8.9	6.5	4.1	1.2	1.8	3.7	6.9	9.2	9.4	11.8	8.1

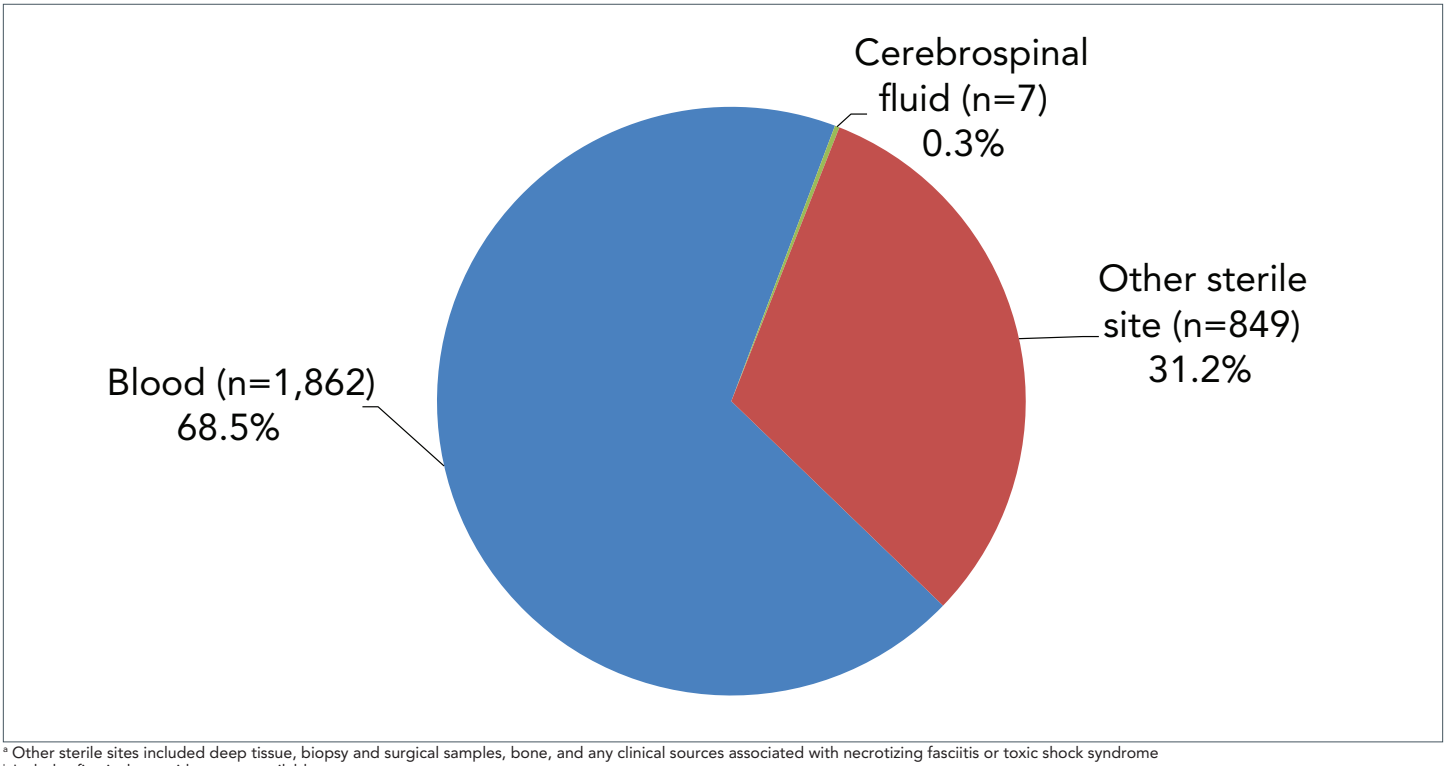
[a] Cases per 100,000 population

Figure S1: Clinical isolation sites[a] of invasive *Streptococcus pyogenes* from children younger than 15 years of age in 2020 (n=149)



[a] Other sterile sites included deep tissue, biopsy and surgical samples, bone, and any clinical sources associated with necrotizing fasciitis or toxic shock syndrome

Figure S2: Clinical isolation sites[a] of invasive *Streptococcus pyogenes* from patients 15 years of age and older in 2020 (n=2,718[b])



[a] Other sterile sites included deep tissue, biopsy and surgical samples, bone, and any clinical sources associated with necrotizing fasciitis or toxic shock syndrome
[b] Includes five isolates with no age available

Figure S3: Percentage of invasive *Streptococcus pyogenes* isolates from blood in 2020, by *emm* type (n=1,947)

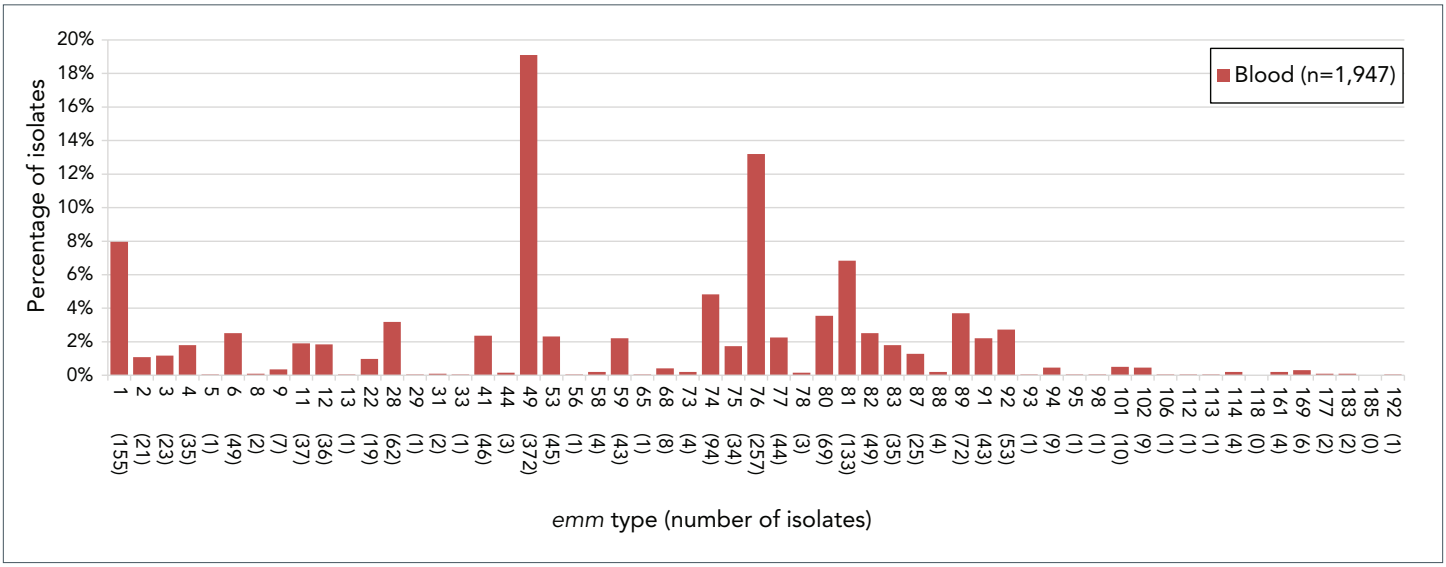
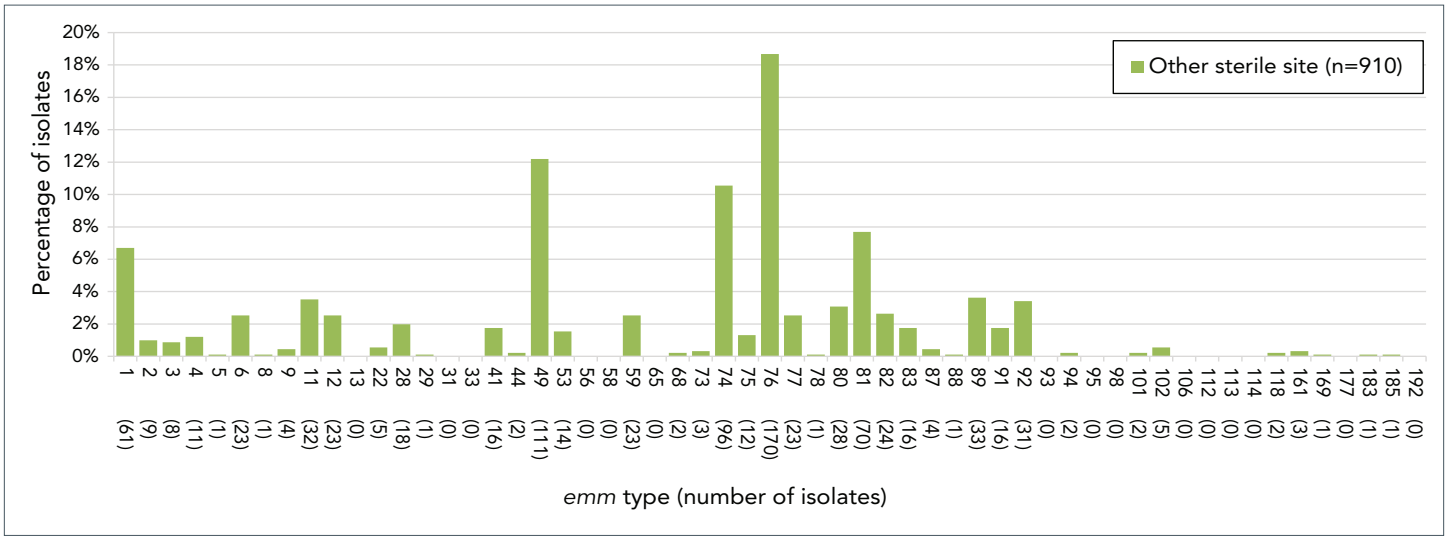


Figure S4: Percentage of invasive *Streptococcus pyogenes* isolates from other sterile sites[a] in 2020, by *emm* type (n=910)



[a] Other sterile sites included pericardial fluid, peritoneal fluid, deep tissue, biopsy and surgical samples, bone, mastoid and any clinical sources associated with necrotizing fasciitis or toxic shock

Figure S5: Percentage of invasive *Streptococcus pyogenes* isolates from cerebrospinal fluid in 2020, by *emm* type (n=10)

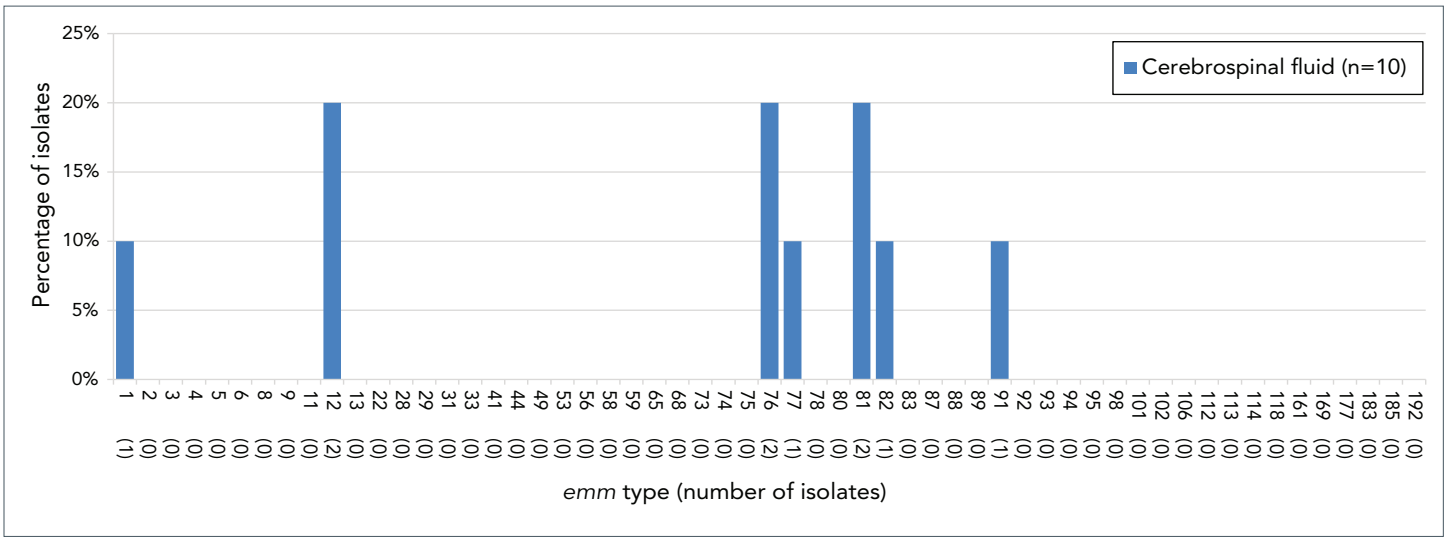
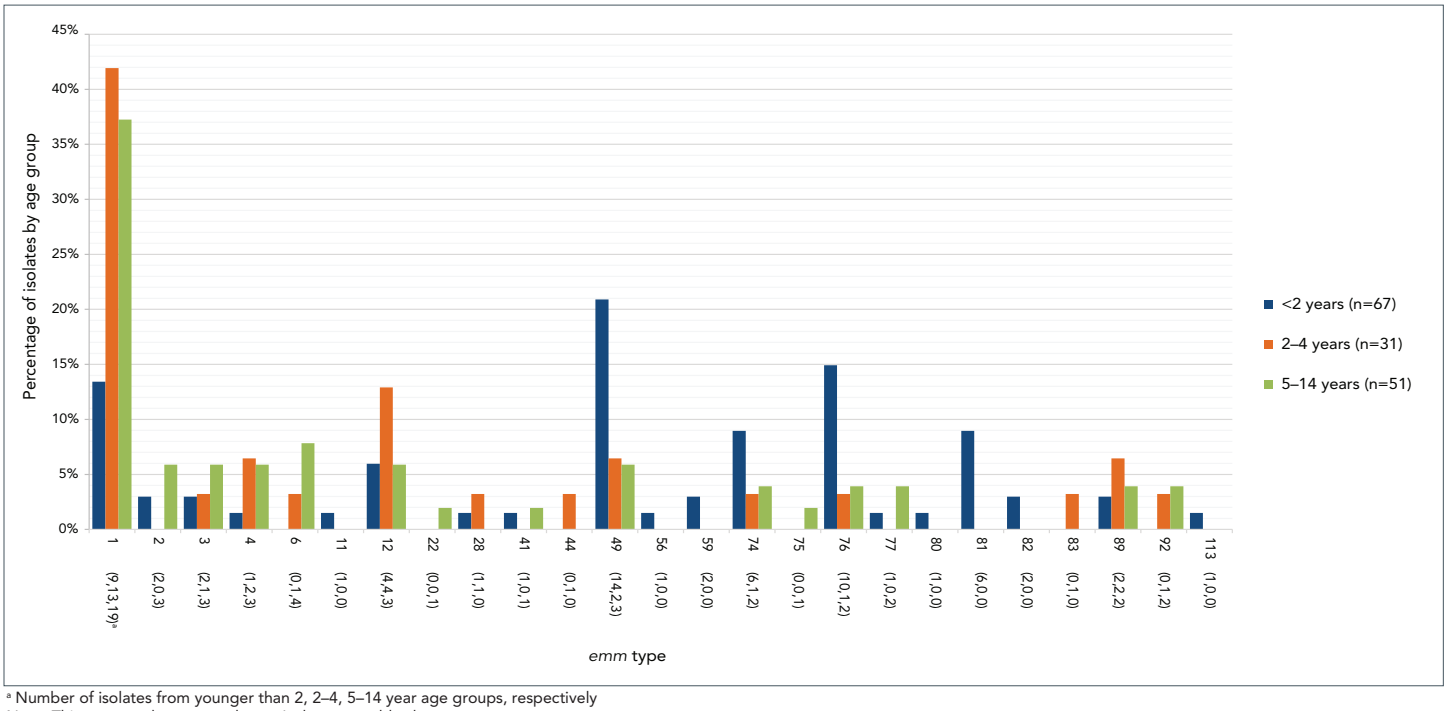
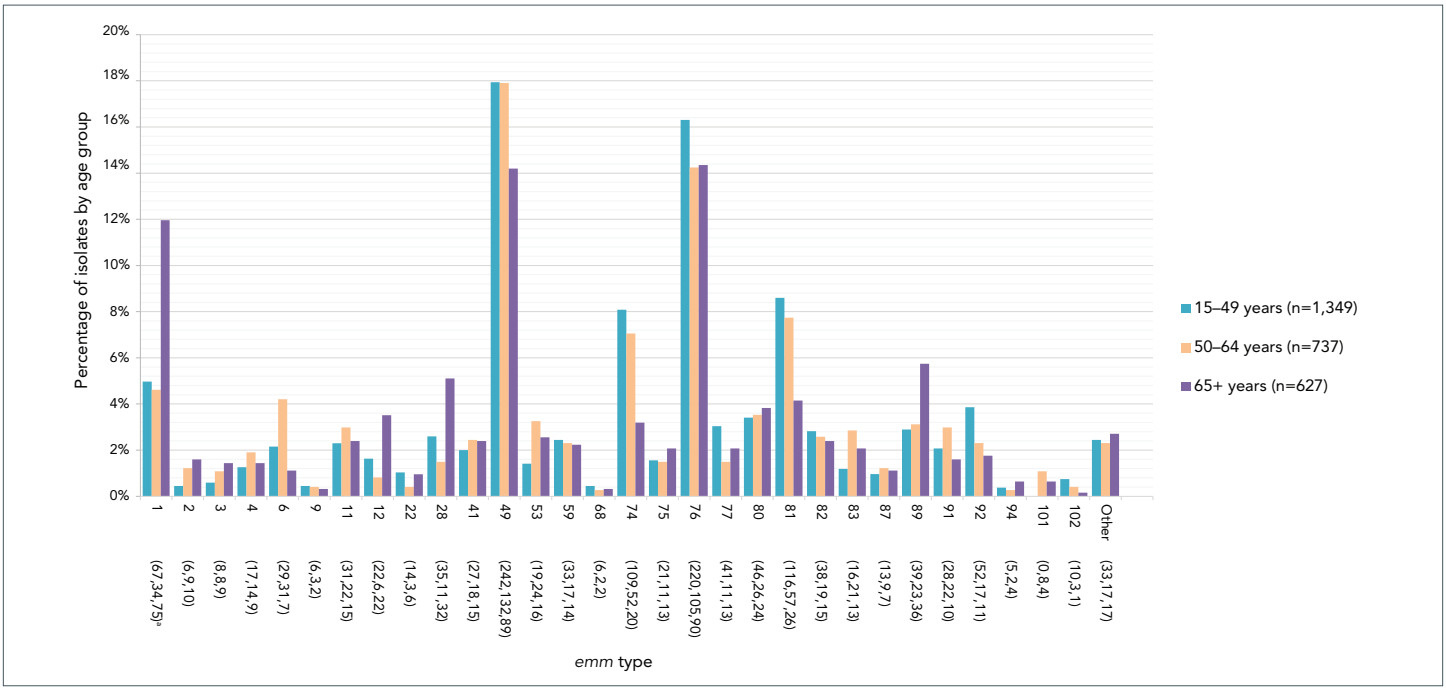


Figure S6: Prevalence of invasive *Streptococcus pyogenes emm* types isolated in 2020 for those younger than two, 2–4 and 5–14 years old



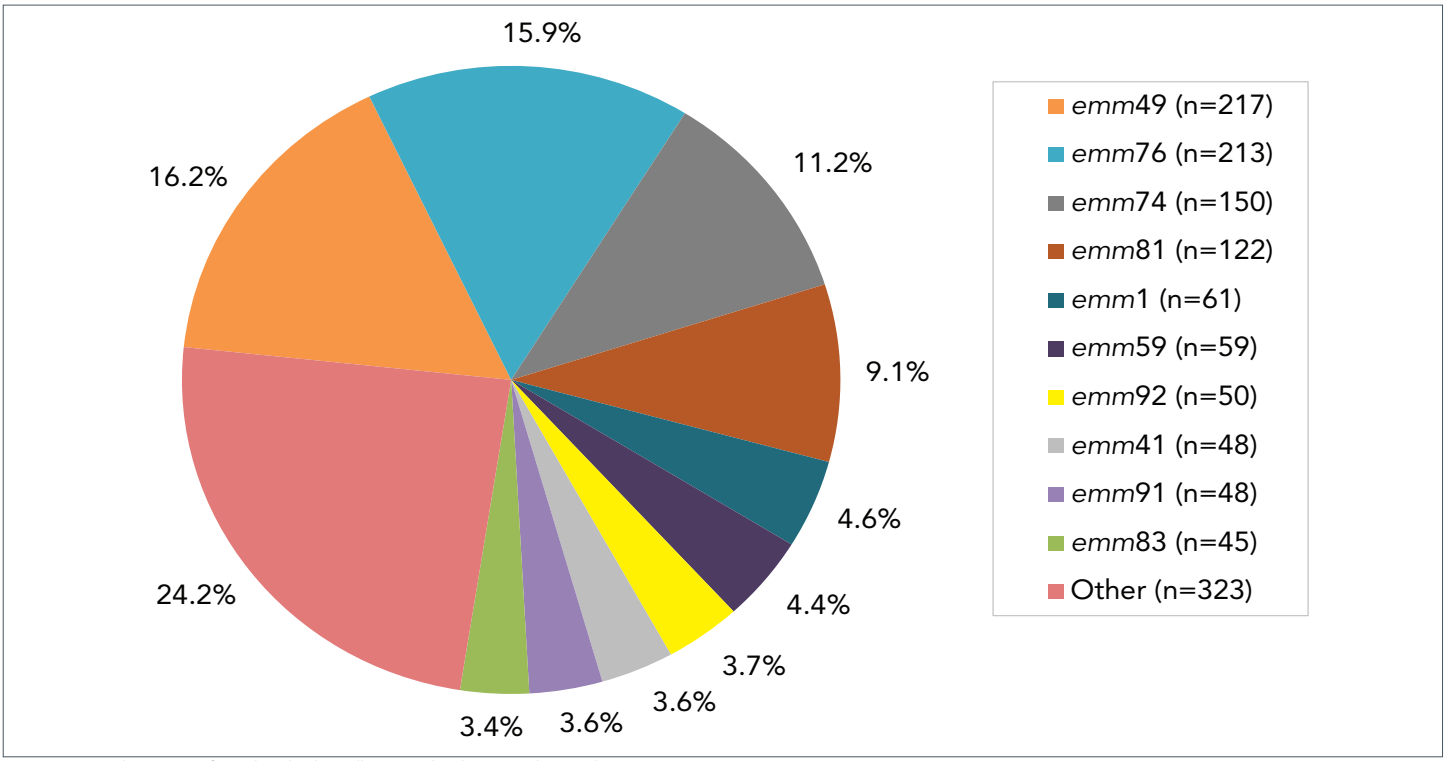
[a] Number of isolates from younger than 2, 2–4, 5–14 year age groups, respectively
Note: This note can be removed now. It does not add value

Figure S7: Prevalence of invasive *Streptococcus pyogenes emm* types isolated in 2020 for those 15–49, 50–64 and 65 years and older



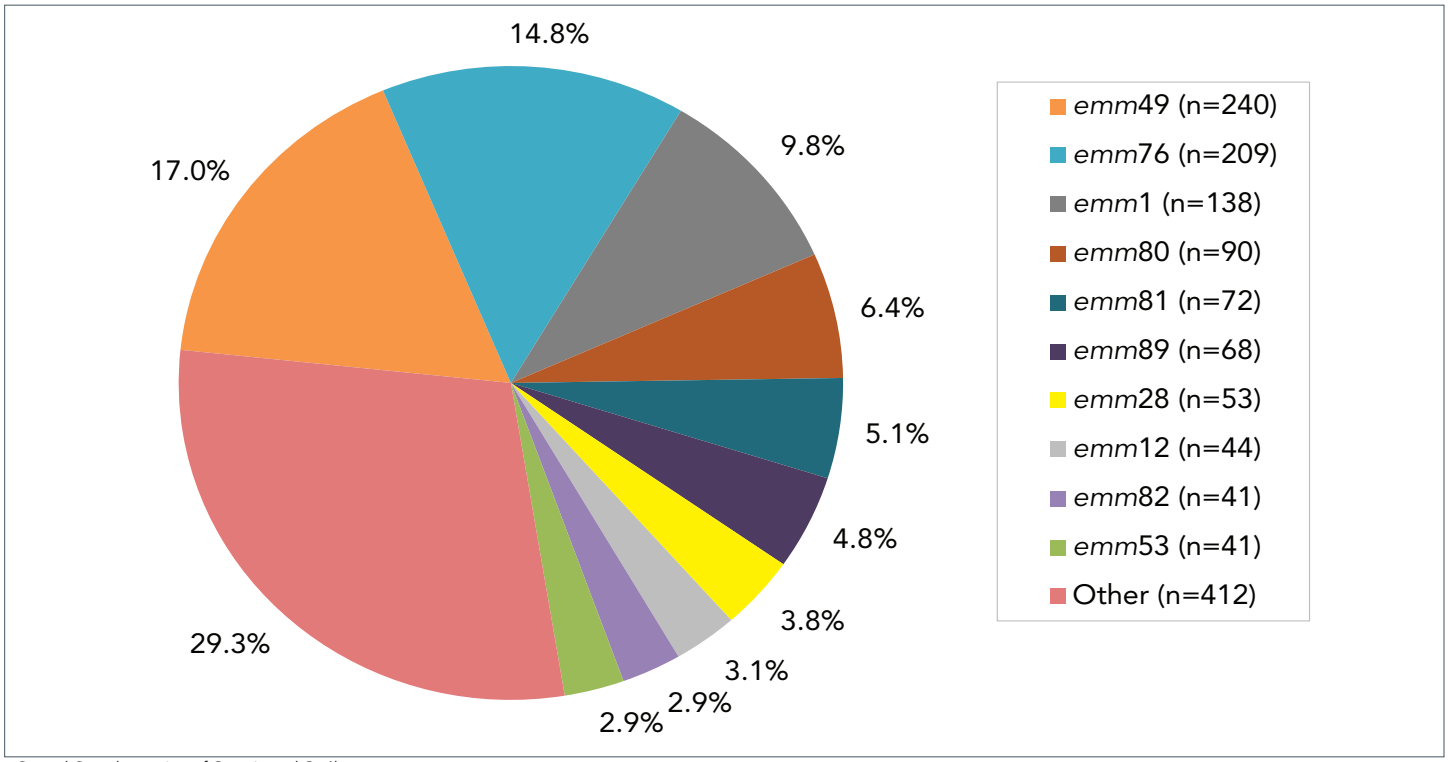
[a] Number of isolates from 15–49, 50–64, older than or 65 year olds, respectively

Figure S8: Prevalence of the ten most common invasive *Streptococcus pyogenes emm* types collected from Western Canada[a] in 2020



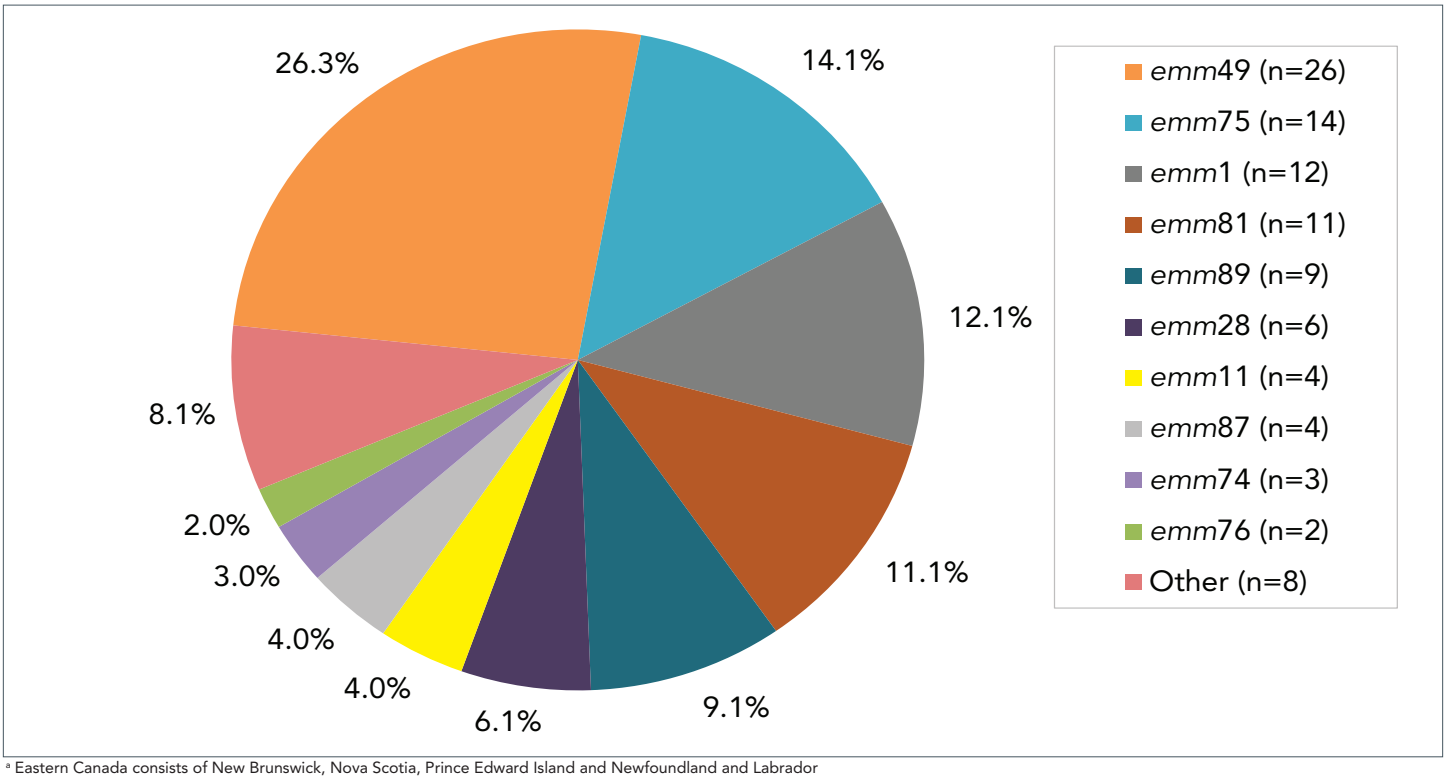
[a] Western Canada consists of British Columbia, Alberta, Saskatchewan and Manitoba

Figure S9: Prevalence of the ten most common invasive *Streptococcus pyogenes emm* types in collected from Central Canada[a] in 2020



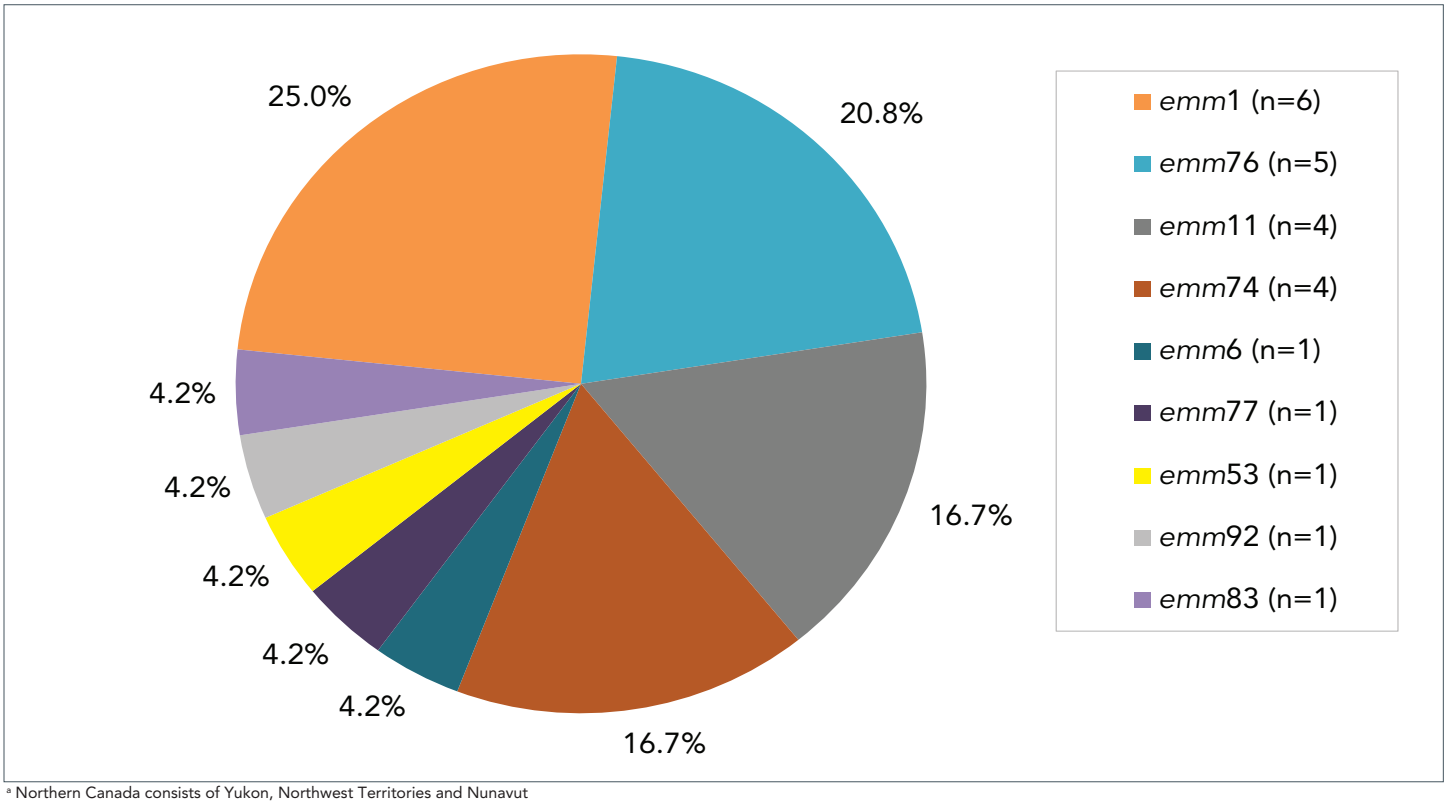
[a] Central Canada consists of Ontario and Québec

Figure S10: Prevalence of the ten most common invasive *Streptococcus pyogenes emm* types collected from Eastern Canada[a] in 2020



[a] Eastern Canada consists of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador

Figure S11: Prevalence of invasive *Streptococcus pyogenes emm* types collected from Northern Canada[a] in 2020



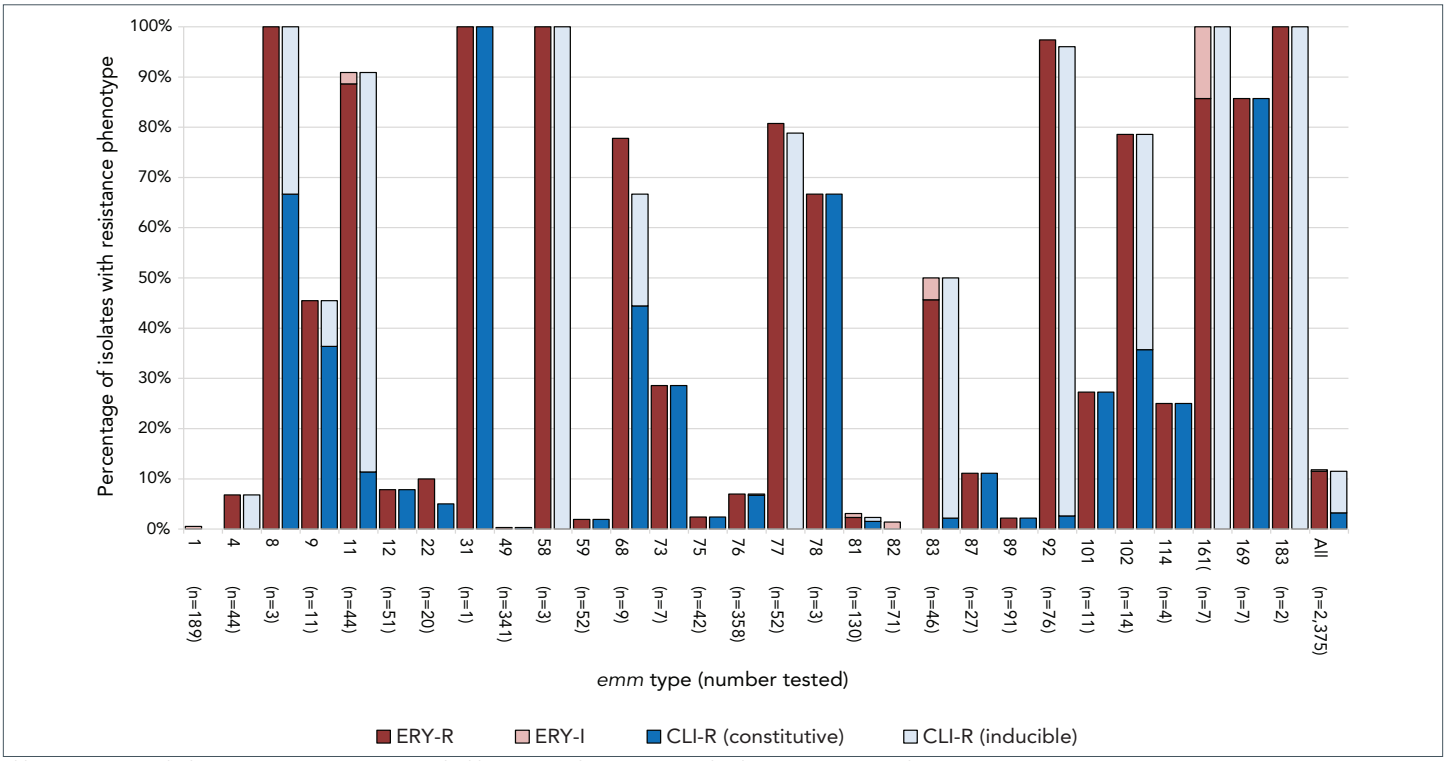
[a] Northern Canada consists of Yukon, Northwest Territories and Nunavut

Table S2: Antimicrobial resistant invasive *Streptococcus pyogenes* isolates by year, 2016–2020

Antimicrobial	Year									
	2016		2017		2018		2019		2020	
	%	n	%	n	%	n	%	n	%	n
CHL-NS	4.7%	84	5.0%	102	2.6%	72	1.6%	44	1.6%	37
ERY-R	8.8%	156	10.0%	205	9.6%	264	8.5%	235	11.5%	273
CLI-R	4.0%	70	6.8%	140	3.4%	95	3.0%	83	3.2%	77
Number tested		1,771		2,055		2,764		2,773		2,375

Abbreviations: CHL-NS, chloramphenicol-nonsusceptible (resistant or intermediate); CLI-R, constitutively clindamycin-resistant; ERY-R, erythromycin-resistant

Figure S12: Percentage of macrolide and lincosamide resistant invasive *Streptococcus pyogenes* isolates collected in 2020, by *emm* type



Abbreviations: CLI-R, clindamycin-resistant (constitutive or inducible); ERY-I, erythromycin intermediately-resistant; ERY-R, erythromycin-resistant

Table S3: Percentage of macrolide and lincosamide resistant invasive *Streptococcus pyogenes* isolates collected in 2020, by *emm* type

Emm (tested)	Percentage of *emm* type (number of isolates)							
	ERY-R		ERY-I		CLI-R (constitutive)		CLI-R (inducible)	
1 (n=189)	0.0%	0	0.5%	1	0.0%	0	0.0%	0
4 (n=44)	6.8%	3	0.0%	0	0.0%	0	6.8%	3
8 (n=3)	100.0%	3	0.0%	0	66.7%	2	33.3%	1
9 (n=11)	45.5%	5	0.0%	0	36.4%	4	9.1%	1
11 (n=44)	88.6%	39	2.3%	1	11.4%	5	79.5%	35
12 (n=51)	7.8%	4	0.0%	0	7.8%	4	0.0%	0
22 (n=20)	10.0%	2	0.0%	0	5.0%	1	0.0%	0
31 (n=1)	100.0%	1	0.0%	0	100.0%	1	0.0%	0
49 (n=341)	0.3%	1	0.0%	0	0.3%	1	0.0%	0
58 (n=3)	100.0%	3	0.0%	0	0.0%	0	100.0%	3
59 (n=52)	1.9%	1	0.0%	0	1.9%	1	0.0%	0
68 (n=9)	77.8%	7	0.0%	0	44.4%	4	22.2%	2
73 (n=7)	28.6%	2	0.0%	0	28.6%	2	0.0%	0
75 (n=42)	2.4%	1	0.0%	0	2.4%	1	0.0%	0
76 (n=358)	7.0%	25	0.0%	0	6.7%	24	0.3%	1
77 (n=52)	80.8%	42	0.0%	0	0.0%	0	78.8%	41
78 (n=3)	66.7%	2	0.0%	0	66.7%	2	0.0%	0
81 (n=130)	2.3%	3	0.8%	1	1.5%	2	0.8%	1
82 (n=71)	0.0%	0	1.4%	1	0.0%	0	0.0%	0
83 (n=46)	45.7%	21	4.3%	2	2.2%	1	47.8%	22
87 (n=27)	11.1%	3	0.0%	0	11.1%	3	0.0%	0
89 (n=91)	2.2%	2	0.0%	0	2.2%	2	0.0%	0
92 (n=76)	97.4%	74	0.0%	0	2.6%	2	93.4%	71
101 (n=11)	27.3%	3	0.0%	0	27.3%	3	0.0%	0
102 (n=14)	78.6%	11	0.0%	0	35.7%	5	42.9%	6
114 (n=4)	25.0%	1	0.0%	0	25.0%	1	0.0%	0
161 (n=7)	85.7%	6	14.3%	1	0.0%	0	100.0%	7
169 (n=7)	85.7%	6	0.0%	0	85.7%	6	0.0%	0
183 (n=2)	100.0%	2	0.0%	0	0.0%	0	100.0%	2
All (n=2,375)	11.5%	273	0.3%	7	3.2%	77	8.3%	196

Abbreviations: CLI-R, clindamycin resistant (constitutive or inducible); ERY-I, erythromycin intermediately resistant; ERY-R, erythromycin resistant

Table S4: Number of invasive *Streptococcus pyogenes* isolates typed by the National Microbiology Laboratory (NML) in comparison to the total number of cases reported to Canadian Notifiable Diseases Surveillance System (CNDSS) in 2019, by patient age group

Age group	Total number of isolates tested at NML	Total number of illnesses reported to CNDSS[a]
Younger than 5 years	131	134
5–39 years	943	894
40–59 years	971	947
60 years and older	1,142	1,077
All ages[b]	3,194	3,054

[a] Canadian Notifiable Diseases Surveillance System, Public Health Agency of Canada. Difference between National Microbiology Laboratory and Canadian Notifiable Disease Surveillance System totals due to variation in provincial laboratories definition of sterile sites
[b] All ages total includes isolates with no patient age