



Serotype distribution in invasive pneumococcal disease before and after introduction of PCV10 in childhood vaccination in Iceland

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Background and aims

PCV10 was introduced in 2011 into the routine childhood vaccination program in Iceland.

Our aim was to assess the effect of PCV10 on pneumococcal serotypes in invasive pneumococcal disease (IPD), by comparing eight years before (2004-11; PreVac) to eight years after (2012-19; PostVac) vaccine implementation.

Material and methods

All IPD isolates were documented and stored at the Department of Clinical Microbiology, Landspítali, which serves as a reference laboratory for the whole country.

All available isolates were serotyped with Immulex Pool Antisera and/or multiplex PCR.

A Two-sided Fisher’s exact test was used for the statistical analyses and significance was set at $p \leq 0.05$.

Results

564 pneumococcal isolates were recovered from invasive disease during the study period (blood $n=526$, cerebrospinal fluid $n=35$ and joint fluid $n=3$).

- 345 isolates PreVac.
- 219 isolates PostVac.

PCV10 serotypes decreased among all age groups in the PostVac period.

For children (<7 years of age):

- Serotype 14 was only detected in one child, 1 year of age in 2017.
- Serotype 7F was only detected in one child, 5 years of age in 2016, which was not eligible for vaccination.

Non-PCV10 serotypes increased among adults ≥ 18 years from 98/345 PreVac to 154/219 ($p < 0.001$) PostVac but not in children <18 years (PreVac 13/345 to 13/219 PostVac $p=0.303$).

The most prevalent non-PCV10 serotypes PostVac among adults ≥ 18 years were serotypes 19A, 22F and 9N (Table 1).

The proportion of penicillin non-susceptible pneumococci (PNSP) increased overall, between the two study periods from 30 of 345 (8.7%) PreVac to 30 of 219 (13.7%; $p=0.036$) PostVac.

Table 1: Ten most prevalent non-PCV10 serotypes in adults ≥ 18 years.

Serotype	PreVac		PostVac		p-value
	n	/100,000	n	/100,000	
19A	16	7.0	25	9.9	0.020
22F	13	5.7	23	9.1	0.013
9N	4	1.7	15	5.9	0.002
3	17	7.4	13	5.1	1.000
11A	0	0	9	3.6	<0.001
6C	2	0.9	8	3.2	0.023
15A	0	0	7	2.8	0.003
33F	6	2.6	7	2.8	0.572
8	0	0	6	2.4	0.006
Other non-PCV10	40	17.4	40	15.8	-
Non-typable	0	0	1	0.4	0.430
Total non-PCV10 serotypes	98	42.9	154	60.8	<0.001

The main PNSP serotypes that increased in the PostVac period were: 19A, 15A, 6C and 35B (Table 2 and Figure 1).

Table 2: PNSP serotypes detected PreVac and PostVac.

Serotype	PreVac		PostVac		p-value
	n	%	n	%	
19A	0	0	7	23.3	<0.001
15A	0	0	5	16.7	0.002
19F	10	33.3	4	13.3	0.582
35B	0	0	4	13.3	0.024
6C	0	0	4	13.3	0.007
14	6	20.0	3	10.0	1.000
23B	0	0	2	6.7	0.151
Other PNSP*	14	46.7	0	0	0.001
Non-typable	0	0	1	3.3	0.388
Total PNSP	30	8.7	30	13.7	0.036

*Other PNSP were of serotypes 6B, 9V and 38.

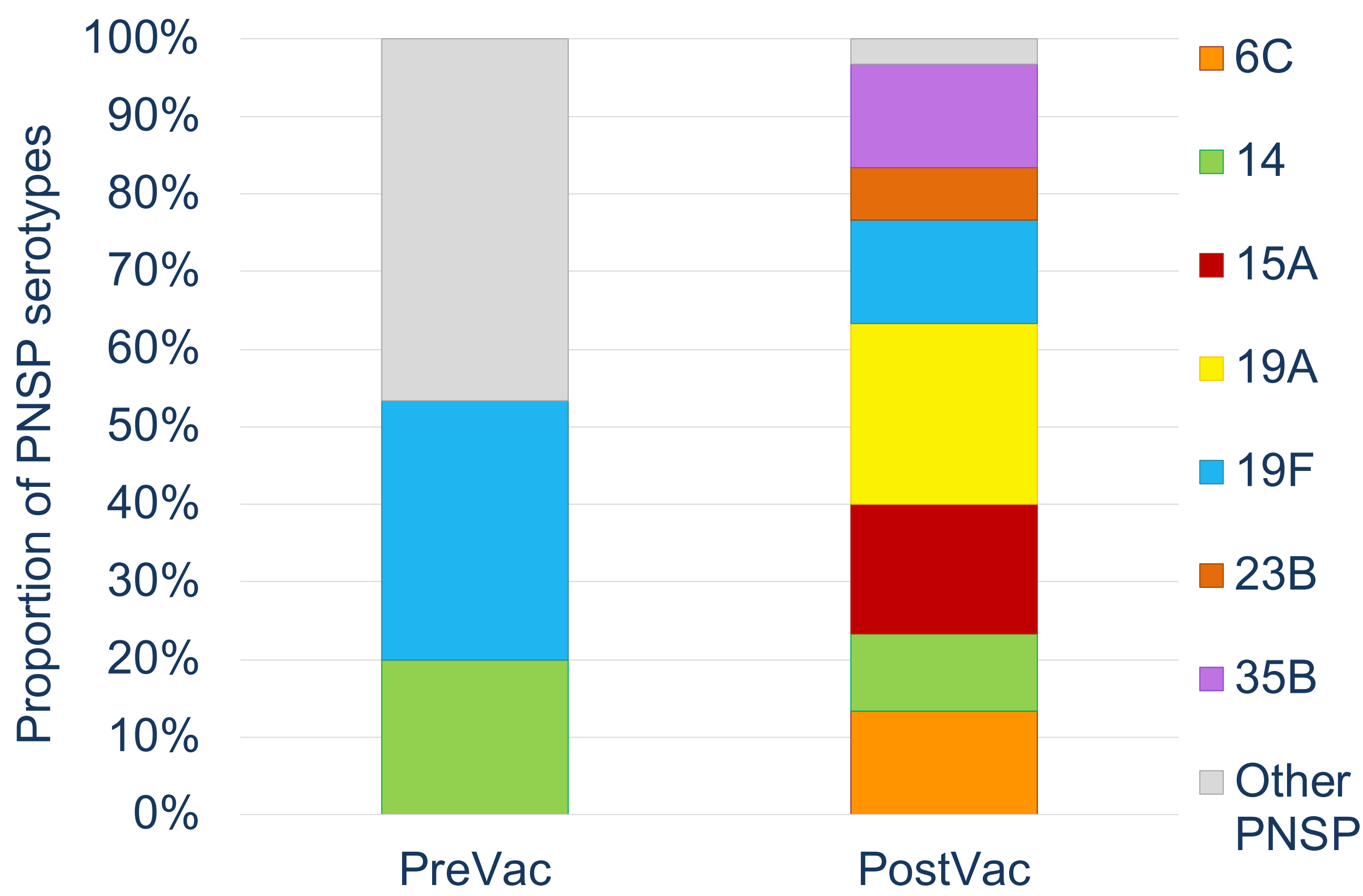


Figure 1. Proportion of PNSP serotypes detected in the PreVac and PostVac periods.

Conclusions

The vaccine impact was highest among children <7 years as only two pneumococcal isolates of PCV10 serotypes were detected in this age group after vaccination. The increasing prevalence of penicillin non-susceptible pneumococci of non-PCV10 serotypes is concerning.