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Can Precision Oncology Deliver at Scale in India?

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India has launched ambitious initiatives, from large-scale genome mapping to disease-specific genetic studies, to advance precision medicine. But with advanced diagnostic tests accessible to only about 5 per cent of the population, the question remains: is the country ready for precision care? Let's find out.



India is gradually building a strong foundation for precision medicine through coordinated efforts in genomics, policy, research, and industry partnerships. The GenomeIndia Project is central to this effort, serving as a national reference dataset for genetics and genomics that can improve disease diagnosis, predict individual drug responses, and guide personalised therapies.

The genomics ecosystem has continued to expand in recent years. In February 2025, the Indian Institute of Technology Madras announced the launch of the Bharat Cancer Genome Atlas, a landmark effort to map the genetic landscape of Indian cancer patients. The initiative addresses a long-standing gap in India-specific cancer genomic data and is expected to support more accurate diagnostics, refined treatment strategies, and drug discovery aligned with local disease biology.

In June 2025, India launched its National Biobank at the CSIR-Institute of Genomics and Integrative Biology in New Delhi. The facility represents a significant step toward building a longitudinal national health database, enabling future research into disease progression and supporting personalised treatment regimens over time.

Industry partnerships are also playing a growing role in expanding access. In October 2025, Gene Solutions partnered with AMPATH to launch an advanced genomics laboratory in Hyderabad, aimed at broadening the availability of precision diagnostics and genetic testing in India.

On the policy front, the Department of Biotechnology has identified precision biotherapeutics as a priority area under its BioE3 policy. As part of this push, the department has supported the establishment of Centres for Advanced Genomics and Precision Medicine to accelerate translational research and clinical adoption.

From Promise to Practice

Precision medicine in India may still be at a nascent stage, but experts believe the country now has the right building blocks in place for its next phase of growth.

“The stage is set, but the performance is just beginning. The Indian precision medicine market is expected to grow from \$2.4 billion in 2024 to over \$6.5 billion by 2033. Initiatives like the Genome India Project have laid the foundation,” said **Devashish Singh, Co-Founder and CEO, MrMed.**

Over the past decade, the increasing adoption of multi-omics has driven a steady shift in healthcare, moving it away from reactive diagnostics toward insights-driven, proactive care. This transition has been particularly pronounced in oncology and rare diseases, where treatment decisions are increasingly shaped by molecular and genetic insights rather than symptoms alone.

“From a diagnostics-led vantage point, it is believed the stage is materially set for precision medicine to take off in India—and this is no longer a ‘future-state’ conversation. India now has the building blocks: rapidly expanding next-generation sequencing (NGS) capacity, better availability of molecular profiling, stronger digital health rails, and a fast-maturing AI ecosystem that can translate complex genomic, pathology, imaging, and clinical data into decision-grade insights,” said **Dr**

Sandip Shah, Joint Managing Director at Neuberg Diagnostics.

Despite this progress, experts caution that the real inflection point will not be driven by technology alone. The next phase of growth will depend on execution discipline across the ecosystem.

“The success of precision medicine in India over the next few years will depend on widespread awareness among clinicians and patients, improvement in accessibility and affordability of integrated diagnostics, and the establishment of clear national guidelines that would integrate genomics into standard-of-care pathways,” said **Dr Vedam Ramprasad, CEO, MedGenome Labs Ltd.**

Dr Shah, suggests several priority areas that must be addressed to unlock scale:

1. **Governance and regulation:** India needs clearer, unified guardrails for biobanking and genomic data, which means consent, data ownership, secondary use, and trusted collaboration pathways because precision medicine is a data-and-sample trust model at its very core.
2. **Interoperability and data stewardship:** precision outcomes need longitudinal datasets linked to real-world clinical endpoints backed by cybersecurity-by-design rather than bolt-on compliance.
3. **Access and affordability:** genetic testing and targeted therapies have to move from urban premium care to scalable mainstream adoption. This requires domestic capability-building in diagnostics, a stronger pathway for biosimilars/biobetters, and pragmatic reimbursement models that recognise downstream value for early risk prediction and therapy selection.
4. **Workforce readiness:** clinicians should receive realistic training and workflow-integrated support to ensure that genomics and AI will simplify and not add to clinician cognitive loads.

“Oncology is already the proof point—the shift in treatment decisions is no longer ‘where the tumour is’ but instead ‘what the tumour is’. And if we get all the above—regulation, data, accessibility, and adoption—in sync, we can easily transition to precision medicine and transform healthcare delivery from being reactive to predictive, preventive, and personalised,” said Dr Shah.

If these elements align, experts believe India is well-positioned to move from promise to practice, transforming precision medicine from an emerging concept into a standard of care.

How successful is Precision Medicine?

Precision medicine remains at a nascent stage in India, even as it has been part of clinical and research practice in developed markets for more than a decade. Despite early promise, global evidence suggests its real-world impact has so far been modest.

Global research shows that while precision medicine does work, it benefits only a small subset of patients. A 2023 US-based study found it to be ineffective in nearly 93 per cent of cases, citing disease pathogenesis, patient and tumor heterogeneity, specimen quality and timing, disease stage, and the lack of predictive biomarkers, along with resistance to targeted therapies and treatment-related toxicities. An earlier *Frontiers in Oncology* study published in 2021 highlighted the limited real-world payoff of precision medicine at scale. In the study, 1,000 patients underwent FoundationOne CDx testing, yet only 14 patients, or 1.4 per cent, ultimately benefited from targeted treatment. The authors stressed the need for larger studies to better determine which patients are most likely to benefit, particularly given the high cost of genomic testing. While the use of precision medicine is expanding, the researchers noted that future analyses would require larger cohorts to assess actionable alterations individually.

More recent evidence from India, however, points to cautious optimism in resource-limited settings. A 2024 prospective observational study in Bihar reported the successful use of genomic profiling and next-generation sequencing to guide targeted cancer therapies. Among 146 advanced cancer cases, NGS identified actionable mutations across multiple tumor types. In lung cancer, around 52 per cent of cases showed actionable driver genes. The study demonstrated that even in a rural setting, precision oncology could inform clinically relevant treatment decisions. A molecular diagnostic laboratory was established locally, enabling genomic analysis across cancers, predominantly lung cancer. Of 73 lung cancer cases tested, 38 harbored actionable driver mutations.

As testing becomes more affordable and clinical integration deepens, precision medicine appears poised to move from isolated success stories toward broader clinical relevance.

