



COST-EFFECTIVENESS OF PoC MICROCHIP ELECTROPHORESIS TEST FOR THALASSEMIA SCREENING DURING PREGNANCY

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Recommendations

- In the current situation, due to limited accessibility of HPLC testing for screening, procuring point-of-care (PoC) tests such as Gazelle (all screened positive cases to be confirmed with HPLC) would be a more feasible option. Deployment at either each PHC or at the block level could help reduce overall expenditure.
- The price of machine and kits need to be negotiated for bulk purchases.

Background :

- India bears 25% of the global β -thalassemia burden, with 35–45 million carriers and high prevalence in tribal and underserved populations.
- β -Thalassemia major imposes lifelong treatment needs, costing ₹66,710 per patient annually and placing a heavy financial burden on families and the health system.
- Thalassemia screening is not routinely included in ANC services, leading to missed opportunities for early detection and prevention of affected births.
- Gazelle offers a portable, rapid point-of-care option that can expand screening access in remote and resource-limited settings where HPLC is unavailable.

Key Findings

- Both Gazelle and HPLC found to be cost effective as compared to No screening.
- POC (₹18,361) and HPLC (₹14,643) incurs higher costs per pregnant woman as compared to No screening (₹16,656).
- The ICERs per QALY gained for PoC is ₹16454 and for HPLC is ₹2526.
- QALY gained per mother is 1.08 for PoC (Gazelle) and 1.48 for (HPLC) compared to No screening (0.98)

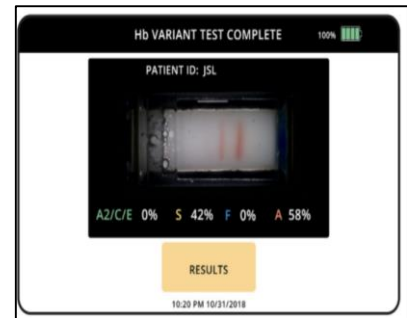
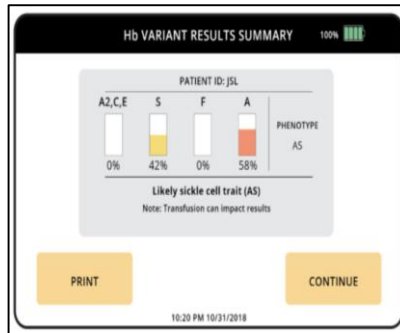
PICO	Description of the components
Population	Pregnant women undergoing antenatal screening (≤ 12 weeks of gestation)
Intervention	- Gazelle -Point-of-care (POC) test for Thalassemia screening - HPLC
Comparator	No screening (currently screening for Thalassemia is not part of ANC package in public health system)
Outcome	- QALY Gained - ICER per QALY gained - Cost per case screened - Cost per case diagnosed

The Model

Decision Analytical Model: Decision Tree

The model comprises of a hypothetical cohort of all pregnant women being screened for Thalassemia in first trimester ANC check-up at primary health care facilities

- If using POC (Gazelle) result is positive, blood sample of both the couple sent to HPLC for diagnosis
- Depending on the report and assessing probability of foetus being affected, couple referred for prenatal testing to tertiary facility
- If prenatal diagnosis suggests risk of foetus being Thalassemia major, the couple is counselled and offered an option to terminate pregnancy
- If pregnancy is continued (assuming only 50% of those counselled would opt for MTP), the mother is treated as high risk, managed and delivered at tertiary care facility.
- Based on birth outcomes, the child born to Thalassemia positive (Trait or Major) mother would be tested at 6 months and diagnosis of the child would be confirmed.
- All probabilities of each of these stages have been taken from literature review or expert opinion
- The same cycle is repeated in the HPLC group without the component of POC (Gazelle) test used for screening



Results:

	Total cost per women	Incremental cost	QALY per mother	Incremental QALY (intervention-Comparator)	ICER per QALY gained
Intervention (Gazelle)	₹ 18,361	₹1705	1.08	0.10	₹16454
Intervention (HPLC)	₹ 17,934	₹1278	1.48	0.5	₹2526
Comparator (No screening)	₹ 16,656		0.98		

Budget Impact:

Introducing the Gazelle at negotiated price (50% of machine and kit cost) screening platform at the district level would require an estimated ₹65 lakh for 1st year and ₹ 24.36 lacs for 2nd year, including both the cost of procuring the device and the kits needed for testing all pregnant women registered for their first ANC visit.

Conclusion:

- Cost effectiveness: Compared to no screening both Point of care (Gazelle) (0.0714 times GDP per capita) and HPLC (0.011 times GDP per capita) are cost-effective.
- Accessibility to HPLC testing for screening being limited in current situation, results in either no screening or delayed reporting [which leads to missing the small window of opportunity available for couples to be advised for prenatal tests, counselling and getting an opportunity to undergo a second trimester medical termination of pregnancy (MTP) as per rule if foetus is Thalassemia Major].