

# **UAE Next Generation Sequencing Market Industry Size, Share, Trends, Opportunity, and Forecast, 2018-2028 Segmented By Product (Consumables, Platforms, Services), By Technology (Sequencing by Synthesis, Ion Semiconductor Sequencing, Sequencing by Ligation, Single Molecule Real Time Sequencing, Others), By Application (Biomarkers & Cancer, Diagnostics, Reproductive Health, Personalized Medicine, Agriculture & Animal Research, Others), By End User (Academic & Clinical Research Centers, Pharmaceutical & Biotechnology Companies, Hospitals & Clinics, Others), by region, and Competition**

<https://marketpublishers.com/r/U7AB69C1361DEN.html>

Date: November 2023

Pages: 79

Price: US\$ 3,500.00 (Single User License)

ID: U7AB69C1361DEN

## **Abstracts**

UAE Next Generation Sequencing Market is anticipated to witness an impressive growth in the forecast period. Next Generation Sequencing (NGS), also known as high-throughput sequencing, is a revolutionary technology that has transformed the field of genomics by enabling rapid and cost-effective sequencing of DNA and RNA. Unlike traditional Sanger sequencing, which is a relatively slow and labor-intensive process, NGS allows for the simultaneous sequencing of millions to billions of DNA fragments, making it a powerful tool for various genomic applications. The process begins with the extraction of DNA or RNA from the biological sample of interest. The isolated genetic material is then prepared into a sequencing library. In the library preparation step, adaptors with unique barcodes may be added to each DNA fragment, allowing for the

identification of individual sequences in the final data. The raw sequencing data generated is processed through bioinformatics pipelines. This involves base calling, which converts raw signal data into nucleotide sequences, and subsequent steps such as alignment, variant calling, and annotation to interpret the biological meaning of the sequences.

The rising incidence of genetic disorders and cancer in the UAE drives the demand for advanced genomic technologies like NGS. The technology's ability to provide comprehensive genomic information is crucial for diagnostics, treatment planning, and understanding the genetic basis of diseases. Continuous advancements in NGS technologies, including improvements in sequencing accuracy, increased throughput, and cost reduction, drive adoption. Technological innovations make NGS more accessible and applicable to a broader range of research and clinical applications. The increasing focus on precision medicine, which involves tailoring medical treatment to individual patients based on their genetic makeup, fuels the demand for NGS. The technology enables detailed genomic profiling, allowing for personalized therapeutic interventions. The increasing awareness and demand for prenatal and newborn screening contribute to the adoption of NGS technologies. NGS allows for comprehensive screening of genetic disorders in infants, aiding in early diagnosis and intervention.

## Key Market Drivers

### Technological Advancements

Single-molecule sequencing technologies, such as PacBio and Oxford Nanopore, enable the direct sequencing of individual DNA or RNA molecules. This approach eliminates the need for amplification and can provide longer read lengths, aiding in the assembly of complex genomes and the detection of structural variants. Advances in sequencing platforms have led to increased throughput, allowing researchers to generate a higher volume of sequencing data in a shorter time. High-throughput sequencing is crucial for large-scale genomics projects and population-scale studies. Continuous efforts to improve sequencing chemistry and error correction algorithms have resulted in reduced error rates. This is especially important for applications where high accuracy is critical, such as clinical diagnostics and genome assembly. Nanopore sequencing, offered by companies like Oxford Nanopore Technologies, allows the direct, real-time analysis of single DNA or RNA molecules as they pass through a nanopore. This technology has the potential for portable sequencing devices and long-read applications. Technologies like PacBio and Oxford Nanopore are considered third-

generation sequencing platforms. They provide long-read sequencing capabilities, which are beneficial for resolving complex genomic regions, detecting structural variations, and improving genome assembly.

Advances in base calling algorithms have enhanced the accuracy of sequencing reads. This is essential for obtaining reliable genomic information, especially in clinical applications where precision is crucial. Ongoing efforts to reduce the cost of sequencing have contributed to the wider accessibility of NGS technologies. Cost-effective sequencing is vital for large-scale projects, clinical applications, and routine use in research laboratories. NGS technologies have been adapted for single-cell genomics, allowing researchers to study the genomic and transcriptomic profiles of individual cells. This has implications for understanding cellular heterogeneity and the role of rare cell populations in diseases. Improvements in library preparation methods have streamlined workflows and reduced the time and input DNA/RNA required for sequencing. This contributes to the efficiency and cost-effectiveness of NGS experiments.

Integrating NGS with other omics technologies, such as proteomics and metabolomics, allows for a more comprehensive understanding of biological systems. Multi-omics approaches enable researchers to explore complex biological interactions and networks. Cloud-based solutions for NGS data analysis have emerged, enabling researchers to perform complex bioinformatics analyses without the need for extensive computational resources. This promotes collaboration and accessibility of data analysis tools. Customized targeted sequencing panels allow researchers to focus on specific regions of interest, improving the cost-effectiveness of NGS for applications such as cancer gene panels or focused genomic studies. This factor will help in the development of the UAE Next Generation Sequencing Market.

### Increasing Prevalence of Genetic Disorders

NGS is a powerful tool for diagnosing genetic disorders. It enables the comprehensive analysis of an individual's entire genome or specific genomic regions, allowing for the identification of genetic variations associated with various disorders. NGS allows for comprehensive genomic profiling, enabling the simultaneous analysis of multiple genes or the entire genome. This is particularly beneficial for identifying the genetic basis of complex and rare genetic disorders. For rare genetic disorders, where traditional diagnostic methods may be challenging, NGS provides a more efficient and accurate approach. It helps in identifying rare mutations and understanding the genetic underpinnings of these conditions. NGS is increasingly utilized in prenatal and neonatal screening programs to detect genetic disorders early in life. The technology allows for

the analysis of fetal or newborn DNA, enabling timely interventions and management strategies.

NGS is employed for carrier screening to identify individuals carrying genetic mutations that may be passed on to their offspring. This is crucial for family planning and making informed reproductive decisions. The demand for genetic counseling services has increased with the rise in the prevalence of genetic disorders. NGS results contribute valuable information to genetic counselors, assisting them in providing informed guidance to individuals and families. NGS facilitates large-scale research projects aimed at understanding the genetic basis of various disorders. This research contributes to the discovery of new genetic variants associated with diseases and informs the development of targeted therapies. NGS enables the identification of disease-causing mutations, including single nucleotide variations, insertions, deletions, and structural variants. This information is essential for understanding the molecular basis of genetic disorders.

The data generated by NGS supports personalized medicine approaches, where treatment plans are tailored to an individual's genetic profile. This is particularly relevant for genetic disorders with targeted therapeutic options. Some regions implement population-wide screening programs using NGS to identify individuals at risk for specific genetic disorders. This proactive approach can lead to early interventions and improved outcomes. Ongoing advancements in NGS technologies, including increased speed, reduced costs, and improved accuracy, make it more accessible for routine clinical use in diagnosing genetic disorders. This factor will pace up the demand of the UAE Next Generation Sequencing Market.

### Rising Demand for Prenatal and Newborn Screening

NGS enables early detection of genetic disorders in fetuses and newborns. The technology allows for a comprehensive analysis of the entire genome, providing insights into potential genetic abnormalities and disorders. NGS allows for comprehensive screening of a wide range of genetic variants simultaneously. This is crucial for identifying various genetic conditions, including both common and rare disorders. NGS is widely used in non-invasive prenatal testing, where fetal DNA obtained from maternal blood is analyzed. This approach provides a safer alternative to traditional invasive procedures, such as amniocentesis, for detecting chromosomal abnormalities.

For rare genetic disorders, NGS provides a powerful tool for identifying specific mutations that may not be covered by traditional screening methods. This is particularly

important for conditions with a low prevalence but significant clinical impact. NGS is used for carrier screening in parents, helping to identify carriers of genetic mutations that may pose a risk to their offspring. This information is valuable for family planning and making informed reproductive decisions. NGS contributes to personalized medicine approaches in neonatal care. By identifying genetic factors early on, healthcare providers can tailor treatment plans to address the specific needs of newborns with genetic disorders. Early identification of genetic disorders through NGS allows for timely interventions and treatment planning. This can include medical interventions, counseling for parents, and preparation for potential medical challenges the newborn may face.

NGS is employed to screen for inherited conditions that may have a familial component. This information is crucial for understanding the genetic risk within families and providing appropriate medical care and guidance. NGS supports research initiatives focused on understanding the genetics of neonatal conditions. These studies contribute to the identification of new genetic variants and potential therapeutic targets. NGS allows for the expansion of newborn screening panels, enabling simultaneous testing for a broader range of genetic disorders. This helps ensure that more conditions are considered in the early screening process. This factor will accelerate the demand of the UAE Next Generation Sequencing Market.

## Key Market Challenges

### Costs and Affordability

The acquisition of NGS instruments and platforms involves a significant upfront capital investment. High initial costs can be a barrier, particularly for smaller research institutions, clinical laboratories, and startups. Beyond the initial investment, ongoing operational costs include the purchase of consumables such as reagents, sequencing kits, and other supplies. These costs can contribute significantly to the overall expense of running NGS experiments. The storage and analysis of large volumes of NGS data can be resource intensive. Costs associated with data storage, computational infrastructure, and bioinformatics analysis tools contribute to the overall cost of implementing NGS technologies. Staying current with the latest advancements in NGS technologies often requires updates to instruments and software. Additionally, routine maintenance and calibration of NGS equipment contribute to ongoing operational costs. Building and maintaining a skilled workforce with expertise in NGS technologies is essential. Training personnel to operate NGS instruments and analyze data requires investment in education and professional development. Large-scale sequencing projects may benefit from economies of scale, leading to lower per-sample costs.

However, for smaller-scale projects or individual sample analyses, the cost per sample can be relatively higher.

### Variability in Quality and Standards

Variances in the accreditation and certification of NGS laboratories can result in differences in the quality of services provided. Standardized accreditation processes ensure that laboratories adhere to established quality and performance standards, promoting consistency in results. Differences in the implementation of quality control protocols among laboratories can lead to variations in the accuracy and reliability of NGS data. Standardized quality control measures are essential for ensuring the reproducibility of results across different laboratories. Variability in the bioinformatics pipelines used for NGS data analysis can impact the consistency and accuracy of results. Standardized and validated analysis workflows are crucial for minimizing discrepancies in variant calling and data interpretation. The use of different reference materials and standards by laboratories can introduce variability in the calibration and normalization of NGS instruments. Standardized reference materials help ensure accuracy and comparability across different platforms. Variability in sample handling, extraction methods, and library preparation techniques can introduce biases and affect the quality of NGS data. Standardized protocols for sample processing and preparation are essential for minimizing variations. The interpretation of genetic variants identified through NGS can vary among different laboratories or clinicians. Consistent guidelines for variant interpretation, particularly in the context of clinical applications, are crucial for accurate diagnosis and treatment decisions.

### Key Market Trends

#### Integration of NGS in Clinical Practice

NGS plays a crucial role in advancing precision medicine approaches, tailoring medical treatments based on the individual's genomic profile. Clinicians can use genomic information to select targeted therapies and optimize treatment plans for better patient outcomes. NGS is utilized for diagnosing genetic disorders, identifying disease-causing mutations, and assessing the risk of hereditary conditions. In clinical genetics, NGS enables comprehensive testing for a wide range of genetic abnormalities. NGS has become integral to cancer genomics, allowing for the identification of somatic mutations, assessment of tumor heterogeneity, and the development of personalized cancer treatment strategies. Molecular profiling using NGS guides targeted therapy selection in oncology. In clinical obstetrics and pediatrics, NGS is employed for prenatal and

neonatal screening. It enables the early detection of genetic disorders in fetuses and newborns, informing timely interventions and treatment plans. NGS is used to analyze the genetic variations that influence drug metabolism and response. This information guides clinicians in prescribing medications that are most likely to be effective and well-tolerated by individual patients. NGS is applied in clinical microbiology for the genomic analysis of infectious agents. It helps in understanding the genetic diversity of pathogens, tracking outbreaks, and guiding the selection of appropriate antimicrobial treatments. NGS facilitates the diagnosis of rare genetic diseases, where traditional diagnostic methods may be challenging. Whole exome sequencing and whole genome sequencing are particularly valuable for identifying rare mutations.

### Segmental Insights

#### Technology Insights

In 2022, the UAE Next Generation Sequencing Market largest share was held by Ion Semiconductor Sequencing segment and is predicted to continue expanding over the coming years. Ion Semiconductor Sequencing, often associated with Ion Torrent sequencing technology, has experienced continuous advancements. These improvements may include enhanced accuracy, increased throughput, and reduced costs, making the technology more attractive to users in the UAE NGS market. Ion Semiconductor Sequencing is known for its rapid sequencing process, allowing for quick turnaround times in obtaining genomic data. The speed and efficiency of this technology may be a key factor in its adoption, especially in applications where timely results are crucial. Ion Semiconductor Sequencing is well-suited for targeted sequencing applications. This is particularly valuable in genomics research and diagnostics, where specific regions of interest in the genome need to be sequenced with high accuracy. Ion Semiconductor Sequencing has demonstrated reliability and accuracy in clinical applications, it may gain prominence in the UAE market. Clinical settings often prioritize technologies that can deliver precise results for diagnostic and treatment decision-making. The Ion Semiconductor Sequencing platform has been positioned as a cost-effective option compared to some other NGS technologies. Affordability and accessibility can be significant drivers for its adoption, particularly in research institutions and clinical laboratories.

#### Application Insights

In 2022, the UAE Next Generation Sequencing Market largest share was held by Biomarkers & Cancer segment and is predicted to continue expanding over the coming

years. NGS plays a pivotal role in precision oncology by enabling the comprehensive analysis of cancer genomes. This technology helps identify specific genetic mutations and alterations associated with diverse types of cancer. The ability to profile the genomic landscape of tumors allows for personalized treatment approaches. NGS facilitates the discovery of molecular biomarkers that can serve as indicators of cancer presence, progression, or response to treatment. These biomarkers are crucial for developing diagnostic tests and guiding therapeutic decisions in cancer care. The Biomarkers & Cancer segment often involves the use of NGS for comprehensive genomic profiling of tumors. This approach provides a holistic view of the genetic alterations within cancer cells, aiding in the identification of potential therapeutic targets and guiding treatment strategies. NGS is increasingly used in liquid biopsies, where circulating tumor DNA (ctDNA) or other biomolecules in bodily fluids are analyzed. This non-invasive approach allows for real-time monitoring of cancer and the detection of minimal residual disease, improving early detection and treatment monitoring. The identification of specific genetic mutations through NGS enables the development and prescription of targeted therapies. Pharmaceutical companies and healthcare providers in the Biomarkers & Cancer segment leverage NGS data to match patients with the most effective and personalized treatment options.

## End-User Insights

In 2022, the UAE Next Generation Sequencing Market largest share was held by Pharmaceutical & Biotechnology Companies segment in the forecast period and is predicted to continue expanding over the coming years. Pharmaceutical companies extensively use NGS technologies in drug discovery and development processes. NGS allows for high-throughput sequencing of genomes, enabling the identification of genetic variations associated with diseases. This information is crucial for developing targeted and personalized therapies. Precision medicine, which involves tailoring medical treatments to the individual characteristics of patients, relies heavily on genomic information. Pharmaceutical companies leverage NGS to identify biomarkers and genetic variations that can guide the development of precision medicine approaches. Pharmaceutical and biotechnology companies often invest significantly in research and development. The adoption of NGS technologies enhances their capabilities in genomics research, enabling a deeper understanding of diseases, identification of therapeutic targets, and development of novel therapies. NGS is utilized in clinical trials for patient stratification, biomarker discovery, and monitoring treatment responses. Pharmaceutical companies leverage NGS data to identify and validate biomarkers that can aid in patient selection and assessment of treatment efficacy. Collaboration between pharmaceutical companies and research institutions can drive advancements



in genomics research. By working with academic and research partners, pharmaceutical companies can access cutting-edge NGS technologies and expertise. NGS plays a crucial role in the development of diagnostic tests and companion diagnostics. Pharmaceutical companies involved in developing targeted therapies often use NGS to identify specific genetic markers that can guide treatment decisions.

## Regional Insights

The Abu Dhabi region dominates the UAE Next Generation Sequencing Market in 2022. Regions with well-established research and healthcare infrastructure are often at the forefront of adopting advanced technologies such as Next Generation Sequencing. If Abu Dhabi invested significantly in these areas, it could contribute to its dominance. Government support and funding for genomics research and healthcare initiatives play a crucial role. If Abu Dhabi has implemented specific policies or provided substantial funding for NGS projects, it could lead to the dominance of the region in the market. The presence of leading research institutions, universities, and healthcare facilities with a focus on genomics can attract NGS-related activities. If Abu Dhabi hosts such institutions, it could contribute to its dominance in the NGS market. Collaborations between academic institutions, healthcare providers, and industry partners can create a conducive environment for the growth of the NGS market. If Abu Dhabi has established effective collaborations, it may contribute to its dominance. The Abu Dhabi region has prioritized genomic medicine and the integration of NGS into clinical practices, it could lead to increased demand and utilization of NGS technologies.

## Key Market Players

Oxford Nanopore UAE

Agiomix Labs

Illumina UAE

Thermo Fischer Scientific UAE

PerkinElmer UAE

Alliance Global UAE

Report Scope:

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

Next Generation Sequencing Market, By Product:

Consumables

Platforms

Services

Next Generation Sequencing Market, By Technology:

Sequencing by Synthesis

Ion Semiconductor Sequencing

Sequencing by Ligation

Single Molecule Real Time Sequencing

Others

Next Generation Sequencing Market, By Application:

Biomarkers & Cancer

Diagnostics

Reproductive Health

Personalized Medicine

Agriculture & Animal Research

Others

Next Generation Sequencing Market, By End-User:

Academic & Clinical Research Centers

Pharmaceutical & Biotechnology Companies

Hospitals & Clinics

Others

Next Generation Sequencing Market, By region:

Dubai

Abu Dhabi

Sharjah

Rest of UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies presents in the UAE Next Generation Sequencing Market.

Available Customizations:

UAE 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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