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How genomic revolution is reshaping healthcare in emerging markets

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A new frontier in medicine, powered by genomics, is unfolding across emerging economies, promising to transform healthcare landscapes from Egypt to China. The application of genomics in healthcare offers a multi-pronged approach to improving public health, from proactive prevention to highly targeted treatments. The benefits are vast and interconnected, creating a powerful ecosystem for medical innovation. Letâ??s explore further.



At its core, genomics enables the shift from reactive to proactive healthcare. It allows for the prediction and prevention of diseases by identifying individuals at high risk for conditions such as diabetes, heart disease, and cancer long before any symptoms manifest, facilitating early, life-saving interventions.

This predictive power is complemented by the rise of precision medicine, which tailors treatments directly to a person's unique genetic profile. This personalised approach significantly improves the effectiveness of therapies while minimising adverse side effects, moving away from a one-size-fits-all model of care.

Furthermore, the field is dramatically accelerating the discovery of new treatments. Rapid genomic sequencing allows researchers to identify drug targets more quickly and efficiently, enabling faster and more affordable drug development. This is particularly crucial for emerging markets, as it can lower healthcare costs by reducing the reliance on expensive imported medications.

In the realm of infectious diseases, genomics has become an indispensable tool. Genomic data is vital for combating infectious diseases by helping scientists track viral and bacterial mutations, control the spread of outbreaks, and guide the development of effective vaccines and treatments in real-time.

Collectively, these advancements work to strengthen public health systems. By enhancing disease surveillance, informing evidence-based policymaking, and improving outbreak response, genomic data empowers governments and healthcare organisations to build more resilient and effective healthcare infrastructures for better long-term outcomes.

Opportunity in emerging economies

The genomics market across emerging economies is experiencing a period of dynamic growth. This expansion is fueled by improvements in healthcare infrastructure, a surge in research and development investment, and a growing public demand for the benefits of personalised medicine. Nations like China, India, Brazil, Egypt, and South Africa are at the vanguard of this transformation, each demonstrating remarkable growth projections.

M**arket data indicates upward trajectory:**

- China stands as the dominant market, projected to grow from $2,721 million in 2024 to an astounding $8,314 million by 2030, reflecting a compound annual growth rate (CAGR) of 20 per cent.
- India's market is set for a 19 per cent CAGR, expected to expand from $841 million in 2024 to $2,434 million by 2030.
- Egypt shows a strong CAGR of 18 per cent, with its market projected to grow from $110 million in 2024 to $296 million in 2030.
- Brazil's market is forecast to grow at a 9 per cent CAGR, from $662 million in 2024 to $1,135 million by 2030.
- South Africa, a key player in African genomics, is expected to see its market grow from $88 million in 2024 to $136 million by 2030, at a CAGR of 8 per cent.

Pioneering initiatives in emerging markets

These market figures are underpinned by ambitious and impactful initiatives on the ground. Emerging nations are not just adopting genomic technologies; they are adapting them to solve specific, regional healthcare challenges.

In a landmark public health achievement, Egypt's Hepatitis C elimination initiative utilised nationwide PCR-based screening and HCV genotyping to screen 50 million people, successfully curing over 2 million and drastically reducing the disease's prevalence.

China is making significant headway in precision oncology and the management of rare diseases. A major breakthrough in lung cancer research identified that nearly half of non-small cell lung cancer patients share the same genetic mutation, paving the way for targeted therapies like Tyrosine Kinase Inhibitors (TKIs) and avoiding broader chemotherapy. Simultaneously, the country's National Rare Disease Registry, established in 2018, has compiled data on 62,000 cases across 166 rare diseases, supporting diagnostics and treatment research.

In South Africa, a hub for infectious disease research, genomic studies are providing new hope for HIV treatment. Research focusing on individuals who naturally suppress the HIV virus has identified specific immune-related genetic variations that could guide the development of new treatment strategies.

Brazil is investing in building a foundational data resource with its "DNA do Brasil Project." Launched in 2019, this large-scale initiative aims to sequence the genomes of 15,000 Brazilians to create a representative genomic database, which will advance research, disease prevention, and national health policies.

Meanwhile, India took a significant step by opening South Asia's first advanced genomics research center in Hyderabad in 2021. The center is tasked with ambitious goals, including the sequencing of thousands of COVID-19 genomes and hundreds of human genomes to bolster regional research capabilities.

Key challenges to widespread adoption

Despite the immense potential and ongoing progress, the journey toward the widespread integration of genomics in emerging markets is fraught with significant challenges.

A primary obstacle is the high cost of equipment. Although the cost of sequencing has plummeted by orders of magnitude over the past two decades, the price of the necessary machinery remains prohibitive for many, often exceeding $100,000 and thus limiting access in developing countries.

Severe infrastructure and talent gaps also hinder progress. There is a critical shortage of skilled professionals, such as medical geneticists and bioinformaticians, stemming from limited funding and inadequate training pipelines. The disparity is stark: the United States has approximately 27 times more medical geneticists per million people than South Africa, highlighting a deep-seated gap that must be addressed. This shortage has tangible consequences; in 2021, African nations collectively sequenced only 7,000 COVID-19 genomes in 50 days, a fraction of the 590,000 sequenced by EU countries in half that time.

A third major challenge is the underrepresentation of local genomic data. The populations of Africa and Southeast Asia account for a quarter of the world's population but contribute less than 15 per cent of the genomic data used in research. This lack of diversity in global databases limits the scope and applicability of scientific findings for these populations, creating a risk of deepening health inequities.

Finally, regulatory barriers present another significant hurdle. Many developing countries lack the robust institutional frameworks and national policies needed to oversee genomic research and its clinical application. For instance, while the US has over 2,000 institutional review boards for research and experiments, a country like Nigeria has fewer than 20, constraining the pace and governance of scientific advancement.

Strategic imperatives for growth

Realising the full potential of genomics in emerging markets requires a concerted and strategic effort. While these nations are already active contributors to global research, surmounting the existing challenges is paramount. The next phase of growth will be contingent on several key pillars: increased investment in both public and private sectors, the cultivation of public-private partnerships to drive innovation, dedicated programs for workforce training, the development of supportive and clear regulatory frameworks, and a major push to expand the collection of diverse genomic data that truly represents the populations of these regions.

As technology continues to evolve and costs inevitably decline, genomics is set to revolutionise healthcare, making the promise of personalised medicine a tangible reality for millions across the globe. The coming years will be a pivotal period. The nations that choose to embrace this transformation, invest strategically, and build collaborative ecosystems will not only enhance the well-being of their own citizens but will also lead the global charge in reshaping the future of health for all.

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