

A COMPARISON OF THE POTENTIAL PUBLIC HEALTH IMPACT OF PCV15 AND PCV20 IN FRENCH INFANTS

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INTRODUCTION

- The 13-valent pneumococcal conjugate vaccine (PCV13) was implemented into the French National Immunization Program (NIP) in 2010 using a 2+1 dosing schedule.
- Two higher-valent vaccines have recently received marketing authorization, including a 15-valent (PCV15, licensed for use in a 2+1 schedule) and a 20-valent (PCV20, licensed for use in a 3+1 dosing schedule).
- In July 2023, the French National Authority for Health (Haute Autorité de santé, HAS) recommended PCV15 as an alternative to PCV13 in the NIP for infants aged <2 years, while PCV20 has yet to be recommended.¹
- A recently published dynamic transmission model estimated that PCV20 implementation in France may result in more PCV13-type invasive pneumococcal disease (IPD) cases than PCV15 in children aged <1 year, though this study underestimated the true impact of higher-valent vaccines by excluding impact on newly covered serotypes and considering a narrow set of disease outcomes.²

OBJECTIVE

- To compare the public health impact of a two-dose priming series of PCV15 with a three-dose priming series of PCV20 on pneumococcal disease caused by all vaccine-type serotypes in French infants during their first year of life.

METHODS

- A previously published Excel-based model³ was adapted to estimate cases of IPD averted with a three dose-priming series of PCV20 versus a two-dose priming series of PCV15 in infants. Impact on inpatient pneumonia was also considered as PCVs have demonstrated effectiveness against this outcome.⁴
- Analyses were conducted across five annual French birth cohorts each followed for 1 year.
- As the model aimed to estimate the impact of the priming series, the model assumed no infants received a booster dose and excluded indirect (herd) effects.
- Direct vaccine effectiveness (VE) against IPD was based on PCV13 dose-specific VE from Savulescu et al. (2022).⁵
- Direct VE against all-cause inpatient community-acquired pneumonia (CAP) was based on the efficacy observed in PCV7 clinical trial, adjusted for the number of doses as well as the serotype coverage of each vaccine.⁶
- Model inputs, including VE estimates, are presented in **Table 1**.
- Although the relationship between immunogenicity and VE is not well established, a scenario analysis was done where the VE against IPD for the PCV20 priming series was up to 30% lower relative to that of PCV15, based on data from Bakker et al. (2025) and Wong et al. (2024).^{2,7}
- A deterministic sensitivity analysis (DSA) that varied key input parameters +/-20% was conducted to identify key drivers of model results.
- The estimated impact of a two-dose PCV20 priming series versus PCV15 was also analyzed.

Table 1. Epidemiological inputs and vaccine effectiveness estimates.

Parameter	Value	
Priming series uptake rate	95.7% ⁸	
Disease incidence per 100k		
IPD	14.5 ⁹	
Inpatient CAP	967 ¹⁰	
IPD clinical presentation		
Meningitis	40.5% ⁹	
Bacteremia	59.5% ⁹	
Case fatality rate (CFR)		
Bacteremia	6.0% ¹⁰	
Meningitis	1.5% ¹⁰	
Inpatient CAP	0.8% ¹⁰	
Serotype coverage by vaccine, <1-year olds		
PCV15	24.0% ⁹	
PCV20	50.0% ⁹	
Vaccine effectiveness		
	Two-dose priming series	Three-dose priming series
IPD	60.7% ⁴	70.9% ⁴
Inpatient CAP†	19.8% ⁶	20.2% ⁶

IPD: Invasive pneumococcal disease; PCV: pneumococcal conjugate vaccine.

†Reported vaccine effectiveness against inpatient pneumonia from PCV7 clinical trials was 25.5%. Values in table are adjusted for number of doses administered in the priming series but not differences in serotype coverage.

References

- HAS. Décision n°2023.0303/DC/SESPEV, 27 juillet 2023. « Stratégie de vaccination contre les infections à pneumocoque. Place du vaccin VAXNEUVANCE chez l'enfant ». 2. Bakker K.M. Infect Dis Ther. 2025;14(4). 3. Ilic A. Vaccines. 2024;12(11):1279. 4. Griffin M.R. MMWR. 2014; 63(44):995-998 5. Savulescu C. Vaccine. 2022;40(29). 6. Black S.B. Pediatr Infect Dis J. 2000;19(3). 7. Wong A. J Infect Dis. 2025;232(1). 8. Santé publique. Données de couverture vaccinale pneumocoque. <https://www.santepubliquefrance.fr/determinants-de-sante/vaccination/articles/donnees-de-couverture-vaccinale-pneumocoque-par-groupe-d-age>. 9. CNR Pneumocoques. Rapports d'activités. <https://cnr-pneumo.com/rapports-publis> (Accessed Sept 2025). 10. Pfizer data on file. PHEBUS Study. France 2019.

Disclosures

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RESULTS

- In all tested scenarios, PCV20 was estimated to avert more disease cases and more deaths in the first year of life than PCV15.
- Across five birth cohorts, PCV20 vaccination could prevent an additional 1,692 pneumococcal disease cases and 16 disease-related deaths versus PCV15 (**Table 2**).

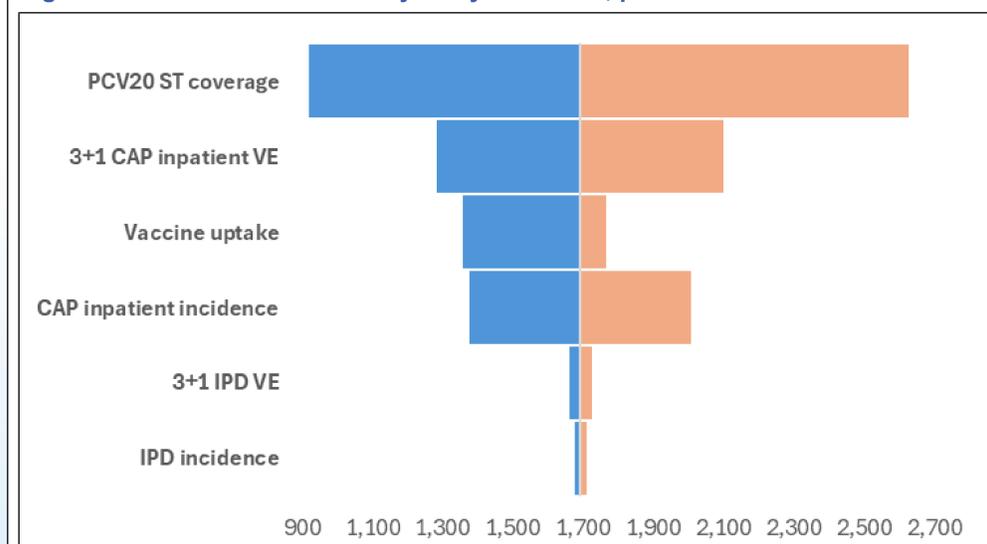
Table 2. Number of cases and deaths prevented under each vaccination strategy.

	PCV15	PCV20	PCV20 vs. PCV15
Prevented cases			
IPD	72	175	103
Inpatient CAP	465	2,054	1,589
Total	537	2,229	1,692
Prevented deaths			
IPD	3	6	3
Inpatient CAP	4	17	13
Total	7	23	16

IPD: Invasive pneumococcal disease; CAP: community-acquired pneumonia; PCV: pneumococcal conjugate vaccine.

- When considering PCV20 with a two-dose priming series, PCV20 still prevented more IPD cases and IPD-related deaths (78 cases and 3 deaths averted) than PCV15.
- Even when the VE of PCV20 was lower than that of PCV15, PCV20 still prevented more IPD cases and IPD-related deaths (42 cases and 1 death averted) than PCV15.
- Per the DSA, the topmost influential model parameters impacting total incremental cases averted were PCV20 serotype coverage, VE against CAP, and vaccine uptake (**Figure 1**).

Figure 1. Deterministic sensitivity analysis results, prevented cases.



IPD: Invasive pneumococcal disease; CAP: community acquired pneumonia; VE: vaccine effectiveness; PCV: pneumococcal conjugate vaccine.

CONCLUSIONS

- PCV20 vaccination is projected to provide greater protection against pneumococcal disease in French infants compared to the PCV15, regardless of vaccine effectiveness assumptions or vaccine dosing schedule.
- Modeling analyses of PCVs should consider impact on all vaccine serotypes and a comprehensive range of outcomes to ensure conclusions are relevant and robust for decision makers.
- These results support the preferential use of PCV20 in France to maximize pneumococcal disease prevention in the first year of life.

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