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Pan-genomic And Multi-gene Panel Testing Market Size, Share & Trends Analysis Report By Test, By Application (Oncology, Cardiology & Cardiomyopathy, Reproductive Carrier Screening), By End-use (Independent Diagnostic Labs, Specialty Genomic Centers), By Region, And Segment Forecasts, 2025 - 2033

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Abstracts

Summary

The global pan-genomic & multi-gene panel testing market size was estimated at USD 8.96 billion in 2024 and is projected to reach USD 23.19 billion by 2033, growing at a CAGR of 11.37% from 2025 to 2033, driven by driven by clinical adoption in oncology and precision medicine and increasing demand for comprehensive genetic insights, rising use of molecular profiling in treatment planning, and advancements in high-throughput sequencing technologies. Compared to traditional single-gene assays, multi-gene panels that often span dozens to hundreds of cancer-related genes provide deeper and more comprehensive molecular insights.

Clinically validated assays, such as FoundationOne CDx (approximately 324 genes) and MSK-IMPACT (468 genes), are now routinely used in CLIA-certified laboratories to identify actionable genomic alterations. This has improved therapeutic matching, enabling clinicians to identify rare but targetable variants through a single, comprehensive analysis, rather than relying on sequential, time-consuming individual tests. As a result, major cancer centers are incorporating multi-gene and pan-genomic testing into their oncology workflows. Real-world results demonstrate the quantifiable impact of this adoption. A November 2024 study from the American Society of Clinical

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Oncology (ASCO) found that 36% of patients who underwent pathologist-directed comprehensive genomic profiling (CGP) received a targeted therapy (TT) or immuno-oncology (IO) agent simply because of biomarker findings in their genomic profile.

Moreover, the one of the key factors propelling the growth of the pan-genomic and multi-gene panel testing market is the swift and ongoing decrease in sequencing costs. The National Human Genome Research Institute (NHGRI) reports that significant advancements in next-generation sequencing (NGS) technologies have enabled the cost of sequencing a human genome to decrease from nearly USD 100 million in 2001 to approximately USD 600 in 2024. Comprehensive multi-gene testing was once a specialized and expensive process, but thanks to this significant decrease, it is now a readily available and reasonably priced tool for both patients and diagnostic laboratories. As a result, hereditary cancer testing has shifted from being used primarily in specialized genetics centers to becoming a standard component of preventive care and oncology workflows.

The rising global prevalence of genetic disorders, both inherited and newly occurring, has become one of the strongest drivers of the pan-genomic and multi-gene panel testing market. An estimated 400 million people worldwide suffer from rare genetic disorders, and 3-5% of all newborns are impacted by congenital or inherited genetic conditions. Healthcare systems are quickly incorporating extensive multi-gene and pan-genomic testing into standard protocols for early diagnosis, carrier screening, therapeutic decision-making, and long-term disease management as the genetic basis of more diseases becomes more apparent. Adoption in oncology is being greatly increased by the growing recognition of hereditary cancer syndromes, such as Lynch syndrome, Li-Fraumeni syndrome, and BRCA-associated breast/ovarian cancer. With 5-10% of all cancers classified as hereditary, and BRCA1/2 mutations increasing breast cancer risk by up to 70% and ovarian cancer risk by up to 40%, the need for proactive and comprehensive genomic screening has never been more compelling.

In addition, the increasing complexity of genomic data, particularly from whole-genome and large multi-gene panel tests, poses a significant challenge because interpreting millions of variants necessitates extensive clinical genomics and bioinformatics expertise. Many laboratories struggle to find enough molecular geneticists, clinical geneticists, and bioinformaticians to handle the workload. According to a global adoption framework for NGS in oncology published in PMC, a shortage of well-trained personnel, such as clinical molecular geneticists and genomic analysts, impedes widespread implementation. Moreover, infrastructural gaps in sequencing and

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bioinformatics pipelines exacerbate the issue, making it difficult to maintain consistent quality across laboratories.

Global Pan-genomic And Multi-gene Panel Testing Market Report Segmentation

This report forecasts revenue growth and provides an analysis of the latest trends in each of the sub-segments from 2021 to 2033. For this study, Grand View Research has segmented the global pan-genomic & multi-gene panel testing market report based on test, application, end-use, and region:

Test Outlook (Revenue, USD Million, 2021 - 2033)

Pan-Genomic / Whole Exome Based Panels

Comprehensive Hereditary Disease Panels

Oncology Multi-Gene Panels

Pharmacogenomics (PGx) Panels

Application Outlook (Revenue, USD Million, 2021 - 2033)

Oncology

Cardiology & Cardiomyopathy

Neurology and Neurogenetics

Rare & Undiagnosed Genetic Diseases

Reproductive Carrier Screening

Newborn & Pediatric Genomics

End-use Outlook (Revenue, USD Million, 2021 - 2033)

Hospital-based Genetic Labs

Independent Diagnostic Labs

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Specialty Genomic Centers

Others

Regional Outlook (USD Million, 2021 - 2033)

North America

U.S.

Canada

Mexico

Europe

UK

Germany

France

Italy

Spain

Denmark

Sweden

Norway

Asia Pacific

Japan

China

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India

Australia

Thailand

South Korea

Latin America

Brazil

Argentina

Middle East & Africa

South Africa

Saudi Arabia

UAE

Kuwait

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