# Pneumococcal conjugate vaccine to prevent mortality, morbidity, and re-admissions due to pneumococcal disease in at-risk Indian adults: a cost-effectiveness analysis.

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## *Recommendations:*

- Pneumococcal conjugate vaccine could be beneficial for preventing readmission with pneumonia among older PMJAY beneficiaries.
- Acquiring the vaccine at a lower price and adherence to the stringent clinical protocol for pneumonia are to be ensured before inclusion of this under PMJAY.

## *Key Findings*

- Single-dose PCV13 is cost-saving in all four at-risk subgroups, delivering lower total costs and higher QALYs than no vaccination.
- Among 65+ adults, ICERs in the high and moderate risk groups are -INR 64,674 and -INR 70,519 per QALY, respectively, demonstrating a higher effect at lower cost.
- Among 75+ adults, ICERs in the high and moderate risk groups are -INR 76,196 and -INR 77,687 per QALY.
- Across all at-risk subgroups, the sensitivity analyses show ICERs remain below the willingness to pay threshold, with almost 100% probability of cost-effectiveness.
- Estimated Cost for all elderly at-risk (high + moderate) PMJAY beneficiaries with a history of hospitalization in one year: INR 1188 Crores.
- Cost of vaccinating only the 75+ population is INR 368 crores and that of vaccinating only the high risk among them is 118 crores.

## Background

- Older adults with existing comorbidities have a higher probability of an elevated risk for Invasive Pneumococcal Diseases (IPDs), the infection of sterile body fluids by Streptococcus pneumoniae. IPD has significant mortality and risk of permanent sequalae.
- Pneumococcal Conjugate Vaccine (PCV13) is an important vaccine candidate against IPD, which is proven to be cost-effective in those older than 65 years.
- A cost-utility analysis of single-dose vaccination with PCV13 in at-risk* Indian adults older than 65 for preventing re-admissions. This population is assumed to constitute the majority of inpatients at PMJAY empanelled hospitals.
- This was model-based analysis from the health-system perspective, over a time-horizon of 10-15 years, applying a uniform discount rate of 3% for both the costs and consequences.

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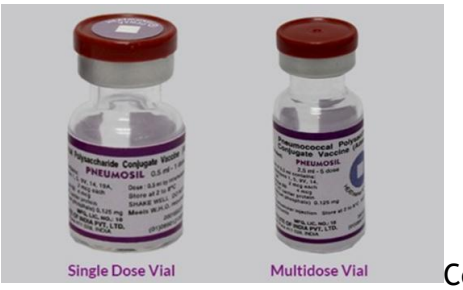


Cost INR 3995

| PICO | Description of the components of PICO |
|---|---|
| **Population** | · **At-risk Indian adults older than 65 years** with a history of hospitalisation in PMJAY empanelled hospitals.<br>· [High risk: immunocompromising conditions such as haematological malignancies, those on high-dose steroids/ immunosuppressants, chronic kidney disease, etc.]<br>· Moderate risk: comorbidities such as diabetes, chronic liver disease, chronic heart disease etc.<br>· **Low-risk patients with no risk-elevating conditions are included as a comparator.** |
| **Intervention** | · Single dose of PCV13 administered I/m at adult immunization clinics. |
| **Comparator** | · No-vaccination scenario, including in-patient care for Pneumonia and invasive pneumococcal diseases. |
| **Outcome** | · Morbidity and Mortality from pneumococcal diseases, Quality-adjusted life years (QALY),<br>· Cost of management of pneumonia and invasive pneumococcal diseases |

*Annual admissions and PCV13 vaccination cost among at-risk High-risk: Immunocompromised (Malignancies, Immunosuppressives, High-dose corticosteroids, Chronic Renal Diseases etc.) Moderate risk: Co-morbidities (Diabetes mellitus, Chronic Liver Diseases, Cardiovascular diseases older PMJAY beneficiaries*

| Age | Annual admissions (Total) | No. HRG (26.9%) | No. MRG (57.1%) | Cost HRG (₹) (Cr) | Cost MRG (₹) (Cr) | Cost Total at-risk (₹) (Cr) |
|---|---|---|---|---|---|---|
| 65-74 | 24,66,628 | 6,63,523 | 14,08,444 | 262 | 557 | 819 |
| 75+ | 11,08,805 | 2,98,269 | 6,33,128 | 118 | 250 | 368 |
| Total (65+) | 35,75,433 | 9,61,791 | 20,41,572 | 380 | 807 | 1188 |

**Budget Impact:**

- The budget required to vaccinate all at-risk adults 65+ corresponds to roughly 12.6% of the annual National Health Authority budget, for an estimated 35.8 lakh beneficiaries.
- Restricting vaccination to high- and moderate-risk adults aged 75+ years (about 9.3 lakh beneficiaries) reduces the budget requirement to about INR 368 crore.
- Actual annual outlay may be lower than these estimates because PMJAY admission data include repeat admissions by the same individual and because the pool of vaccine-eligible persons shrinks over time as coverage expands.

**References**


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