

## Recommendation

- Quadrivalent influenza vaccination (QIV) for India's elderly is marginally cost-effective at 50% coverage.
- Vaccine price reductions can further improve affordability, potentially making the program cost-saving.
- QIV may be integrated into the national immunization program for adults  $\geq 65$  years, with strategic vaccine price negotiations to ensure sustainability.

## Key Findings

Epidemiological Impact (at 50% coverage; 54.7 million elderly):

- 147,774 ILI cases averted ( $\downarrow 25.2\%$ )
- 24,662 SARI hospitalizations averted ( $\downarrow 27.0\%$ )
- 3,471 SARI-IPD deaths prevented ( $\downarrow 32.7\%$ )
- 6,993 SARI-ICU deaths prevented ( $\downarrow 38.5\%$ )

Health Gains:

- QALY loss per 1,000 elderly reduced from 4.364 to 2.786; 1.578 QALYs gained per 1,000 elderly.

Economic Impact:

- Health system costs (excluding vaccination): reduced from ₹1,31,120 to ₹92,035 per 1,000 elderly
- Including vaccination: total costs increase to ₹4,92,695 per 1,000 elderly
- ICER: ₹2,29,154 per QALY gained – below India's cost-effectiveness threshold

Budget impact:

- ₹5.1 crore per district; ₹4,379 crore nationally.

## Background:

- Influenza causes significant morbidity and mortality among India's rapidly growing elderly population.
- Annual vaccination with quadrivalent influenza vaccine (QIV) offers critical protection.
- As per resolution WHA 56.19 of the 56th World Health Assembly, Member States committed to achieving at least 75% influenza vaccination coverage among the elderly population.

| PICO         | Description of the components                                                                                                                                                                                            |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population   | Elderly individuals aged $\geq 65$ years                                                                                                                                                                                 |
| Intervention | Quadrivalent Influenza Vaccine (QIV)                                                                                                                                                                                     |
| Comparator   | Routine care without vaccination                                                                                                                                                                                         |
| Outcomes     | <ul style="list-style-type: none"> <li>• Reduction in influenza-related illness (ILI and SARI)</li> <li>• Gains in Quality-Adjusted Life Years (QALYs)</li> <li>• Incremental Cost-Effectiveness Ratio (ICER)</li> </ul> |

## Quadrivalent Influenza Vaccine

- Annual vaccination with quadrivalent influenza vaccine (QIV) offers critical protection against influenza
- As per resolution WHA56.19 of the 56th World Health Assembly, Member States committed to achieving at least 75% influenza vaccination coverage among the elderly population.



Cost: ₹738.7

## Results:

| Health Outcome         | No Vaccine | Vaccine | QALY (No Vaccine) | QALY (Vaccine) | Cost (No Vaccine) | Cost (Vaccine - Total) |
|------------------------|------------|---------|-------------------|----------------|-------------------|------------------------|
| No Influenza           | 987.63     | 990.78  | 0.000             | 0.000          | -                 | -                      |
| ILI                    | 10.70      | 8.00    | 0.016             | 0.012          | 9,641             | 7,207                  |
| SARI                   | 1.67       | 1.22    | -                 | -              | -                 | -                      |
| ICU Admission (%)      | 46.2       |         |                   |                |                   |                        |
| - SARI-IPD             | 0.90       | 0.69    | -                 | -              | -                 | -                      |
| SARI-IPD Mortality     | 0.19       | 0.13    | 1.574             | 1.059          | 6,741             | 4,537                  |
| SARI-IPD Discharge     | 0.70       | 0.56    | 0.003             | 0.002          | 21,512            | 17,206                 |
| - SARI-ICU             | 0.77       | 0.53    | -                 | -              | -                 | -                      |
| SARI-ICU Mortality     | 0.33       | 0.20    | 2.691             | 1.654          | 43,207            | 26,557                 |
| SARI-ICU Discharge     | 0.44       | 0.32    | 0.080             | 0.058          | 50,020            | 36,528                 |
| Total (Health outcome) | -          | -       | 4.364             | 2.786          | 1,31,120          | 92,035                 |
| Cost of vaccination    | -          | -       | -                 | -              | -                 | 4,00,660               |
| Total                  | -          | -       | -                 | -              | 1,31,120          | 4,92,695               |

| Parameter            | Value    |
|----------------------|----------|
| QALY Gain            | 1.578    |
| Incremental Cost (₹) | 3,61,575 |
| ICER (₹/QALY gained) | 2,29,154 |

## Impact of Vaccine Price Reduction on ICER and Budget Impact Analysis:

| Vaccine Price Reduction (%) | Vaccine Price (₹) | Unit Cost (Vaccine + Program) (₹) | ICER (₹/QALY Gained) | Budget Impact per District (₹ Crore)<br>(n = 63,750) | Budget Impact Nationally (₹ Crore)<br>(n = 54,695,500) |
|-----------------------------|-------------------|-----------------------------------|----------------------|------------------------------------------------------|--------------------------------------------------------|
| Base case                   | 738.7             | 800.8                             | 229,154              | 5.10                                                 | 4,379.90                                               |
| 10                          | 664.8             | 726.9                             | 205,581              | 4.63                                                 | 3,975.98                                               |
| 25                          | 554.0             | 616.1                             | 170,469              | 3.93                                                 | 3,369.93                                               |
| 50                          | 369.3             | 431.5                             | 111,948              | 2.75                                                 | 2,359.84                                               |
| 75                          | 184.7             | 246.8                             | 53,428               | 1.57                                                 | 1,349.75                                               |
| 80                          | 147.7             | 209.8                             | 41,724               | 1.33                                                 | 1,147.73                                               |
| 90                          | 73.9              | 136.0                             | 18,315               | 0.86                                                 | 743.69                                                 |
| 95                          | 36.9              | 99.0                              | 6,611                | 0.63                                                 | 541.68                                                 |
| 97                          | 22.2              | 84.3                              | 1,930                | 0.54                                                 | 460.87                                                 |
| 98                          | 14.8              | 76.9                              | -411                 | 0.49                                                 | 420.47                                                 |

## Conclusion:

- Cost Effectiveness: At 50% coverage, the ICER of ₹2,29,154 per QALY gained is 0.98 times the GDP-per-capita-based threshold, indicating that quadrivalent influenza vaccination is cost-effective
- QIV significantly reduces influenza burden, preventing an estimated 1.48 lakh ILI cases, 24,662 SARI hospitalizations, and 10,464 deaths annually.

## References

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