

Supplementary Material

Table S1. Proportions of PCV serotypes among invasive pneumococcal disease cases in Switzerland, 2005-2019

Age category	Serotype proportions of IPD cases in different age group populations (%)															
	Year															<i>P</i> ^a
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
< 5 years	45 (4.4)	44 (4.5)	33 (3.2)	21 (1.9)	11 (1)	9 (0.9)	13 (1.3)	2 (0.2)	3 (0.3)	4 (0.5)	0 (0)	4 (0.5)	3 (0.3)	3 (0.3)	1 (0.1)	< 0.001
5-64 years	160 (15.7)	145 (14.8)	165 (15.9)	169 (15)	147 (13)	91 (9.3)	69 (6.8)	50 (5.4)	48 (4.9)	32 (3.8)	23 (2.6)	25 (2.9)	36 (3.6)	31 (3.3)	33 (3.6)	< 0.001
≥65 years	230 (22.6)	248 (25.4)	243 (23.4)	230 (20.4)	196 (17.4)	134 (13.7)	127 (12.5)	85 (9.2)	83 (8.4)	68 (8)	61 (6.9)	43 (4.9)	41 (4.1)	38 (4)	44 (4.8)	< 0.001
Unknown	29 (2.9)	34 (3.5)	26 (2.5)	15 (1.3)	12 (1.1)	8 (0.8)	10 (1)	7 (0.8)	7 (0.7)	9 (1.1)	4 (0.4)	5 (0.6)	5 (0.5)	1 (0.1)	1 (0.1)	< 0.001
Total PCV7^b	464 (45.7)	471 (48.2)	467 (45)	435 (38.5)	366 (32.5)	242 (24.7)	219 (21.5)	144 (15.6)	141 (14.3)	113 (13.4)	88 (9.9)	77 (8.8)	85 (8.4)	73 (7.7)	79 (8.6)	< 0.001
< 5 years	15 (1.5)	19 (1.9)	25 (2.4)	35 (3.1)	44 (3.9)	32 (3.3)	35 (3.4)	21 (2.3)	14 (1.4)	14 (1.7)	10 (1.1)	8 (0.9)	7 (0.7)	18 (1.9)	7 (0.8)	< 0.001
5-64 years	135 (13.3)	117 (12)	147 (14.2)	155 (13.7)	203 (18)	179 (18.2)	189 (18.5)	158 (17.1)	171 (17.4)	99 (11.7)	103 (11.6)	80 (9.1)	74 (7.3)	79 (8.4)	58 (6.3)	< 0.001
≥65 years	139 (13.7)	134 (13.7)	159 (15.3)	188 (16.7)	195 (17.3)	199 (20.3)	217 (21.3)	207 (22.4)	188 (19.1)	144 (17)	138 (15.5)	147 (16.8)	146 (14.4)	130 (13.8)	110 (12)	0.2
Unknown	27 (2.7)	23 (2.4)	27 (2.6)	18 (1.6)	20 (1.8)	13 (1.3)	19 (1.9)	36 (3.9)	16 (1.6)	12 (1.4)	21 (2.4)	12 (1.4)	24 (2.4)	15 (1.6)	16 (1.7)	0.2
Total PCV13nonPCV7^c	316 (31.1)	293 (30)	358 (34.5)	396 (35.1)	462 (41)	423 (43.1)	460 (45.1)	422 (45.7)	389 (39.5)	269 (31.8)	272 (30.6)	247 (28.2)	251 (24.8)	242 (25.6)	191 (20.9)	< 0.001
< 5 years	10 (1)	14 (1.4)	14 (1.4)	7 (0.6)	12 (1.1)	17 (1.7)	11 (1.1)	15 (1.6)	13 (1.3)	15 (1.8)	20 (2.2)	16 (1.8)	17 (1.7)	17 (1.8)	16 (1.7)	0.005
5-64 years	89 (8.8)	84 (8.6)	87 (8.4)	120 (10.6)	127 (11.3)	117 (11.9)	121 (11.9)	128 (13.9)	169 (17.2)	144 (17)	177 (19.9)	196 (22.3)	215 (21.2)	203 (21.5)	207 (22.6)	< 0.001
≥65 years	119 (11.7)	95 (9.7)	104 (10)	155 (13.7)	149 (13.2)	171 (17.4)	187 (18.3)	179 (19.4)	245 (24.9)	270 (31.9)	292 (32.8)	304 (34.7)	391 (38.6)	359 (38)	375 (41)	< 0.001
Unknown	18 (1.8)	21 (2.1)	7 (0.7)	16 (1.4)	11 (1)	11 (1.1)	22 (2.2)	36 (3.9)	28 (2.8)	35 (4.1)	40 (4.5)	37 (4.2)	53 (5.2)	50 (5.3)	47 (5.1)	< 0.001
Total Non-PCV^d	236 (23.2)	214 (21.9)	212 (20.4)	298 (26.4)	299 (26.4)	316 (32.2)	341 (33.4)	358 (38.7)	455 (46.2)	464 (54.8)	529 (59.5)	553 (63.1)	676 (66.8)	629 (66.6)	645 (70.5)	< 0.001
All cases	1016 (100)	978 (100)	1037 (100)	1129 (100)	1127 (100)	981 (100)	1020 (100)	924 (100)	985 (100)	846 (100)	889 (100)	877 (100)	1012 (100)	944 (100)	915 (100)	

a *P*-values for chi-squared test of trend. *P* < 0.05 indicated in bold.

b Serotypes included in PCV7: 4, 6B, 9V, 14, 18C, 19F & 23F

c Additional serotypes included in PCV13, but not PCV7: 1, 3, 5, 6A, 7F & 19A

d Serotypes not included in either PCV7 or PCV13

Table S2. Overall incidence of serotypes among IPD cases in Switzerland, 2005-2019

Serotype/ serogroup ^a	Incidence of serotypes/serogroups among IPD cases in Switzerland (Cases per 100'000 population)														
	Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
4	77 (1)	81 (1.1)	67 (0.9)	79 (1)	79 (1)	51 (0.6)	48 (0.6)	32 (0.4)	27 (0.3)	21 (0.3)	18 (0.2)	19 (0.2)	21 (0.2)	13 (0.2)	8 (0.1)
6B	48 (0.6)	38 (0.5)	32 (0.4)	26 (0.3)	27 (0.3)	16 (0.2)	22 (0.3)	11 (0.1)	7 (0.1)	7 (0.1)	4 (0)	5 (0.1)	9 (0.1)	4 (0)	4 (0)
9V	73 (1)	57 (0.8)	77 (1)	68 (0.9)	58 (0.7)	29 (0.4)	19 (0.2)	13 (0.2)	19 (0.2)	6 (0.1)	7 (0.1)	7 (0.1)	6 (0.1)	8 (0.1)	12 (0.1)
14	136 (1.8)	151 (2)	142 (1.9)	111 (1.4)	88 (1.1)	66 (0.8)	56 (0.7)	30 (0.4)	39 (0.5)	37 (0.4)	29 (0.3)	19 (0.2)	17 (0.2)	19 (0.2)	22 (0.3)
18C	25 (0.3)	35 (0.5)	39 (0.5)	30 (0.4)	19 (0.2)	23 (0.3)	17 (0.2)	10 (0.1)	9 (0.1)	12 (0.1)	4 (0)	4 (0)	1 (0)	6 (0.1)	8 (0.1)
19F	44 (0.6)	49 (0.7)	50 (0.7)	48 (0.6)	34 (0.4)	29 (0.4)	29 (0.4)	17 (0.2)	27 (0.3)	21 (0.3)	16 (0.2)	20 (0.2)	27 (0.3)	18 (0.2)	23 (0.3)
23F	61 (0.8)	60 (0.8)	60 (0.8)	73 (0.9)	61 (0.8)	28 (0.4)	28 (0.4)	31 (0.4)	13 (0.2)	9 (0.1)	10 (0.1)	3 (0)	4 (0)	5 (0.1)	2 (0)
1	60 (0.8)	40 (0.5)	37 (0.5)	50 (0.6)	49 (0.6)	57 (0.7)	49 (0.6)	41 (0.5)	26 (0.3)	24 (0.3)	6 (0.1)	5 (0.1)	3 (0)	0 (0)	1 (0)
3	121 (1.6)	108 (1.4)	135 (1.8)	151 (2)	162 (2.1)	126 (1.6)	168 (2.1)	137 (1.7)	163 (2)	131 (1.6)	151 (1.8)	163 (1.9)	158 (1.9)	187 (2.2)	149 (1.7)
6A	20 (0.3)	40 (0.5)	36 (0.5)	37 (0.5)	45 (0.6)	30 (0.4)	20 (0.3)	24 (0.3)	18 (0.2)	18 (0.2)	11 (0.1)	7 (0.1)	5 (0.1)	4 (0)	4 (0)
7F	83 (1.1)	80 (1.1)	98 (1.3)	99 (1.3)	115 (1.5)	109 (1.4)	106 (1.3)	99 (1.2)	96 (1.2)	43 (0.5)	37 (0.4)	26 (0.3)	22 (0.3)	9 (0.1)	6 (0.1)
19A	30 (0.4)	24 (0.3)	43 (0.6)	49 (0.6)	79 (1)	99 (1.3)	116 (1.5)	119 (1.5)	82 (1)	50 (0.6)	66 (0.8)	46 (0.5)	63 (0.7)	42 (0.5)	31 (0.4)
10A	0 (0)	0 (0)	1 (0)	1 (0)	1 (0)	9 (0.1)	16 (0.2)	15 (0.2)	19 (0.2)	20 (0.2)	22 (0.3)	23 (0.3)	24 (0.3)	25 (0.3)	30 (0.3)
11A	0 (0)	0 (0)	0 (0)	3 (0)	2 (0)	13 (0.2)	23 (0.3)	15 (0.2)	18 (0.2)	25 (0.3)	22 (0.3)	20 (0.2)	27 (0.3)	24 (0.3)	19 (0.2)
12F	0 (0)	0 (0)	3 (0)	11 (0.1)	9 (0.1)	5 (0.1)	8 (0.1)	16 (0.2)	17 (0.2)	19 (0.2)	21 (0.3)	25 (0.3)	29 (0.3)	37 (0.4)	48 (0.6)
15B/C	0 (0)	1 (0)	11 (0.1)	10 (0.1)	15 (0.2)	14 (0.2)	11 (0.1)	17 (0.2)	13 (0.2)	20 (0.2)	19 (0.2)	23 (0.3)	24 (0.3)	25 (0.3)	1 (0)
15A	0 (0)	0 (0)	0 (0)	9 (0.1)	5 (0.1)	5 (0.1)	10 (0.1)	8 (0.1)	10 (0.1)	20 (0.2)	20 (0.2)	24 (0.3)	31 (0.4)	27 (0.3)	29 (0.3)
20	4 (0.1)	3 (0)	8 (0.1)	14 (0.2)	10 (0.1)	9 (0.1)	10 (0.1)	6 (0.1)	8 (0.1)	6 (0.1)	21 (0.3)	10 (0.1)	17 (0.2)	13 (0.2)	12 (0.1)
22F	0 (0)	0 (0)	30 (0.4)	33 (0.4)	45 (0.6)	61 (0.8)	62 (0.8)	54 (0.7)	85 (1)	92 (1.1)	66 (0.8)	85 (1)	91 (1.1)	86 (1)	103 (1.2)
23A	0 (0)	1 (0)	4 (0.1)	11 (0.1)	12 (0.2)	8 (0.1)	11 (0.1)	11 (0.1)	17 (0.2)	24 (0.3)	19 (0.2)	16 (0.2)	27 (0.3)	20 (0.2)	29 (0.3)
23B	0 (0)	0 (0)	4 (0.1)	6 (0.1)	3 (0)	8 (0.1)	8 (0.1)	13 (0.2)	23 (0.3)	22 (0.3)	33 (0.4)	20 (0.2)	39 (0.5)	33 (0.4)	23 (0.3)
24	2 (0)	1 (0)	10 (0.1)	5 (0.1)	9 (0.1)	3 (0)	7 (0.1)	15 (0.2)	22 (0.3)	25 (0.3)	42 (0.5)	31 (0.4)	15 (0.2)	13 (0.2)	0 (0)
35F	0 (0)	0 (0)	6 (0.1)	7 (0.1)	8 (0.1)	17 (0.2)	4 (0.1)	15 (0.2)	18 (0.2)	14 (0.2)	20 (0.2)	16 (0.2)	15 (0.2)	16 (0.2)	20 (0.2)
6C	0 (0)	0 (0)	4 (0.1)	8 (0.1)	12 (0.2)	21 (0.3)	23 (0.3)	16 (0.2)	40 (0.5)	10 (0.1)	26 (0.3)	20 (0.2)	22 (0.3)	15 (0.2)	13 (0.2)
8	57 (0.8)	57 (0.8)	32 (0.4)	50 (0.6)	51 (0.7)	45 (0.6)	60 (0.8)	53 (0.7)	66 (0.8)	60 (0.7)	89 (1.1)	107 (1.3)	150 (1.8)	160 (1.9)	142 (1.7)
9N	0 (0)	0 (0)	27 (0.4)	41 (0.5)	26 (0.3)	32 (0.4)	32 (0.4)	33 (0.4)	31 (0.4)	31 (0.4)	32 (0.4)	55 (0.7)	64 (0.8)	50 (0.6)	63 (0.7)
others^b	175 (2.3)	152 (2)	81 (1.1)	99 (1.3)	103 (1.3)	68 (0.9)	57 (0.7)	73 (0.9)	72 (0.9)	79 (1)	78 (0.9)	78 (0.9)	101 (1.2)	85 (1)	113 (1.3)
Total	1016 (13.6)	978 (13)	1037 (13.7)	1129 (14.7)	1127 (14.5)	981 (12.5)	1020 (12.8)	924 (11.5)	985 (12.1)	846 (10.3)	889 (10.7)	877 (10.4)	1012 (11.9)	944 (11)	915 (10.6)

a Serotypes/serogroups with proportions $\geq 1\%$ are highlighted as such: PCV7 in peach, additional serotypes included in PCV13, but not PCV7 are in blue and non-PCV serotypes are in gray.

b Serotypes/serogroups with proportions $< 1\%$ were classified as others irrespective of PCV type.

Table S3. Incidence of invasive pneumococcal disease cases in children below 5 years by region and PCV serotypes, Switzerland 2005-2019

Children <5 years	IPD cases- East	IPD cases- West	Incidence (per 100'000) East	Incidence (per 100'000) West	IRR- West vs. East	95% CI
2005-2007 (early PCV7 era)						
PCV7	85	37	11.2	10.9	0.97	0.66-1.43
PCV13nonPCV7	47	12	6.2	3.5	0.57	0.30-1.07
Non-PCV	33	5	4.3	1.5	0.34	0.13-0.87
Total cases	165	54	21.7	15.8	0.73	0.54-0.99
2008-2010 (late PCV7 era)						
PCV7	34	7	4.3	2	0.46	0.20-1.04
PCV13nonPCV7	72	39	9.1	11	1.21	0.82-1.79
Non-PCV	22	14	2.8	3.9	1.42	0.73-2.78
Total cases	128	60	16.1	16.9	1.05	0.77-1.42
2011-2013 (early PCV13 era)						
PCV7	11	7	1.3	1.9	1.45	0.56-3.74
PCV13nonPCV7	55	15	6.5	4	0.62	0.35-1.10
Non-PCV	27	12	3.2	3.2	1.01	0.51-2.00
Total cases	93	34	11	9.2	0.83	0.56-1.23
2014-2016 (mid PCV13 era)						
PCV7	6	2	0.7	0.5	0.77	0.16-3.82
PCV13nonPCV7	28	4	3.2	1	0.33	0.12-0.94
Non-PCV	39	12	4.4	3.1	0.71	0.37-1.36
Total cases	73	18	8.2	4.7	0.57	0.34-0.96
2017-2019 (late PCV13 era)						
PCV7	5	2	0.5	0.5	0.94	0.18-4.86
PCV13nonPCV7	30	2	3.3	0.5	0.16	0.04-0.66
Non-PCV	36	14	3.9	3.6	0.92	0.50-1.70
Total cases	71	18	7.7	4.6	0.60	0.36-1.00
<p>West region was defined as primarily French & Italian speaking cantons: Jura (JU), Geneva (GE), Fribourg (FR), Neuchâtel (NE), Valais (VS), Vaud (VD) & Ticino (TI). All other cantons were defined as East. IRR= Incidence rate ratio. Significant changes in IRR are in bold. Serotypes included in PCV7: 4, 6B, 9V, 14, 18C, 19F & 23F. Additional serotypes included in PCV13, but not PCV7: 1, 3, 5, 6A, 7F & 19A. Serotypes not included in either PCV7 or PCV13 were designated as Non-PCV. For 13 isolates/cases, regions were unknown.</p>						

Table S4. Incidence of invasive pneumococcal disease cases in age group 5-64 years by region and PCV serotypes, Switzerland 2005-2019

5-64 years	IPD cases- East	IPD cases- West	Incidence (per 100'000) East	Incidence (per 100'000) West	IRR- West vs. East	95% CI
2005-2007 (early PCV7 era)						
PCV7	323	147	2.6	2.8	1.09	0.90-1.33
PCV13nonPCV7	281	117	2.2	2.2	1.00	0.81-1.24
Non-PCV	189	71	1.5	1.4	0.90	0.69-1.18
Total cases	793	335	6.3	6.4	1.01	0.89-1.15
2008-2010 (late PCV7 era)						
PCV7	312	94	2.4	1.7	0.71	0.57-0.90
PCV13nonPCV7	401	135	3.1	2.5	0.80	0.66-0.97
Non-PCV	251	115	2.0	2.1	1.08	0.87-1.35
Total cases	964	344	7.5	6.3	0.84	0.75-0.95
2011-2013 (early PCV13 era)						
PCV7	121	46	0.9	0.8	0.89	0.63-1.25
PCV13nonPCV7	375	143	2.9	2.6	0.89	0.74-1.08
Non-PCV	297	121	2.3	2.2	0.95	0.77-1.18
Total cases	793	310	6	5.5	0.92	0.80-1.04
2014-2016 (mid PCV13 era)						
PCV7	69	11	0.5	0.2	0.37	0.20-0.70
PCV13nonPCV7	206	76	1.5	1.3	0.85	0.66-1.11
Non-PCV	385	132	2.9	2.3	0.79	0.65-0.97
Total cases	660	219	4.9	3.8	0.77	0.66-0.89
2017-2019 (late PCV13 era)						
PCV7	88	12	0.6	0.2	0.31	0.17-0.58
PCV13nonPCV7	160	51	1.2	0.9	0.74	0.54-1.01
Non-PCV	467	155	3.4	2.6	0.77	0.64-0.92
Total cases	715	218	5.2	3.7	0.70	0.61-0.82

West region was defined as primarily French & Italian speaking cantons: Jura (JU), Geneva (GE), Fribourg (FR), Neuchâtel (NE), Valais (VS), Vaud (VD) & Ticino (TI). All other cantons were defined as East. IRR= Incidence rate ratio. Significant changes in IRR are in bold. Serotypes included in PCV7: 4, 6B, 9V, 14, 18C, 19F & 23F. Additional serotypes included in PCV13, but not PCV7: 1, 3, 5, 6A, 7F & 19A. Serotypes not included in either PCV7 or PCV13 were designated as Non-PCV. For 13 isolates/cases, regions were unknown.

Table S5. Incidence of invasive pneumococcal disease cases in adults ≥ 65 years by region and PCV serotypes, Switzerland 2005-2019

≥65 years	IPD cases- East	IPD cases- West	Incidence (per 100'000) East	Incidence (per 100'000) West	IRR- West vs. East	95% CI
2005-2007 (early PCV7 era)						
PCV7	549	171	21.2	16.1	0.76	0.64-0.91
PCV13nonPCV7	316	115	12.2	10.9	0.89	0.72-1.10
Non-PCV	218	100	8.4	9.4	1.12	0.89-1.42
Total cases	1083	386	41.7	36.4	0.87	0.78-0.98
2008-2010 (late PCV7 era)						
PCV7	449	108	16.1	9.4	0.58	0.47-0.72
PCV13nonPCV7	439	143	15.8	12.5	0.79	0.66-0.96
Non-PCV	348	129	12.5	11.3	0.90	0.74-1.10
Total cases	1236	380	44.4	33.2	0.75	0.67-0.84
2011-2013 (early PCV13 era)						
PCV7	218	77	7.3	6.3	0.85	0.66-1.11
PCV13nonPCV7	443	169	14.9	13.7	0.92	0.77-1.10
Non-PCV	425	186	14.3	15.1	1.06	0.89-1.26
Total cases	1086	432	36.6	35.1	0.96	0.86-1.07
2014-2016 (mid PCV13 era)						
PCV7	139	33	4.4	2.5	0.57	0.39-0.83
PCV13nonPCV7	331	98	10.5	7.4	0.71	0.57-0.89
Non-PCV	632	234	20	17.8	0.89	0.77-1.03
Total cases	1102	365	34.8	27.7	0.80	0.71-0.90
2017-2019 (late PCV13 era)						
PCV7	96	27	2.9	2.0	0.68	0.45-1.05
PCV13nonPCV7	308	77	9.2	5.6	0.61	0.47-0.78
Non-PCV	852	270	25.4	19.6	0.77	0.67-0.88
Total cases	1256	374	37.5	27.1	0.72	0.65-0.81
<p>West region was defined as primarily French & Italian speaking cantons: Jura (JU), Geneva (GE), Fribourg (FR), Neuchâtel (NE), Valais (VS), Vaud (VD) & Ticino (TI). All other cantons were defined as East. IRR= Incidence rate ratio. Significant changes in IRR are in bold. Serotypes included in PCV7: 4, 6B, 9V, 14, 18C, 19F & 23F. Additional serotypes included in PCV13, but not PCV7: 1, 3, 5, 6A, 7F & 19A. Serotypes not included in either PCV7 or PCV13 were designated as Non-PCV. For 13 isolates/cases, regions were unknown.</p>						

Table S6. Incidence of serotypes among IPD cases in eastern Switzerland, 2005-2019

Serotype/ serogroup ^a	Incidence of serotypes/serogroups among IPD cases in the East ^b (Cases per 100'000 population)														
	Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
4	57 (1.1)	49 (0.9)	47 (0.9)	59 (1.1)	63 (1.2)	36 (0.7)	31 (0.6)	21 (0.4)	13 (0.2)	19 (0.3)	17 (0.3)	19 (0.3)	20 (0.3)	12 (0.2)	8 (0.1)
6B	30 (0.6)	29 (0.5)	26 (0.5)	19 (0.4)	24 (0.4)	15 (0.3)	16 (0.3)	7 (0.1)	7 (0.1)	7 (0.1)	3 (0.1)	1 (0)	8 (0.1)	2 (0)	4 (0.1)
9V	50 (0.9)	44 (0.8)	52 (1)	51 (0.9)	45 (0.8)	23 (0.4)	14 (0.3)	7 (0.1)	13 (0.2)	4 (0.1)	3 (0.1)	4 (0.1)	5 (0.1)	6 (0.1)	11 (0.2)
14	93 (1.8)	121 (2.3)	98 (1.8)	81 (1.5)	71 (1.3)	52 (0.9)	43 (0.8)	23 (0.4)	27 (0.5)	28 (0.5)	26 (0.4)	16 (0.3)	13 (0.2)	14 (0.2)	20 (0.3)
18C	19 (0.4)	24 (0.5)	30 (0.6)	22 (0.4)	15 (0.3)	21 (0.4)	14 (0.3)	9 (0.2)	7 (0.1)	11 (0.2)	4 (0.1)	3 (0.1)	1 (0)	6 (0.1)	7 (0.1)
19F	34 (0.6)	31 (0.6)	31 (0.6)	37 (0.7)	27 (0.5)	22 (0.4)	22 (0.4)	13 (0.2)	21 (0.4)	17 (0.3)	15 (0.3)	12 (0.2)	17 (0.3)	17 (0.3)	15 (0.2)
23F	33 (0.6)	44 (0.8)	51 (1)	58 (1.1)	53 (1)	23 (0.4)	24 (0.4)	21 (0.4)	12 (0.2)	7 (0.1)	7 (0.1)	3 (0.1)	3 (0.1)	2 (0)	2 (0)
1	31 (0.6)	28 (0.5)	25 (0.5)	35 (0.6)	32 (0.6)	42 (0.8)	27 (0.5)	29 (0.5)	19 (0.3)	21 (0.4)	4 (0.1)	4 (0.1)	3 (0.1)	0 (0)	1 (0)
3	84 (1.6)	75 (1.4)	91 (1.7)	111 (2)	133 (2.4)	94 (1.7)	115 (2.1)	90 (1.6)	125 (2.2)	96 (1.7)	103 (1.8)	123 (2.1)	120 (2)	140 (2.3)	124 (2.1)
6A	15 (0.3)	28 (0.5)	30 (0.6)	28 (0.6)	36 (0.7)	21 (0.4)	17 (0.3)	22 (0.4)	16 (0.3)	16 (0.3)	9 (0.2)	7 (0.1)	4 (0.1)	1 (0)	4 (0.1)
7F	65 (1.2)	56 (1.1)	73 (1.4)	71 (1.3)	88 (1.6)	75 (1.4)	80 (1.4)	68 (1.2)	74 (1.3)	36 (0.6)	32 (0.5)	21 (0.4)	19 (0.3)	7 (0.1)	5 (0.1)
19A	20 (0.4)	16 (0.3)	28 (0.5)	32 (0.6)	58 (1.1)	56 (1)	75 (1.3)	76 (1.3)	55 (1)	35 (0.6)	47 (0.8)	27 (0.5)	42 (0.7)	31 (0.5)	22 (0.4)
10A	0 (0)	0 (0)	1 (0)	1 (0)	0 (0)	6 (0.1)	8 (0.1)	9 (0.2)	14 (0.2)	10 (0.2)	16 (0.3)	17 (0.3)	17 (0.3)	15 (0.3)	18 (0.3)
11A	0 (0)	0 (0)	0 (0)	2 (0)	2 (0)	11 (0.2)	16 (0.3)	7 (0.1)	14 (0.2)	13 (0.2)	15 (0.3)	15 (0.3)	21 (0.4)	20 (0.3)	15 (0.2)
12F	0 (0)	0 (0)	3 (0.1)	11 (0.2)	4 (0.1)	5 (0.1)	7 (0.1)	10 (0.2)	11 (0.2)	17 (0.3)	16 (0.3)	16 (0.3)	18 (0.3)	32 (0.5)	39 (0.6)
15B/C	0 (0)	0 (0)	8 (0.1)	10 (0.2)	10 (0.2)	8 (0.1)	2 (0)	9 (0.2)	7 (0.1)	15 (0.3)	16 (0.3)	19 (0.3)	17 (0.3)	21 (0.4)	1 (0)
15A	0 (0)	0 (0)	0 (0)	7 (0.1)	1 (0)	2 (0)	4 (0.1)	2 (0)	8 (0.1)	15 (0.3)	16 (0.3)	13 (0.2)	24 (0.4)	17 (0.3)	14 (0.2)
22F	0 (0)	0 (0)	22 (0.4)	19 (0.4)	36 (0.7)	49 (0.9)	45 (0.8)	38 (0.7)	67 (1.2)	65 (1.1)	47 (0.8)	62 (1.1)	66 (1.1)	69 (1.2)	86 (1.4)
23A	0 (0)	0 (0)	2 (0)	8 (0.1)	7 (0.1)	5 (0.1)	6 (0.1)	9 (0.2)	11 (0.2)	18 (0.3)	15 (0.3)	8 (0.1)	19 (0.3)	16 (0.3)	20 (0.3)
23B	0 (0)	0 (0)	3 (0.1)	4 (0.1)	0 (0)	3 (0.1)	5 (0.1)	7 (0.1)	18 (0.3)	16 (0.3)	29 (0.5)	18 (0.3)	31 (0.5)	23 (0.4)	17 (0.3)
24	2 (0)	1 (0)	9 (0.2)	2 (0)	6 (0.1)	0 (0)	7 (0.1)	9 (0.2)	14 (0.2)	18 (0.3)	34 (0.6)	29 (0.5)	10 (0.2)	11 (0.2)	0 (0)
35F	0 (0)	0 (0)	4 (0.1)	6 (0.1)	6 (0.1)	12 (0.2)	4 (0.1)	10 (0.2)	11 (0.2)	8 (0.1)	11 (0.2)	12 (0.2)	9 (0.2)	13 (0.2)	13 (0.2)
6C	0 (0)	0 (0)	3 (0.1)	4 (0.1)	8 (0.1)	14 (0.3)	14 (0.3)	12 (0.2)	25 (0.4)	9 (0.2)	20 (0.3)	12 (0.2)	19 (0.3)	12 (0.2)	8 (0.1)
8	35 (0.7)	36 (0.7)	20 (0.4)	31 (0.6)	34 (0.6)	30 (0.5)	39 (0.7)	27 (0.5)	47 (0.8)	41 (0.7)	63 (1.1)	69 (1.2)	104 (1.8)	109 (1.8)	101 (1.7)
9N	0 (0)	0 (0)	22 (0.4)	36 (0.7)	19 (0.3)	19 (0.3)	25 (0.4)	24 (0.4)	22 (0.4)	23 (0.4)	23 (0.4)	39 (0.7)	50 (0.8)	37 (0.6)	53 (0.9)
others^c	126 (2.4)	105 (2)	62 (1.2)	72 (1.3)	79 (1.4)	54 (1)	49 (0.9)	59 (1)	55 (1)	66 (1.1)	73 (1.3)	57 (1)	79 (1.3)	78 (1.3)	87 (1.4)
Total*	694 (13.2)	687 (13)	741 (13.8)	817 (15.1)	857 (15.7)	698 (12.6)	709 (12.7)	618 (11)	713 (12.5)	631 (10.9)	664 (11.4)	626 (10.6)	739 (12.5)	711 (11.9)	695 (11.5)

a Serotypes/serogroups with proportions ≥1% are highlighted as such: PCV7 in peach, additional serotypes included in PCV13, but not PCV7 are in blue and non-PCV serotypes are in gray.

b East region defined as primarily German speaking cantons in Switzerland.

c Serotypes/serogroups with proportions <1% were classified as others irrespective of PCV type.

* Excludes 13 isolates/cases with unknown regional classification

Table S7. Incidence of serotypes among IPD cases in western Switzerland, 2005-2019

Serotype/ serogroup ^a	Incidence of serotypes/serogroups among IPD cases in the West ^b (Cases per 100'000 population)														
	Year														
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
4	20 (0.9)	32 (1.4)	20 (0.9)	20 (0.9)	16 (0.7)	15 (0.6)	17 (0.7)	11 (0.5)	14 (0.6)	2 (0.1)	1 (0)	0 (0)	1 (0)	1 (0)	0 (0)
6B	18 (0.8)	9 (0.4)	6 (0.3)	7 (0.3)	3 (0.1)	1 (0)	6 (0.3)	4 (0.2)	0 (0)	0 (0)	1 (0)	4 (0.2)	1 (0)	2 (0.1)	0 (0)
9V	23 (1.1)	13 (0.6)	25 (1.1)	17 (0.7)	13 (0.6)	6 (0.3)	5 (0.2)	6 (0.3)	6 (0.2)	2 (0.1)	4 (0.2)	3 (0.1)	1 (0)	2 (0.1)	1 (0)
14	43 (2)	30 (1.4)	44 (2)	30 (1.3)	17 (0.7)	14 (0.6)	13 (0.5)	7 (0.3)	12 (0.5)	9 (0.4)	3 (0.1)	3 (0.1)	4 (0.2)	5 (0.2)	2 (0.1)
18C	6 (0.3)	11 (0.5)	9 (0.4)	8 (0.4)	4 (0.2)	2 (0.1)	3 (0.1)	1 (0)	2 (0.1)	1 (0)	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)
19F	10 (0.5)	18 (0.8)	19 (0.8)	11 (0.5)	7 (0.3)	7 (0.3)	7 (0.3)	4 (0.2)	6 (0.2)	4 (0.2)	1 (0)	8 (0.3)	10 (0.4)	1 (0)	8 (0.3)
23F	28 (1.3)	15 (0.7)	9 (0.4)	15 (0.7)	8 (0.3)	5 (0.2)	4 (0.2)	10 (0.4)	1 (0)	2 (0.1)	3 (0.1)	0 (0)	1 (0)	3 (0.1)	0 (0)
1	29 (1.3)	12 (0.5)	12 (0.5)	15 (0.7)	17 (0.7)	15 (0.6)	22 (0.9)	12 (0.5)	7 (0.3)	3 (0.1)	2 (0.1)	1 (0)	0 (0)	0 (0)	0 (0)
3	37 (1.7)	32 (1.4)	44 (2)	40 (1.8)	29 (1.3)	32 (1.4)	53 (2.2)	47 (2)	38 (1.6)	35 (1.4)	48 (1.9)	40 (1.6)	38 (1.5)	47 (1.8)	24 (0.9)
6A	5 (0.2)	12 (0.5)	6 (0.3)	9 (0.4)	9 (0.4)	9 (0.4)	3 (0.1)	2 (0.1)	2 (0.1)	2 (0.1)	2 (0.1)	0 (0)	1 (0)	3 (0.1)	0 (0)
7F	18 (0.8)	23 (1)	25 (1.1)	28 (1.2)	27 (1.2)	34 (1.5)	26 (1.1)	31 (1.3)	22 (0.9)	7 (0.3)	5 (0.2)	5 (0.2)	3 (0.1)	2 (0.1)	1 (0)
19A	10 (0.5)	8 (0.4)	15 (0.7)	17 (0.7)	21 (0.9)	43 (1.8)	41 (1.7)	43 (1.8)	27 (1.1)	15 (0.6)	19 (0.8)	19 (0.8)	21 (0.8)	11 (0.4)	8 (0.3)
10A	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	3 (0.1)	8 (0.3)	6 (0.3)	5 (0.2)	10 (0.4)	6 (0.2)	6 (0.2)	7 (0.3)	10 (0.4)	12 (0.5)
11	5 (0.2)	8 (0.4)	6 (0.3)	13 (0.6)	6 (0.3)	2 (0.1)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
11A	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	2 (0.1)	7 (0.3)	8 (0.3)	4 (0.2)	12 (0.5)	7 (0.3)	5 (0.2)	6 (0.2)	4 (0.2)	3 (0.1)
12F	0 (0)	0 (0)	0 (0)	0 (0)	5 (0.2)	0 (0)	1 (0)	6 (0.3)	6 (0.2)	2 (0.1)	5 (0.2)	9 (0.4)	11 (0.4)	5 (0.2)	9 (0.3)
15B/C	0 (0)	1 (0)	3 (0.1)	0 (0)	5 (0.2)	6 (0.3)	9 (0.4)	8 (0.3)	6 (0.2)	5 (0.2)	3 (0.1)	4 (0.2)	7 (0.3)	4 (0.2)	0 (0)
15A	0 (0)	0 (0)	0 (0)	2 (0.1)	4 (0.2)	3 (0.1)	6 (0.3)	6 (0.3)	2 (0.1)	5 (0.2)	4 (0.2)	11 (0.4)	7 (0.3)	10 (0.4)	15 (0.6)
20	0 (0)	2 (0.1)	2 (0.1)	6 (0.3)	2 (0.1)	0 (0)	2 (0.1)	1 (0)	2 (0.1)	2 (0.1)	6 (0.2)	6 (0.2)	8 (0.3)	4 (0.2)	7 (0.3)
22F	0 (0)	0 (0)	8 (0.4)	14 (0.6)	9 (0.4)	12 (0.5)	17 (0.7)	16 (0.7)	18 (0.7)	27 (1.1)	19 (0.8)	23 (0.9)	25 (1)	17 (0.7)	16 (0.6)
23A	0 (0)	1 (0)	2 (0.1)	3 (0.1)	5 (0.2)	3 (0.1)	5 (0.2)	2 (0.1)	6 (0.2)	6 (0.2)	4 (0.2)	8 (0.3)	8 (0.3)	4 (0.2)	9 (0.3)
23B	0 (0)	0 (0)	1 (0)	2 (0.1)	3 (0.1)	5 (0.2)	3 (0.1)	6 (0.3)	5 (0.2)	6 (0.2)	4 (0.2)	2 (0.1)	8 (0.3)	10 (0.4)	6 (0.2)
24	0 (0)	0 (0)	1 (0)	3 (0.1)	3 (0.1)	3 (0.1)	0 (0)	6 (0.3)	8 (0.3)	7 (0.3)	8 (0.3)	2 (0.1)	5 (0.2)	2 (0.1)	0 (0)
35F	0 (0)	0 (0)	2 (0.1)	1 (0)	2 (0.1)	5 (0.2)	0 (0)	5 (0.2)	7 (0.3)	6 (0.2)	9 (0.4)	4 (0.2)	6 (0.2)	3 (0.1)	7 (0.3)
6C	0 (0)	0 (0)	1 (0)	4 (0.2)	4 (0.2)	7 (0.3)	9 (0.4)	4 (0.2)	15 (0.6)	1 (0)	6 (0.2)	8 (0.3)	3 (0.1)	3 (0.1)	5 (0.2)
8	22 (1)	21 (0.9)	12 (0.5)	19 (0.8)	17 (0.7)	15 (0.6)	21 (0.9)	26 (1.1)	19 (0.8)	19 (0.8)	26 (1)	38 (1.5)	46 (1.8)	50 (1.9)	41 (1.6)
9N	0 (0)	0 (0)	5 (0.2)	5 (0.2)	7 (0.3)	13 (0.6)	7 (0.3)	9 (0.4)	9 (0.4)	8 (0.3)	9 (0.4)	16 (0.6)	14 (0.5)	13 (0.5)	10 (0.4)
others^c	48 (2.2)	40 (1.8)	19 (0.8)	21 (0.9)	26 (1.1)	21 (0.9)	15 (0.6)	19 (0.8)	23 (0.9)	17 (0.7)	20 (0.8)	25 (1)	31 (1.2)	15 (0.6)	28 (1.1)
Total*	322 (14.7)	288 (13)	296 (13.2)	311 (13.6)	270 (11.7)	283 (12.1)	311 (13.1)	306 (12.8)	272 (11.2)	215 (8.7)	225 (9)	251 (9.9)	273 (10.7)	231 (9)	213 (8.3)

a Serotypes/serogroups with proportions ≥1% are highlighted as such: PCV7 in peach, additional serotypes included in PCV13, but not PCV7 are in blue and non-PCV serotypes are in gray.

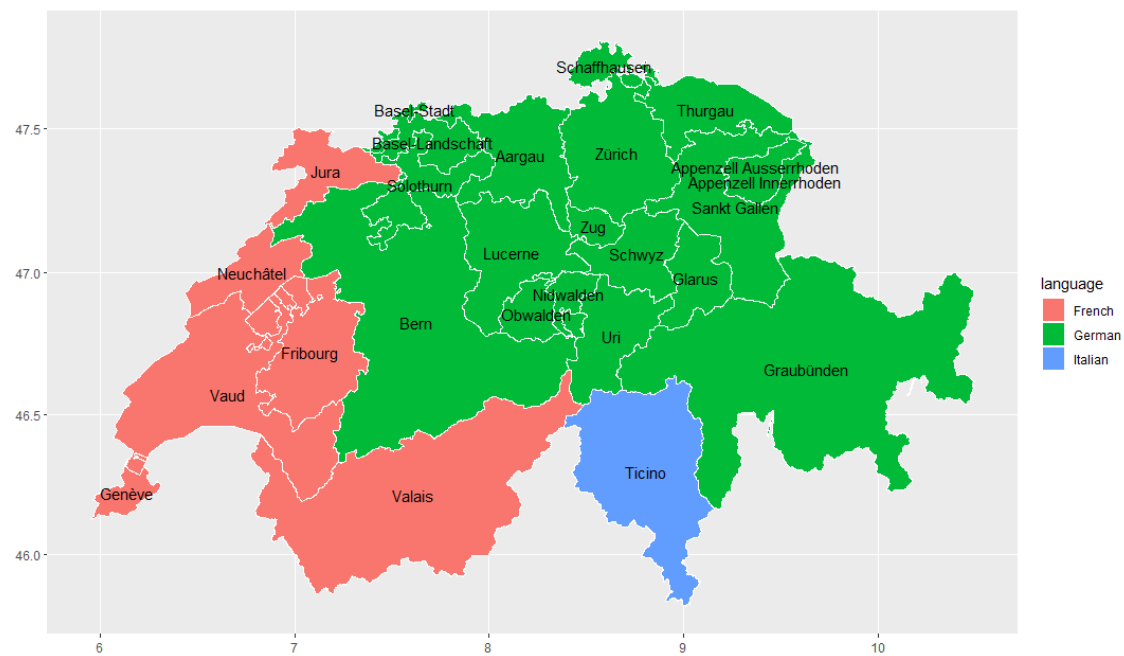
b West region defined as primarily French and Italian speaking cantons in Switzerland.

c Serotypes/serogroups with proportions <1% were classified as others irrespective of PCV type.

* Excludes 13 isolates/cases with unknown regional classification.

Supplementary Figures

Figure S1. Cantons of Switzerland and their regional classification



Canton(s)	Majority Language	Regional classification
Ticino (TI)	Italian	West
Fribourg (FR), Geneva (GE), Jura (JU), Neuchâtel (NE), Valais (VS), Vaud (VD)	French	West
Aargau (AG), Appenzell Ausserrhoden (AR), Appenzell Innerrhoden (AI), Basel-Landschaft (BL), Basel-Stadt (BS), Bern (BE), Glarus (GL), Graubünden (GR), Lucerne (LU), Nidwalden (NW), Obwalden (OW), Schaffhausen (SH), Schwyz (SZ), Solothurn (SO), St. Gallen (SG), Thurgau (TG), Uri (UR), Zug (ZG), Zürich (ZH).	German	East

Figure S2. Regional estimates of pneumococcal vaccine coverage in children aged 2-years and age-group specific IPD incidence in Switzerland, 2005-2019. (A) regional estimates with up to 1 PCV dose and (B) up to 3 PCV doses.

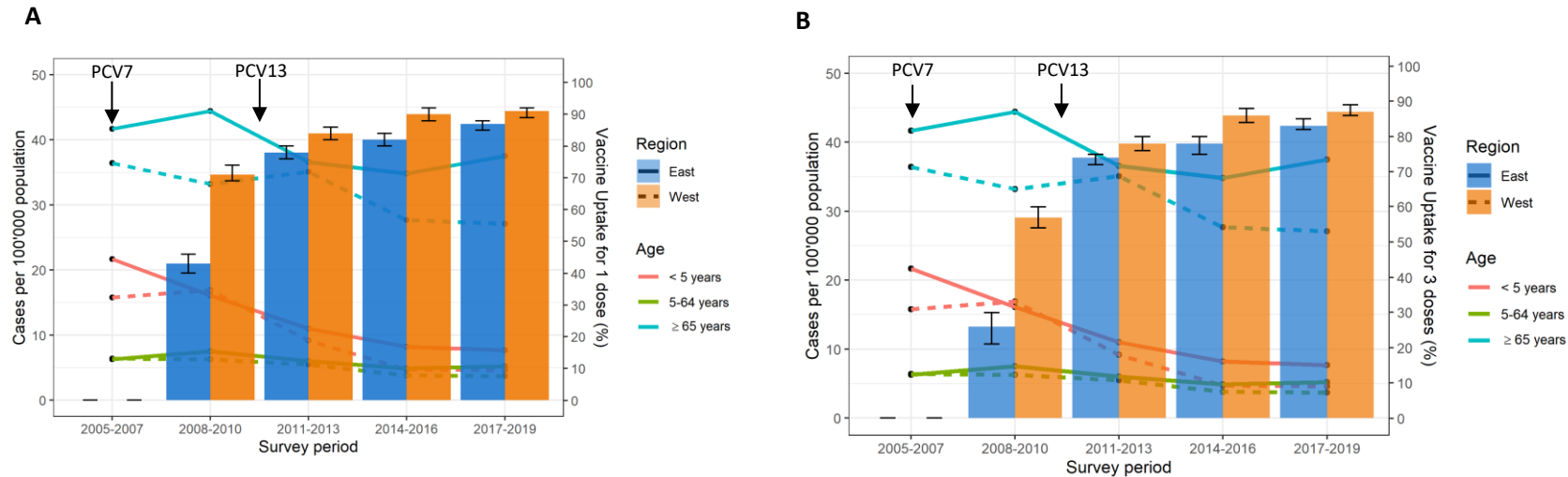


Figure S3. Timeliness of pneumococcal conjugate vaccine uptake in children aged 8 years old in Switzerland and its regions, 2014-2019.

(A) Timeliness of vaccine uptake in children aged 8 years vaccinated with 1-3 doses of PCV7 or PCV13, (B) regional estimates of pneumococcal vaccination coverage among children 8 years with up to 1 PCV dose, (C) up to 2 PCV doses and (D) up to 3 PCV doses.

