

## Editorial

# The cost-effectiveness of chronic myeloid leukemia treatment strategies in the Indian healthcare context

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## INTRODUCTION

Chronic myeloid leukemia (CML) poses a significant health burden globally, and India is no exception. India's annual incidence of CML ranges from 0.8 to 2.2/100,000 people.<sup>[1]</sup> It is the most frequent type of leukemia, accounting for 30–60% of all leukemia in India.<sup>[2]</sup> With its diverse population and varying healthcare landscape, optimizing the cost-effectiveness of CML treatment strategies in the Indian context requires a nuanced approach that considers factors such as economic constraints, healthcare infrastructure, diverse patient demographics, and government policies. In recent years, the landscape of CML treatment has witnessed significant advancements, particularly with the introduction of tyrosine kinase inhibitors (TKIs) such as imatinib, dasatinib, bosutinib, nilotinib, ponatinib, and vamorinib (PF-114) and other drugs such as specifically targeting the ABL myristoyl pocket (STAMP) inhibitor.<sup>[3]</sup> While these therapies have revolutionized the management of CML and improved patient outcomes, their high costs and limited availability pose challenges in resource-constrained settings like India. Through collaboration between healthcare providers, policymakers, pharmaceutical companies, and patient advocacy groups, we can strive to achieve the dual goals of improving patient outcomes and maximizing the efficiency of healthcare resource utilization in the management of CML in India. This review aims to explore the complexities of enhancing the cost-effectiveness of CML treatment in the Indian healthcare context.

## THE CHALLENGE OF AFFORDABILITY

Managing CML effectively requires a comprehensive approach that not only focuses on clinical outcomes but also addresses the economic implications of treatment. One of the primary barriers in accessing CML treatment in India is the affordability of medications. Fluctuations in drug prices due to factors such as patent expiration, supply chain disruptions, and regulatory changes can influence the overall cost-effectiveness of CML treatment strategies. However, India benefits from a robust generic drug industry, which often provides lower-cost alternatives to patented medications. Generic versions of essential CML drugs, such as imatinib, have significantly reduced the financial burden on patients, making treatment more accessible.<sup>[4,5]</sup> The intersection of drug prices, healthcare infrastructure, patient demographics, and government policies profoundly influences the affordability and accessibility of CML treatment in India. Moreover, the effectiveness of CML treatment is not only solely determined by clinical outcomes but also by factors such as treatment adherence, quality of life, and long-term sustainability.<sup>[6]</sup> Thus, achieving optimal cost-effectiveness requires a holistic approach that considers not only the upfront costs

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of treatment but also the downstream economic implications and societal benefits. The cost of generic imatinib 400 mg for 1 month is around Rs. 3000–Rs. 6000. One-month therapy for dasatinib 50 mg, costs around Rs. 3500–Rs. 9000, for Nilotinib 300 mg, Rs. 6000–Rs. 12000, and for Bosutinib 400 mg, it is Rs. 5000–Rs.7500. These cost reductions have made these drugs available for a wider range of population.

## HEALTHCARE INFRASTRUCTURE

The availability and quality of healthcare infrastructure play a crucial role in determining the cost-effectiveness of CML treatment. Access to specialized healthcare facilities, diagnostic services, and trained healthcare professionals are essential for timely diagnosis, treatment initiation, and monitoring of CML patients. In India, there may be disparities in healthcare infrastructure between urban and rural areas, impacting the accessibility and cost-effectiveness of CML treatment strategies. Investments in healthcare infrastructure, including the expansion of cancer care centers and the adoption of telemedicine technologies, can improve cost-effectiveness by reducing barriers to care.

## PATIENT DEMOGRAPHICS

In India, the median age of CML patients is younger than in Western countries, ranging from 35 to 40 years compared to 50–60 years with male preponderance. Patient demographics, including socioeconomic status, insurance coverage, and co-morbidities, influence the cost-effectiveness of CML treatment strategies. Low-income patients may face financial barriers to accessing treatment, affecting their ability to adhere to prescribed regimens and achieve optimal outcomes. In addition, co-morbidities such as diabetes, hypertension, and cardiovascular disease can complicate CML management, leading to increased healthcare costs and reduced cost-effectiveness. Tailoring treatment strategies to account for patient demographics and individual circumstances can improve cost-effectiveness by optimizing resource allocation and patient outcomes.

## GOVERNMENT POLICIES

Government policies and regulations play a significant role in shaping the cost-effectiveness of CML treatment strategies in India. Policies related to drug pricing, intellectual property rights, healthcare financing, and reimbursement mechanisms impact the affordability and accessibility of CML drugs and services. For example, initiatives such as the National List of Essential Medicines (NLEM) and price control measures aim to ensure the availability of essential drugs at affordable prices, thereby enhancing cost-effectiveness. Imatinib has been added in NLEM in 2022. Similarly, government-sponsored health insurance schemes like Ayushman Bharat

provide financial protection to eligible patients, improving access to CML treatment and enhancing cost-effectiveness. However, not all TKIs are available in Ayushman Bharat. Only imatinib, dasatinib and bosutinib are available under the scheme which needs to be expanded in view of growing incidence of TKI resistance. It is not possible for all physicians, including medical oncologists and hemato-oncologists, to treat every CML patient if cost is a major concern. These patients should be referred to specialized centers that can handle logistical challenges, such as drug availability, or seek alternative funding sources beyond Ayushman Bharat, like Corporate Social Responsibility initiatives and Indian Cancer Society funding, to ensure uninterrupted access to necessary medications.

## IMPORTANCE OF TREATMENT GUIDELINES

Adhering to evidence-based treatment guidelines is crucial for optimizing cost-effectiveness. By following established protocols for CML management, healthcare providers can ensure that patients receive the most appropriate and efficient treatments available, minimizing unnecessary costs and maximizing therapeutic outcomes. Timely and accurate diagnosis is essential for initiating treatment promptly, which can prevent disease progression and improve cost-effectiveness. Affordable diagnostic tests enable healthcare providers to identify CML patients early, facilitating timely intervention and improving long-term outcomes. Ensuring patient adherence to treatment regimens is critical for achieving optimal outcomes and cost-effectiveness. Patient education and support programs play a vital role in promoting adherence, empowering patients to actively participate in their treatment and management of CML.

## LONG-TERM CONSIDERATIONS

While newer CML drugs may have higher initial costs, they often offer better long-term outcomes and fewer treatment-related adverse events. Investing in these newer therapies can thus improve cost-effectiveness over time by reducing the need for costly interventions and hospitalizations associated with disease progression. Conducting Health technology assessment (HTA) studies can provide valuable insights into the cost-effectiveness of different CML treatment strategies. By evaluating factors such as quality-adjusted life years gained and incremental cost-effectiveness ratios, HTA enables policymakers and healthcare providers to make informed decisions about resource allocation and treatment prioritization. Ongoing research regarding optimization of choice of drug and duration of therapy can help further decrease the affordability issues by making the treatment effective and time limited for the patients.

## CONCLUSION

Optimizing the cost-effectiveness of CML treatment in India requires a comprehensive approach that considers affordability, adherence, long-term outcomes, and collaborative efforts among stakeholders. By leveraging generic drugs, expanding health insurance coverage, promoting timely diagnosis and intervention, and investing in patient support programs and research initiatives, India can enhance the accessibility and affordability of CML treatment, ultimately improving outcomes for patients across the country.

By considering these factors and implementing evidence-based strategies, stakeholders in the Indian healthcare system can work toward improving the cost-effectiveness of CML treatment and ultimately enhancing patient outcomes. Collaborative efforts between policymakers, healthcare providers, pharmaceutical companies, and patient advocacy groups are essential for addressing the unique challenges of CML management in the Indian context and optimizing resource utilization to achieve the best possible outcomes for patients.

In conclusion, optimizing the cost-effectiveness of CML treatment strategies in the Indian healthcare context requires a multifaceted approach that addresses factors such as drug affordability, healthcare infrastructure, patient access, and long-term outcomes. Collaboration between stakeholders

and evidence-based decision-making are essential for achieving this goal.

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