

Supplementary Material

Estimating the Health and Economic Burden of Pneumococcal Diseases Attributable to PCV21 Versus PCV20 or PPSV23 Serotypes Among Adults in Norway

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Supplemental Table S1. Risk groups

Age (years)	Low-risk	At-risk	High-risk
18-49	95.96%	3.50%	0.54%
50-64	84.95%	12.82%	2.22%
65+	67.02%	26.42%	6.56%

Sources: Norwegian Institute of Public Health (2024) and Statistics Norway (2024) [2]

Supplemental Table S2. Population size and mortality rates ^A

Ages 18–64			Ages 65–100		
Age	Population	Mortality	Age	Population	Mortality
18	65,310	0.000398	65	60,503	0.007968
19	65,023	0.0004	66	59,650	0.008448
20	64,317	0.000264	67	58,634	0.009946
21	64,665	0.000464	68	56,770	0.010217
22	67,072	0.000373	69	55,324	0.011662
23	68,982	0.000406	70	54,031	0.012176
24	69,387	0.000447	71	51,878	0.014466
25	70,680	0.00041	72	50,488	0.015386
26	73,034	0.000424	73	50,217	0.018136
27	74,480	0.000389	74	49,684	0.02024
28	74,857	0.000347	75	49,587	0.022244
29	75,673	0.000489	76	49,771	0.025232
30	77,259	0.000518	77	46,585	0.027628
31	78,835	0.000634	78	41,805	0.032114
32	80,097	0.000587	79	37,468	0.035833
33	80,206	0.000511	80	32,696	0.038215
34	79,460	0.000541	81	28,160	0.046712
35	77,790	0.000668	82	25,368	0.050025
36	76,107	0.000709	83	23,928	0.056899
37	75,299	0.000611	84	21,610	0.067104
38	74,073	0.000823	85	19,114	0.073836
39	73,283	0.000805	86	16,733	0.086576
40	73,188	0.000833	87	14,488	0.096424
41	72,452	0.001062	88	12,532	0.109994
42	71,983	0.001069	89	10,938	0.126731
43	71,747	0.000961	90	9,761	0.141139
44	70,834	0.001016	91	8,477	0.157837
45	69,622	0.001206	92	7,008	0.183432

46	69,400	0.001325	93	5,559	0.206972
47	70,964	0.001296	94	4,276	0.22045
48	73,247	0.00146	95	3,231	0.244444
49	74,557	0.001501	96	2,419	0.284257
50	75,605	0.001586	97	1,765	0.293192
51	76,715	0.001823	98	1,270	0.298802
52	76,143	0.00206	99	826	0.330081
53	76,223	0.002503	100	1,269	0.374503
54	76,402	0.002719			
55	74,820	0.002829			
56	73,356	0.002913			
57	72,244	0.003289			
58	70,780	0.003554			
59	68,512	0.004456			
60	66,126	0.004346			
61	64,582	0.004865			
62	63,376	0.005492			
63	62,605	0.00621			
64	61,898	0.006731			

Sources: Statistics Norway (2024) [3, 4]

^A Population and mortality data are from 2023.

Supplemental Table S3. Serotype distribution by age group

Serotype	IPD			NBPP		
	Ages 18–49	Ages 50–64	Ages 65+	Ages 18–49	Ages 50–64	Ages 65+
1	0.00%	0.00%	0.12%	0.00%	0.00%	0.12%
3	16.42%	15.95%	14.23%	16.42%	15.95%	14.23%
4	3.48%	2.28%	0.86%	3.48%	2.28%	0.86%
5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6A	0.00%	0.57%	0.00%	0.00%	0.57%	0.00%
6C	0.50%	1.71%	1.23%	0.50%	1.71%	1.23%
6B	0.00%	0.28%	0.25%	0.00%	0.28%	0.25%
7F	1.00%	0.28%	0.25%	1.00%	0.28%	0.25%
8	24.38%	15.38%	11.29%	24.38%	15.38%	11.29%
9V	0.00%	0.00%	0.25%	0.00%	0.00%	0.25%
10A	2.99%	1.42%	3.93%	2.99%	1.42%	3.93%
11A	1.49%	2.28%	2.82%	1.49%	2.28%	2.82%
12F	1.49%	0.57%	0.00%	1.49%	0.57%	0.00%
14	0.50%	0.00%	0.12%	0.50%	0.00%	0.12%
15B	0.90%	1.66%	1.90%	0.90%	1.66%	1.90%
15C	0.60%	2.33%	1.78%	0.60%	2.33%	1.78%
18C	0.00%	0.28%	0.37%	0.00%	0.28%	0.37%
19A	1.49%	2.56%	1.72%	1.49%	2.56%	1.72%
19F	1.00%	1.42%	1.96%	1.00%	1.42%	1.96%
22F	12.44%	16.52%	15.34%	12.44%	16.52%	15.34%
23F	0.00%	0.28%	0.37%	0.00%	0.28%	0.37%
33F	1.00%	1.14%	2.33%	1.00%	1.14%	2.33%
2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
9N	7.96%	6.55%	5.15%	7.96%	6.55%	5.15%
17F	0.00%	0.00%	0.98%	0.00%	0.00%	0.98%
20A	3.48%	3.13%	2.21%	3.48%	3.13%	2.21%
15A	1.99%	1.99%	4.05%	1.99%	1.99%	4.05%
16F	1.49%	1.71%	1.60%	1.49%	1.71%	1.60%
23A	1.99%	4.27%	4.54%	1.99%	4.27%	4.54%

23B	2.99%	2.56%	4.79%	2.99%	2.56%	4.79%
24F	1.49%	3.70%	1.96%	1.49%	3.70%	1.96%
31	0.00%	0.57%	0.37%	0.00%	0.57%	0.37%
35B	0.00%	0.57%	3.19%	0.00%	0.57%	3.19%
NVT	8.96%	7.98%	10.06%	8.96%	7.98%	10.06%

IPD, invasive pneumococcal disease; NBPP, non-bacteremic pneumococcal pneumonia; NVT, non-vaccine type

Source: Norwegian Institute of Public Health (2024) [5]

Supplemental Table S4. Estimated discounted lifetime clinical and economic outcomes for PCV21, PCV20, the 8 unique serotypes in PCV21, and PPSV23 among adults 65+ years old in Norway

Outcomes	Risk Group	PCV20	PPSV23	PCV21	PCV21 Unique 8	Incremental	
		Serotypes	Serotypes	Serotypes		PCV21 vs. PCV20	PCV21 vs. PPSV23
IPD Cases	LR	459	514	648	172	189	134
	AR	776	869	1,095	291	319	226
	HR	1,053	1,179	1,486	395	433	307
	Total	2,288	2,562	3,229	859	941	667
NBPP IP	LR	7,412	8,301	10,461	2,782	3,050	2,161
	AR	12,983	14,540	18,325	4,873	5,342	3,785
	HR	17,883	20,028	25,242	6,712	7,358	5,213
	Total	38,278	42,869	54,028	14,366	15,750	11,158
NBPP OP	LR	7,693	8,616	10,859	2,887	3,166	2,243
	AR	13,338	14,937	18,825	5,006	5,488	3,888
	HR	18,294	20,488	25,821	6,866	7,527	5,333
	Total	39,324	44,042	55,505	14,759	16,181	11,464
IPD Death	LR	29	33	41	11	12	8
	AR	50	56	71	19	21	15
	HR	68	77	97	26	28	20
	Total	148	165	208	55	61	43
NBPP IP Death	LR	354	397	500	133	146	103
	AR	637	713	899	239	262	186
	HR	887	994	1,252	333	365	259
	Total	1,878	2,104	2,651	705	773	548
Direct Cost (NOK)	LR	541,038,373	605,937,402	763,655,895	203,062,560	222,617,522	157,718,494
	AR	943,450,555	1,056,620,023	1,331,645,987	354,095,929	388,195,432	275,025,964
	HR	1,297,115,614	1,452,708,171	1,830,831,297	486,833,524	533,715,682	378,123,126
	Total	2,781,604,542	3,115,265,595	3,926,133,179	1,043,992,014	1,144,528,637	810,867,584

IP, inpatient; IPD, invasive pneumococcal disease; NBPP, non-bacteremic pneumococcal pneumonia; NOK, Norwegian kroner; OP, outpatient; PCV20, 20-valent pneumococcal conjugate vaccine; PCV21, 21-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine

Supplemental Table S5. Estimated discounted lifetime clinical and economic outcomes for PCV21, PCV20, the 8 unique serotypes in PCV21, and PPSV23 in adults 50-64 years old in Norway

Outcomes	Risk Group	PCV20 Serotypes	PPSV23 Serotypes	PCV21 Serotypes	PCV21 Unique 8	Incremental	
						PCV21 vs. PCV20	PCV21 vs. PPSV23
IPD Cases	LR	991	1,098	1,371	341	380	273
	AR	897	993	1,235	302	338	241
	HR	1,099	1,217	1,501	358	402	284
	Total	2,987	3,308	4,107	1,001	1,120	798
NBPP IP	LR	11,382	12,620	15,869	4,045	4,487	3,249
	AR	9,901	10,976	13,760	3,472	3,859	2,784
	HR	11,284	12,502	15,581	3,852	4,297	3,079
	Total	32,567	36,098	45,210	11,369	12,642	9,112
NBPP OP	LR	12,909	14,312	17,970	4,558	5,060	3,658
	AR	11,320	12,546	15,701	3,939	4,382	3,155
	HR	13,101	14,513	18,047	4,427	4,947	3,535
	Total	37,329	41,371	51,718	12,924	14,389	10,348
IPD Death	LR	51	57	70	17	19	14
	AR	49	54	67	16	18	13
	HR	64	70	86	20	23	16
	Total	164	181	223	53	60	42
NBPP IP Death	LR	348	386	486	125	138	100
	AR	310	344	432	110	122	88
	HR	351	389	486	121	135	97
	Total	1,009	1,119	1,404	356	395	285
Direct Cost (NOK)	LR	870,586,851	965,187,264	1,212,253,915	307,827,759	341,667,063	247,066,651
	AR	762,035,589	844,625,608	1,057,428,834	265,580,811	295,393,245	212,803,226
	HR	879,005,720	973,790,733	1,211,499,340	297,673,119	332,493,620	237,708,607
	Total	2,511,628,160	2,783,603,605	3,481,182,089	871,081,689	969,553,928	697,578,484

IP, inpatient; IPD, invasive pneumococcal disease; NBPP, non-bacteremic pneumococcal pneumonia; NOK, Norwegian kroner; OP, outpatient; PCV20, 20-valent pneumococcal conjugate vaccine; PCV21, 21-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine

Supplemental Table S6. Estimated discounted lifetime clinical and economic outcomes for PCV21, PCV20, the 8 unique serotypes in PCV21, and PPSV23 in adults 18-64 years old with risk factors in Norway

Outcomes	Risk Group	PCV20 Serotypes	PPSV23 Serotypes	PCV21 Serotypes	PCV21 Unique 8	Incremental	
						PCV21 vs. PCV20	PCV21 vs. PPSV23
IPD Cases	LR	-	-	-	-	0	-
	AR	1,941	2,179	2,635	600	694	455
	HR	2,461	2,771	3,293	702	832	522
	Total	4,402	4,950	5,928	1,302	1,526	978
NBPP IP	LR	-	-	-	-	0	-
	AR	19,675	22,073	27,070	6,526	7,395	4,997
	HR	20,352	22,804	27,906	6,638	7,554	5,102
	Total	40,027	44,876	54,976	13,164	14,949	10,100
NBPP OP	LR	-	-	-	-	0	-
	AR	22,849	25,639	31,347	7,468	8,498	5,708
	HR	26,792	30,128	36,256	8,137	9,464	6,128
	Total	49,642	55,767	67,603	15,605	17,961	11,836
IPD Death	LR	-	-	-	-	0	-
	AR	92	103	123	27	32	20
	HR	128	145	170	35	42	25
	Total	220	248	294	62	73	46
NBPP IP Death	LR	-	-	-	-	0	-
	AR	469	526	651	162	181	125
	HR	500	560	691	169	190	131
	Total	970	1,086	1,341	331	372	255
Direct Cost (NOK)	LR	-	-	-	-	0	-
	AR	1,535,937,198	1,723,407,897	2,108,397,580	503,491,524	572,460,382	384,989,682
	HR	1,651,870,401	1,852,701,822	2,253,726,302	524,787,947	601,855,901	401,024,480
	Total	3,187,807,599	3,576,109,719	4,362,123,882	1,028,279,471	1,174,316,283	786,014,162

IP, inpatient; IPD, invasive pneumococcal disease; NBPP, non-bacteremic pneumococcal pneumonia; NOK, Norwegian kroner; OP, outpatient; PCV20, 20-valent pneumococcal conjugate vaccine; PCV21, 21-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine

Results are shown for adults 18-64 years old with risk factors.

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