

# COST EFFECTIVENESS OF GLUCOSE 6 PHOSPHATE DEHYDROGENASE POINT OF CARE TESTING BEFORE PRIMAQUINE ADMINISTRATION

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## Recommendations:

- Prioritize G6PD POCT screening in high prevalence states to maximize health impact and reduce primaquine-associated hemolysis risk.
- May consider integrating routine G6PD screening into the National Centre for Vector Borne Diseases Control for management of P.vivax malaria.
- Periodically reassess prevalence and cost parameter to refine screening strategies and ensure long-term cost-effectiveness.

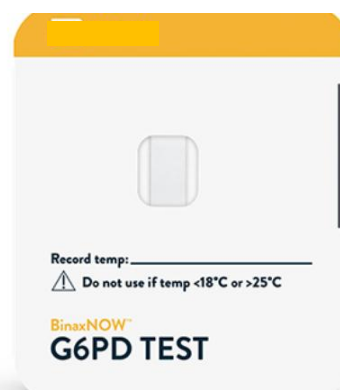
## Key Findings:

- Point-of-care (POC) G6PD screening before primaquine is cost-effective compared with the current practice of giving primaquine without testing.
- In the general population, the ICER is ₹60,558 per QALY, well below the national cost-effectiveness threshold (₹2,30,701/QALY).
- The introduction of G6PD screening using qualitative POCT kit increased the mean cost by ₹21,98,300 compared with the non-screening strategy and resulted in a gain of 36.3 QALYs per cohort size of 10,000.

## Background

- India reports a substantial burden of *Plasmodium vivax* malaria, responsible for 39% of malaria cases.
- Primaquine is essential for radical cure but poses a significant haemolysis risk in individuals with G6PD deficiency.
- G6PD deficiency prevalence varies from 0% to 30% across India, with higher rates in tribal populations.
- Current practice often includes primaquine administration without prior testing, increasing risk of haemolysis, transfusion, and avoidable morbidity.
- POC qualitative G6PD tests enable rapid, decentralised decision-making at PHC/CHC levels and can make primaquine safer.
- The qualitative G6PD POCT showed high sensitivity and specificity of 0.95 and 0.99, respectively, in both heparinized and EDTA whole blood samples.

| PICO         | Description of the components of PICO                                      |
|--------------|----------------------------------------------------------------------------|
| Population   | Patients with <i>P. vivax</i> malaria (excluding infants & pregnant women) |
| Intervention | Point-of-care qualitative G6PD test with 14-day Primaquine treatment       |
| Comparator   | Standard 14-day Primaquine treatment without prior G6PD testing            |
| Outcome      | 1. QALYs gained<br>2. ICER                                                 |



**Results:**

| Population of 10000 Cohort | Cost (₹)  | QALY    | Incremental Cost (₹) | Incremental QALY gain | ICER (₹)/QALY |
|----------------------------|-----------|---------|----------------------|-----------------------|---------------|
| Intervention               | 57,97,900 | 9,997.0 | 21,98,300            | 36.3                  | 60,558.8      |
| Comparator                 | 35,99,600 | 9,960.7 |                      |                       |               |

**Budget Impact Analysis:**

| Total population (India, 2024) | Malaria incidence (per 1000 population) | Proportion of <i>P.vivax</i> in malaria (%) | Estimated annual malaria cases | Estimated annual <i>P. vivax</i> cases (39%) | Cost per patient for G6PD screening (₹) | Budget required for screening (all India) (₹) (Cr) |
|--------------------------------|-----------------------------------------|---------------------------------------------|--------------------------------|----------------------------------------------|-----------------------------------------|----------------------------------------------------|
| 1421749000                     | 1.41                                    | 39                                          | 20,04,666                      | 7,81,820                                     | 495.00                                  | 38.70                                              |

The estimated annual additional budget required for screening all *P.vivax* malaria cases across India is ₹38.70 crores, in high-prevalence states is ₹6.21 crores.

**Conclusion:**

- The intervention to be cost-effective and potentially cost-saving in regions with higher G6PD deficiency prevalence.
- When prevalence of G6PD was increased up to 30%, QALY gains showed only a small rise while cost-effectiveness remained strong, confirming the robustness of the intervention across varying epidemiological conditions.