

# **United States Clinical Oncology Next Generation Sequencing Market Segmented By Technology (Whole Genome Sequencing, Whole Exome Sequencing, Targeted Sequencing & Resequencing Centrifuges), By Workflow (NGS Pre-Sequencing, NGS Sequencing, NGS Data Analysis), By Application (Screening, Companion Diagnostics, Other Diagnostics), By End Use (Hospitals, Clinics, Laboratories) Region and Competition, Opportunity, and Forecast, 2018-2028**

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## **Abstracts**

United States Clinical Oncology Next Generation Sequencing Market is anticipated to project robust growth in the forecast period. The United States Clinical Oncology Next Generation Sequencing (NGS) market is a dynamic and rapidly evolving sector within the broader healthcare and life sciences industry. NGS technology, also known as high-throughput sequencing, has revolutionized the field of clinical oncology by enabling the comprehensive analysis of a patient's genetic makeup and the genetic alterations present in their cancer cells. This market overview will provide a brief snapshot of the key trends, drivers, and challenges shaping the landscape of clinical oncology NGS in the United States.

NGS has emerged as a powerful tool for precision medicine, allowing oncologists to tailor cancer treatments to an individual's unique genetic profile. This approach has the potential to improve patient outcomes, minimize adverse effects, and enhance the overall quality of cancer care. The United States is a global leader in clinical oncology NGS, with numerous academic institutions, research centers, and biotechnology companies actively engaged in cutting-edge research and development.

Key drivers of this market include the growing incidence of cancer, rising awareness about the potential benefits of precision medicine, and the continuous advancement of NGS technologies. Additionally, the decreasing cost of sequencing and the expansion of reimbursement policies for NGS-based tests are making these technologies more accessible to a wider patient population.

However, there are challenges to address in the clinical oncology NGS market, including regulatory and data privacy concerns, as well as the need for robust bioinformatics and data analysis capabilities. Ensuring the integration of NGS into routine clinical practice and establishing standardized protocols are ongoing priorities.

## Key Market Drivers

### Rising Incidence of Cancer

The United States Clinical Oncology Next Generation Sequencing (NGS) market is experiencing a substantial boost driven by the rising incidence of cancer. Cancer remains a formidable challenge in the United States, with a growing number of individuals being diagnosed with various forms of the disease each year. This escalating incidence has created an urgent need for more advanced and precise diagnostic and treatment approaches, which is where NGS technology comes into play.

One of the primary factors contributing to the increased incidence of cancer is an aging population. As the baby boomer generation continues to grow older, the risk of cancer rises, as the disease is more commonly associated with aging. This demographic shift has put a higher burden on the healthcare system to diagnose and treat cancer effectively.

Furthermore, lifestyle factors, such as unhealthy diets, lack of physical activity, and exposure to environmental carcinogens, have also contributed to the rising cancer rates. These modifiable risk factors have led to increased prevalence of various cancer types, necessitating more effective methods for early detection and tailored treatment.

NGS technology is instrumental in addressing these challenges. It allows for a comprehensive analysis of a patient's genetic and molecular makeup, enabling oncologists to identify specific genetic mutations and alterations driving the development of cancer. This information is invaluable for making informed decisions about treatment approaches. NGS facilitates the development of personalized treatment

plans, which can result in higher treatment success rates and fewer adverse effects, thereby improving the quality of life for cancer patients.

In addition, NGS-based tests are at the forefront of early cancer detection and screening efforts. As the incidence of cancer continues to rise, early detection becomes increasingly critical, as it significantly improves the chances of successful treatment. NGS technology enables the identification of cancer-related biomarkers and circulating tumor DNA, allowing for the early diagnosis and monitoring of cancer, even before symptoms manifest.

### Advancements in NGS Technologies

Advancements in Next Generation Sequencing (NGS) technologies are playing a pivotal role in boosting the United States Clinical Oncology NGS market. These innovations are revolutionizing the landscape of cancer diagnosis, treatment, and research, offering remarkable benefits in terms of precision, speed, and accessibility.

the rapid progress in NGS technology has resulted in platforms that offer faster and more cost-effective sequencing. This has made NGS more accessible to a broader range of healthcare institutions and research facilities, reducing the barriers to entry and allowing smaller and non-specialized laboratories to embrace this technology. As a result, NGS is becoming increasingly integrated into routine clinical oncology practice.

Furthermore, advancements in NGS technologies have significantly improved the accuracy and sensitivity of sequencing, making it possible to detect genetic mutations and variations associated with cancer with greater precision. These technologies now enable comprehensive profiling of tumor genomes, providing oncologists with a wealth of information to guide personalized treatment strategies. The ability to identify specific genetic alterations driving cancer empowers oncologists to choose targeted therapies that are more likely to be effective, resulting in better patient outcomes.

NGS technologies have also expanded to encompass various applications, such as RNA sequencing for gene expression analysis and epigenetic modifications. This broad range of applications enables comprehensive insights into the underlying molecular mechanisms of cancer, allowing for a deeper understanding of the disease and its treatment. The ability to explore not only DNA but also RNA and epigenetic changes broadens the scope of what can be analyzed, providing a more holistic view of cancer biology.

Moreover, the continuous development of NGS platforms is driving the growth of the Clinical Oncology NGS market by enabling the identification of unique genetic alterations associated with cancer subtypes and rare genetic mutations. This is particularly crucial in the era of personalized medicine, where tailoring treatment to the specific characteristics of a patient's cancer is the cornerstone of effective care.

### Rise in Personalized Medicine

The rise of personalized medicine is a significant driving force behind the burgeoning United States Clinical Oncology Next Generation Sequencing (NGS) market. Personalized medicine, also known as precision medicine, represents a groundbreaking approach to patient care that takes into account individual genetic variations, making it particularly impactful in the field of clinical oncology.

Personalized medicine leverages NGS technology to decode a patient's unique genetic makeup, allowing oncologists to tailor treatment strategies with unparalleled precision. The primary goal is to provide patients with therapies that are specifically designed to target the genetic mutations and alterations driving their particular form of cancer. This approach not only enhances the effectiveness of treatment but also minimizes potential side effects, ultimately improving the quality of life for cancer patients.

The NGS-based genomic profiling made possible by personalized medicine empowers healthcare providers to make data-driven decisions. This includes the identification of actionable genetic mutations and alterations, as well as the ability to predict treatment responses, which is especially crucial in the rapidly evolving landscape of cancer therapies. With the increasing availability of targeted therapies and immunotherapies, the ability to match the right treatment to the right patient is becoming paramount.

Moreover, personalized medicine in clinical oncology is not limited to treatment decisions. It also extends to risk assessment and early detection. NGS-based tests can identify genetic predispositions to cancer, allowing for proactive measures such as increased surveillance and preventive interventions for individuals at higher risk due to inherited mutations. This approach is particularly valuable for individuals with a family history of cancer.

The demand for NGS technology in clinical oncology has surged in response to the rise of personalized medicine. Both healthcare providers and patients are increasingly recognizing the value of integrating NGS into the diagnostic and treatment process. The potential for more effective, personalized care is a driving force behind this market

growth.

## Key Market Challenges

### Data Privacy and Security

The United States Clinical Oncology Next Generation Sequencing (NGS) market has made remarkable strides in advancing cancer diagnosis, treatment, and research. However, it faces a significant challenge that cannot be ignored - data privacy and security concerns. The sensitive and personal nature of patient genetic and clinical data obtained through NGS has raised critical issues regarding confidentiality and protection.

Patients undergoing NGS testing have their genetic and clinical data stored and analyzed. This information is among the most private and intimate a person can provide. Ensuring that this data remains confidential and secure is paramount. Any breach could have severe consequences, including identity theft, discrimination, or misuse of this information.

Healthcare organizations, laboratories, and research institutions must adhere to strict data privacy regulations, such as the Health Insurance Portability and Accountability Act (HIPAA). Ensuring compliance is not only a legal obligation but also a significant operational challenge, requiring stringent measures and investments in technology and staff training.

The vast amount of data generated by NGS requires secure storage and retention policies. Ensuring that this data is protected from theft or unauthorized access is crucial and maintaining it over extended periods can be costly and complex.

Like other sectors, the Clinical Oncology NGS market is vulnerable to cyberattacks. Hackers and cybercriminals may target organizations to steal patient data, leading to data breaches with severe consequences. Protecting NGS data from these threats requires robust cybersecurity measures and continuous monitoring.

Patients must provide informed consent before their genetic data is sequenced and analyzed. Ensuring that patients fully understand the implications of NGS and the use of their data for research and clinical care is an ongoing challenge.

### Cost and Accessibility

One of the primary challenges in the Clinical Oncology NGS market is the high cost associated with NGS technology. While NGS has become more affordable over the years, comprehensive sequencing remains relatively expensive. The cost includes not only the actual sequencing but also data analysis, interpretation, and the equipment required for this highly specialized field.

The expenses associated with NGS can be a significant barrier for both healthcare institutions and patients. The initial investment in NGS equipment, the cost of consumables, and the need for skilled personnel to operate the technology can strain the budgets of hospitals and research institutions. This can limit the capacity of these facilities to offer NGS-based tests and services to their patients.

Accessibility to NGS services in clinical oncology is another significant challenge. Not all healthcare facilities, particularly in underserved or rural areas, have the resources and expertise to offer NGS-based tests. This creates disparities in access to cutting-edge cancer care, as patients in these areas may not benefit from the latest advancements in precision medicine.

Furthermore, even in urban areas with advanced healthcare systems, not all patients have equal access to NGS services. Socioeconomic factors, insurance coverage, and geographic location can limit access to NGS-based testing and treatments. This disparity in access can result in unequal healthcare outcomes, as patients who could benefit from NGS may miss out on the advantages it offers.

## Key Market Trends

### Growth in Genomic Medicine

The growth of genomic medicine is playing a pivotal role in boosting the United States Clinical Oncology Next Generation Sequencing (NGS) market. Genomic medicine, which involves the application of genetic information in healthcare, is increasingly recognized as a game-changer in the field of clinical oncology. The integration of genomics into clinical practice has shifted the paradigm of cancer care towards more personalized and effective approaches.

Genomic medicine harnesses the power of NGS technology to decode the genetic makeup of an individual's tumor. This allows oncologists to understand the genetic alterations that drive cancer and identify potential therapeutic targets with unparalleled precision. By gaining comprehensive insights into the genetic and molecular



underpinnings of a patient's cancer, healthcare providers can tailor treatment plans to address the specific genetic abnormalities present, thereby improving the chances of treatment success and minimizing adverse effects.

Moreover, the growth of genomic medicine has led to a greater understanding of the genetic predisposition to cancer. NGS-based tests can identify inherited genetic mutations that increase the risk of developing cancer. This knowledge allows for more proactive measures such as increased surveillance, risk-reduction strategies, and preventive interventions, which are especially valuable for individuals with a family history of cancer.

The demand for NGS-based tests in the clinical oncology space has surged in response to this growth in genomic medicine. Oncologists and healthcare institutions increasingly recognize the value of integrating NGS into their diagnostic and treatment workflows. As a result, the Clinical Oncology NGS market is thriving, driven by the need for more precise and personalized cancer care.

### Data Analysis and Interpretation Tools

Advanced data analysis tools can identify clinically actionable genetic mutations, helping oncologists select the most appropriate treatment options for individual patients. They enable healthcare providers to make data-driven decisions that can lead to more effective and personalized cancer therapies.

NGS data analysis can be a time-consuming process, especially in the context of clinical care where timely decisions are crucial. Robust data analysis tools streamline the process, reducing the time required to turn raw sequencing data into clinically relevant information. This efficiency is particularly important in rapidly progressing oncology cases.

Human interpretation of NGS data is prone to errors and subjectivity. Advanced data analysis tools provide more consistency and accuracy, minimizing the risk of misinterpretation and ensuring that results are reliable for clinical decision-making.

NGS generates a massive amount of data that can be challenging to manage effectively. Data analysis tools include features for data storage, organization, and retrieval, simplifying the handling of large datasets and ensuring that pertinent information is readily accessible when needed.

Different clinical scenarios may require unique data analysis approaches. The ability to customize data analysis tools allows healthcare providers to adapt to specific patient needs, disease types, and research objectives. This flexibility is essential in the rapidly evolving field of clinical oncology.

Data analysis tools that seamlessly integrate with existing clinical workflows and electronic health record (EHR) systems facilitate the efficient incorporation of NGS data into patient care. This integration ensures that NGS results are readily accessible to healthcare teams, contributing to a holistic approach to patient management.

In the era of collaborative research and data sharing, data analysis tools that adhere to standardized formats and can be used across multiple institutions are invaluable. These tools foster collaboration, accelerate knowledge exchange, and drive innovation in clinical oncology.

## Segmental Insights

### Technology Insights

Based on the Technology , Whole Exome Sequencing emerged as the dominant segment in the United States market for United States Clinical Oncology Next Generation Sequencing Market in 2022. Whole Exome Sequencing specifically targets the protein-coding regions of the genome, known as exomes. These regions contain a majority of the known disease-associated variants. By concentrating on these areas, WES can efficiently identify genetic mutations that are more likely to be causative in oncology, making it a practical choice for clinical applications. Whole Genome Sequencing (WGS) is comprehensive but often expensive, given the vast amount of data generated. WES provides a more cost-effective alternative by sequencing only the exome, which significantly reduces the data size while still capturing crucial genetic information. This cost-effectiveness is essential for widespread clinical adoption.

In clinical oncology, time is often of the essence, and WES offers a more focused and faster analysis than WGS. It helps identify actionable genetic mutations with clinical relevance, aiding in treatment decisions and therapeutic approaches tailored to the patient's specific condition..

### Workflow Insights

Based on the Workflow, the NGS Sequencing segment emerged as the dominant player



in the United States market for United States Clinical Oncology Next Generation Sequencing Market in 2022. NGS Sequencing directly addresses the core objective of clinical oncology NGS, which is the generation of genetic and genomic data from patient samples. It is the central step in the process, where the actual sequencing of DNA or RNA occurs, providing the raw genetic information necessary for the diagnosis, treatment, and research in oncology.

NGS Sequencing generates vast amounts of data that encompass the entire genome or specific regions of interest. This comprehensive approach is critical in identifying genetic mutations, variants, and abnormalities associated with cancer. It enables the profiling of the entire genome or specific genomic regions, allowing for a deep exploration of potential cancer drivers. NGS Sequencing is the foundation for clinical diagnosis and treatment decisions in oncology. It reveals genetic alterations, such as mutations and translocations, that inform precision medicine approaches. By identifying these specific genetic changes, oncologists can tailor treatments to the patient's unique genetic profile, optimizing therapeutic outcomes.

### Regional Insights

Mid-West emerged as the dominant player in the United States Clinical Oncology Next Generation Sequencing Market in 2022, holding the largest market share Access to Funding: The East region is often a hub for medical research and biotechnology innovation, attracting substantial funding from government agencies, private investors, and philanthropic organizations. This financial support bolsters the development and adoption of NGS technologies in clinical oncology. Leading hospitals and cancer treatment centers in the East region are renowned for their clinical excellence and patient care. The demand for NGS in clinical oncology is driven by the commitment to providing the best possible care to patients, and the East region's healthcare institutions are known for their clinical expertise and innovation.

### Key Market Players

Illumina, Inc.

Thermo Fisher Scientific Inc.

F. Hoffmann-La Roche Ltd.

Agilent Technologies

Myriad Genetics

Beijing Genomics Institute (BGI)

Perkin Elmer

Foundation Medicine

Pacific Bioscience

Oxford Nanopore Technologies Ltd.

Report Scope:

In this report, the United States Clinical Oncology Next Generation Sequencing Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

United States Clinical Oncology Next Generation Sequencing Market, By  
Technology:

Whole Exome Sequencing

Targeted Sequencing & Resequencing Centrifuges

United States Clinical Oncology Next Generation Sequencing Market, By  
Workflow:

NGS Pre-Sequencing

NGS Sequencing

NGS Data Analysis

United States Clinical Oncology Next Generation Sequencing Market, By  
Application:

Screening

Companion Diagnostics

Other Diagnostics

United States Clinical Oncology Next Generation Sequencing Market, By End Use:

Hospitals

Clinics

Laboratories

United States Clinical Oncology Next Generation Sequencing Market, By Region:

North-East

Mid-west

West

South

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the United States Clinical Oncology Next Generation Sequencing Market.

Available Customizations:

United States Clinical Oncology Next Generation Sequencing Market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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