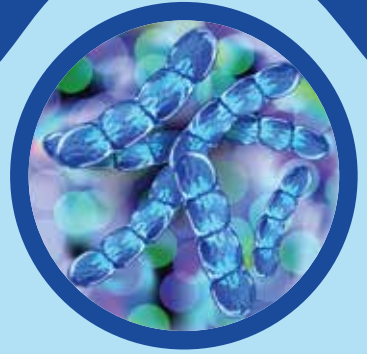




PNEUMO SHOTS



COPD and Beyond: Maximizing the Benefits of Pneumococcal Vaccination

Burden of pneumococcal disease in India



In India, the **incidence of CAP is 4 million cases/year** with 20% requiring hospitalization.¹



The most prevalent clinical conditions associated with IPD in India are **pneumonia (39%), meningitis (24.3%), and septicemia (18.4%).**²

Pneumococcal pneumonia can be prevented through pneumococcal vaccination. **Currently, two pneumococcal vaccines-PCV13 and PPSV23-are approved for use in adults in India.**³



PCV13 should be administered first followed by PPSV23 as PCV13 establishes an immunological state, enabling both a recall response and an enhanced antipneumococcal response upon subsequent administration of PPSV23.⁴

Immunogenicity and safety of PCV13 in the Indian population



Open-label⁵



Single-arm⁵



Multicenter;
12 sites, 6 states⁵



1000 participants,
50 to 65 years⁵



- PCV13 **elicited robust immune responses** against all 13 pneumococcal serotypes.
- **Significant geometric mean fold rises** (range, 6.6–102.7) in functional antibody levels 1 month after PCV13 vaccination⁵



No deaths or SAEs were reported. None of the AEs led to withdrawal from the study.⁵

PCV13 is well tolerable and immunogenic when administered to adults in India, which indicates that a single dose of PCV13 has the potential to help protect against vaccine-type pneumococcal disease in adults.⁵

Benefits of PCV13 to COPD patients*

Comparative effectiveness of PCV13 and PPV23 in COPD patients⁶

Subjects and the study design: An open-label, prospective, observational cohort study involving 302 male patients aged ≥45 years. Patients were allocated into three groups: patients vaccinated with the 23-valent vaccine (PPV23 group), those vaccinated with the 13-valent vaccine (PCV13 group), and vaccine-naïve patients (control group).

Effectiveness of PCV13 vs. PPSV23



Prevention of pneumonia

Pneumonia after 5 years was reported in **3.3% of patients receiving PCV13 and 47% receiving PPSV23**.⁶

While **the positive effect persists for 5 years** with PCV13, it gradually declines from year 2 with PPV23.⁶



Reduced rate of COPD exacerbations

COPD exacerbations after 5 years were reported in **23.6% of patients receiving PCV13 and 81.3% receiving PPSV23**.⁶

Only **PCV13 is characterized by persistent clinical effectiveness during the 5-year follow-up period**.⁶



Improved quality of life

Vaccination with PCV13 significantly **reduced and maintained the BODE index** over the 5-year follow-up period.⁶

Patients who received PPV23 have significantly higher risks of having pneumonia episodes more frequently during the long-term follow-up.⁶

Hospitalization outcomes in PCV13 vaccinated versus unvaccinated COPD subjects in India⁷

Subjects and the study design: A prospective analytical study of 120 patients hospitalized with an acute exacerbation of COPD between Sep 2019 and Sep 2021. The patients were recruited into two groups: pneumococcal-vaccinated (n=60) as well as -unvaccinated group (n=60).

Clinical outcomes

p=0.002

30%

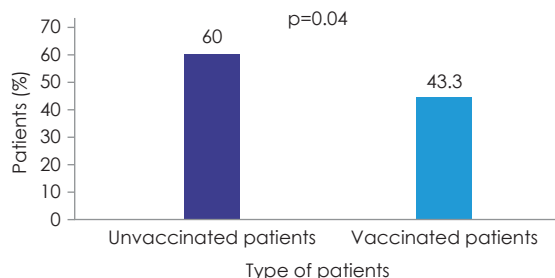
Vaccinated patients needed ICU admission

58.3%

Unvaccinated patients needed ICU admission

Parameters	Vaccinated patients	Unvaccinated patients	p-value
Length of ICU stay (days)	0.67±1.11	1.77±1.89	0.001
Length of hospital stay (days)	4.50±1.64	5.47±2.03	0.005

Patients requiring assisted ventilation⁷



COPD patients with prior PCV13 showed improved outcomes during hospitalization for acute exacerbation.⁷

Adapted from: Venkitakrishnan R, et al. *ERJ Open Res.* 2023;9(3):00476-2022.

*Kindly note that this is an RWE study and these studies should be read in concordance with RCT studies.

Cost effectiveness of PCV13 in Adults

Country	Result
Japan ⁸	<ul style="list-style-type: none"> 10.4123 QALY for PCV13 and 10.4088 QALY for PPV23 On comparing, PCV13 with PPV23, ICER estimated at 500,255JPY per QALY gained.
South Africa ⁹	<ul style="list-style-type: none"> PCV13 compared to PPSV23 is highly cost-effective Public sector cohorts with ICER of \$771/QALY and \$956/QALY Private sector cohort with ICER of \$626/QALY
United States ¹⁰	The addition of one dose of PCV13 to the PPSV23 averted 93 deaths, saved 1360 QALY, and saved \$5.2 million per cohort.
Thailand ¹¹	PCV13 was a cost-effective vaccine, with an ICER of 233.63 USD/QALY gained and 627.24 USD/QALY gained, respectively as compared with PPSV23.

PCV13 is shown to be a more cost-effective alternative to PPV23 in reducing both disease and cost.⁸⁻¹¹

Conclusion

A single dose of PCV13 could offer protection against vaccine-type pneumococcal disease in adults.⁵

COPD patients hospitalized for acute exacerbation have improved hospitalization outcomes post-PCV13 vaccination.⁷

PCV13 vaccination is a more cost-effective alternative than PPSV23 for older adults.⁸⁻¹¹

AE: Adverse event; BODE: Body mass index, airflow obstruction, dyspnea, and exercise capacity; CAP: Community-acquired pneumonia; COPD: Chronic obstructive pulmonary disease; DALY: Disability-adjusted life year; GDP: Gross domestic product; GMT: Geometric mean titer; ICER: Incremental cost-effectiveness ratio; ICU: Intensive care unit; IPD: Invasive pneumococcal disease; PCV13: 13-valent pneumococcal conjugate vaccine 13; PPSV23: 23-valent pneumococcal polysaccharide vaccine; QALY: Quality adjusted life year; RCT: Randomized control trial; RWE: Real-world evidence; SAE: Serious adverse event; USD: US Dollars.

References: 1. Prasad P, Bhat S. Clinicomicrobiological study of community-acquired pneumonia. *Lung India*. 2017;34(5):491–492. 2. Jayaraman R, Varghese R, Kumar JL, et al. Invasive pneumococcal disease in Indian adults: 11 years' experience. *J Microbiol Immunol Infect*. 2019;52:736–742. 3. Dhar R, Ghoshal AG, Guleria R, et al. Clinical practice guidelines 2019: Indian consensus-based recommendations on pneumococcal vaccination for adults. *Lung India*. 2020;37(Supplement):S19–S29. 4. Greenberg RN, Gurtman A, Frenck RW, et al. Sequential administration of 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine in pneumococcal vaccine-naïve adults 60–64 years of age. *Vaccine*. 2014;32(20):2364–2374. 5. Solanki BB, Juergens C, Chopada MB, et al. Safety and immunogenicity of a 13-valent pneumococcal conjugate vaccine in adults 50 to 65 years of age in India: An open-label trial. *Hum Vaccin Immunother*. 2017;13(9):2065–2071. 6. Ignatova GL, Avdeev SN, Antonov VN. Comparative effectiveness of pneumococcal vaccination with PPV23 and PCV13 in COPD patients over a 5-year follow-up cohort study. *Sci Rep*. 2021;11(1):15948. 7. Venkitakrishnan R, Vijay A, Augustine J, et al. Hospitalisation outcomes in pneumococcal-vaccinated versus- unvaccinated patients with exacerbation of COPD: Results from the HOPE COPD Study. *ERJ Open Res*. 2023;9(3):00476-2022. 8. Igarashi A, et al. Cost-effectiveness analysis for PCV13 in adults 60 years and over with underlying medical conditions which put them at an elevated risk of pneumococcal disease in Japan. *Expert Rev Vaccines*. 2021;20(9):1153–1165. 9. Feldman C et al. The cost-effectiveness of using pneumococcal conjugate vaccine (PCV13) versus pneumococcal polysaccharide vaccine (PPSV23), in South African adults. *PLoS One*. 2020;15(1):e0227945. 10. Cho BH, et al. Cost-effectiveness of administering 13-valent pneumococcal conjugate vaccine in addition to 23-valent pneumococcal polysaccharide vaccine to adults with immunocompromising conditions. *Vaccine*. 2013;31(50):6011–6021. 11. Ngamprasertchai T, Kositamongkol C, Lawpoolsri S, et al. A cost-effectiveness analysis of the 13-valent pneumococcal conjugated vaccine and the 23-valent pneumococcal polysaccharide vaccine among Thai older adult. *Front Public Health*. 2023;11:1071117.

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