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Bovine Tuberculosis Diagnosis Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Tests (Molecular Diagnostic Tests, Serological Tests, Traditional Tests), By Region and Competition, 2020-2030F

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Abstracts

Global Bovine Tuberculosis Diagnosis Market was valued at USD 782.12 million in 2024 and is expected to reach USD 1066.97 Million by 2030 with a CAGR of 5.27% during the forecast period. The Global Bovine Tuberculosis Diagnosis Market is a dynamic and evolving sector dedicated to the detection and management of bovine tuberculosis (bTB) in cattle populations. Bovine tuberculosis is a contagious disease caused by Mycobacterium bovis, which not only poses a significant threat to animal health but also carries potential zoonotic implications. The global bovine tuberculosis diagnosis market is driven by several factors, including the rising prevalence of bovine tuberculosis in livestock and the growing need for efficient diagnostic solutions. Advances in diagnostic technologies, such as molecular-based tests, have improved detection accuracy and speed, fueling market growth. Additionally, government regulations and initiatives aimed at controlling bovine tuberculosis, including mandatory testing and eradication programs, are pushing the demand for diagnostic tools. The increasing livestock population, especially in developing countries, and the expanding global demand for animal-based products also contribute to the growth of the market. With ongoing concerns over animal health and food safety, the market is expected to continue growing in the coming years.

Key Market Drivers

Rising Awareness and Concern for Animal Health

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In recent years, there has been a remarkable increase in awareness and concern for animal health, particularly in the livestock industry. This heightened awareness has had a profound impact on various aspects of animal agriculture, including disease management. One disease that has come under the spotlight due to its implications for both animal health and public health is bovine tuberculosis (bTB).

Livestock, including cattle, play a crucial role in global agriculture. They are a source of food, income, and livelihood for millions of people. Any disease outbreak in livestock can have severe economic consequences, including reduced productivity, increased veterinary costs, and trade restrictions. As a result, cattle owners and the livestock industry at large are becoming increasingly conscious of the economic impact of diseases like bTB.

There is a growing emphasis on animal welfare, with consumers and stakeholders demanding better living conditions and healthcare for animals. Bovine tuberculosis can cause significant suffering to affected cattle, including weight loss, lethargy, and respiratory distress. This suffering raises ethical concerns and highlights the importance of early detection and treatment.

Consumers are increasingly concerned about the safety and quality of the meat and dairy products they consume. Bovine tuberculosis can pose a risk to food safety if not detected and managed properly. Contaminated dairy products can transmit the disease to humans, making it a public health concern. As a result, consumers are more inclined to support measures that ensure disease-free cattle herds.

As awareness of the impact of bTB on animal health and welfare grows, cattle owners and industry stakeholders are more willing to invest in the diagnosis and management of the disease. They recognize that early detection is key to preventing the spread of bTB within herds.

The heightened concern for animal health has led to increased funding for research and development in the field of veterinary diagnostics. This investment has resulted in the development of more accurate and efficient diagnostic tools for bTB, including interferon-gamma release assays (IGRAs), PCR-based tests, and serological tests.

Governments and regulatory bodies are responding to the rising awareness of animal health concerns by implementing stricter regulations related to disease monitoring and control. These policies often mandate regular bTB testing and surveillance, creating a consistent demand for diagnostic services and products.

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Increased awareness has encouraged collaboration between cattle owners, veterinary professionals, diagnostic laboratories, and research institutions. This collaboration promotes the exchange of knowledge and best practices, leading to more effective bTB management strategies.

Zoonotic Risk and Public Health Concerns

Zoonotic diseases, those that can be transmitted from animals to humans, have been a growing concern in the realm of public health. Among these diseases, bovine tuberculosis (bTB) stands out as a significant threat due to its zoonotic potential. The awareness of this zoonotic risk and associated public health concerns has been a driving force behind the growth of the Global Bovine Tuberculosis Diagnosis Market. A study conducted at the Animal Health Institute near Addis Ababa, Ethiopia, compared traditional tuberculin tests with novel defined-antigen cocktails, including ESAT-6, CFP-10, and Rv3615c. The research addressed the challenge of differentiating immune responses following BCG vaccination, which has previously led to false-positive results in bTB detection. The study involved 134 cattle (67 vaccinated and 67 unvaccinated) over one year, with skin tests conducted every four months and interferon-gamma release assays (IGRAs) every two months. Notably, prior to disease exposure, both DIVA (Differentiation of Infected from Vaccinated Animals) tests and tuberculin exhibited 100% specificity for unvaccinated control animals. However, post-exposure evaluations revealed that the sensitivity of the DIVA skin test was 46%, the DIVA IGRA was 45%, and the comparative cervical tuberculin (CCT) test was 47%, indicating these tests' limitations in reliably detecting infections.

Bovine tuberculosis is caused by Mycobacterium bovis, a pathogen that can infect both cattle and humans. While human infections are relatively rare compared to those in cattle, they can have severe consequences. Transmission to humans primarily occurs through the consumption of unpasteurized dairy products or direct contact with infected cattle. Once infected, humans can develop a range of health issues, including respiratory problems and even death in severe cases.

The zoonotic risk associated with bTB has raised significant public health concerns. Governments, health organizations, and the general public have become increasingly aware of the potential consequences of this disease. This heightened concern has led to greater efforts to control and manage bTB in cattle herds. Zoonotic diseases like bTB require early detection to prevent transmission to humans. As a result, there is a growing demand for accurate and timely diagnostic tools to identify infected cattle. This

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demand is a key driver of market growth, as it necessitates the availability of reliable diagnostic tests. The contamination of dairy products with Mycobacterium bovis poses a direct threat to food safety. In response, food safety regulations have become more stringent, requiring rigorous testing of cattle herds. Compliance with these regulations drives the need for advanced diagnostic methods, further boosting the market.

In an era of increased global connectivity, zoonotic diseases can easily cross borders. The risk of bTB spreading across regions and countries has led to international health security concerns. As a result, there is a push for standardized and effective diagnostic methods to ensure the early detection and containment of the disease. The zoonotic risk of bTB has spurred research and development efforts aimed at improving diagnostic accuracy and efficiency. These investments have resulted in the development of more advanced diagnostic assays, such as interferon-gamma release assays (IGRAs) and PCR-based tests, which are crucial for early detection.

Advancements in Diagnostic Technologies

Advancements in diagnostic technologies have been a driving force behind the evolution of healthcare and disease management across various sectors. In the realm of veterinary medicine, these innovations are playing a pivotal role in transforming the Global Bovine Tuberculosis Diagnosis Market. Bovine tuberculosis (bTB), a contagious disease affecting cattle and posing zoonotic risks, has witnessed significant growth in diagnostic capabilities thanks to these technological strides.

Accurate and early diagnosis of bovine tuberculosis is crucial for disease management and control. Traditionally, diagnostic methods relied on tuberculin skin tests, which had limitations in terms of sensitivity and specificity. However, recent advancements in diagnostic technologies have revolutionized the field, offering more reliable and efficient tools for detecting bTB. In November 2024, Scottish biotech company Biotangents has successfully raised USD 2.87 million in an investment round led by Eos and British Business Investments, with participation from existing investors Kelvin Capital and Scottish Enterprise. The company’s molecular diagnostic device can identify diseases like bovine mastitis in under two hours, providing results directly to farmers' phones. If needed, the data can also be shared with management systems, veterinarians, and milk processors. With this new investment, Biotangents plans to begin on-farm trials both across the UK and internationally starting next year.

IGRAs are a prime example of technological advancement in bTB diagnosis. These blood tests measure the release of interferon-gamma, a protein produced by the

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immune system when exposed to Mycobacterium bovis, the causative agent of bTB. IGRAs are highly specific and sensitive, reducing the likelihood of false positives and negatives. The adoption of IGRAs has significantly improved the accuracy of bTB diagnosis.

Polymerase Chain Reaction (PCR) technology has revolutionized molecular diagnostics, including bTB detection. PCR-based tests can detect the DNA of Mycobacterium bovis in clinical samples, offering a highly sensitive and specific method for identifying infected cattle. These tests have greatly expedited the diagnosis process, allowing for earlier intervention and control measures.

Serological tests detect specific antibodies produced by the host's immune system in response to bTB infection. Advancements in serological test development have resulted in improved accuracy and efficiency. These tests provide a complementary diagnostic approach to existing methods, enhancing the overall diagnostic toolkit.

The integration of digital health solutions has streamlined the diagnostic process. Digital platforms and data analytics enable real-time monitoring of disease prevalence and transmission patterns. Additionally, they facilitate data sharing and communication among stakeholders, leading to more effective disease management strategies.

Miniaturized diagnostic devices and point-of-care tests are becoming increasingly available. These technologies allow for rapid, on-site testing, reducing the time and resources required for diagnosis. This is particularly valuable in remote or resource-limited areas where timely bTB diagnosis is essential.

Automation and robotics have improved the efficiency and throughput of diagnostic laboratories. High-throughput robotic systems can process a large number of samples quickly and accurately, enabling large-scale bTB testing and surveillance efforts.

Increasing Cattle Populations

The Global Bovine Tuberculosis Diagnosis Market is undergoing a period of significant growth, driven by various factors, one of which is the increasing global population of cattle. As cattle populations continue to rise to meet the growing demand for meat and dairy products, the need for effective disease surveillance and control, particularly in the case of bovine tuberculosis (bTB), becomes more pronounced. As of January 1, 2024, the U.S. had 87.2 million head of cattle and calves, according to the Cattle report published by the U.S. Department of Agriculture’s National Agricultural Statistics

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Service (NASS). Of this total, 37.6 million were cows and heifers that have calved. The number of beef cows in the U.S. stood at 28.2 million, reflecting a 2% decrease from the previous year. Meanwhile, the milk cow population slightly declined to 9.36 million. The U.S. calf crop for 2024 was estimated at 33.6 million head, marking a 2% reduction compared to 2022. Additionally, the number of cattle on feed rose to 14.4 million head, up 2% from 2023.

Cattle are a fundamental component of the global agricultural landscape, providing essential resources such as meat, milk, and hides. The rising human population, urbanization, and changing dietary habits have led to an increased demand for livestock products. Consequently, cattle populations have been expanding to meet this growing demand. As emerging economies experience income growth and urbanization, there is a rising demand for protein-rich diets, including beef and dairy products. This trend has led to an increase in cattle production worldwide. The dairy industry, in particular, has seen significant expansion due to increased demand for milk and dairy products. Dairy cattle populations have surged in response to this demand. In many regions, cattle farming remains a primary source of livelihood for rural communities. The growth in cattle populations supports the livelihoods of millions of smallholder farmers.

With more cattle in existence, the probability of bTB infections increases. This necessitates more extensive disease surveillance and diagnostic testing to identify infected animals. Regulatory bodies and governments, recognizing the potential for bTB transmission, often require routine testing and surveillance of cattle herds. As cattle populations grow, so does the demand for diagnostic services and tests. The economic consequences of bTB in cattle herds can be severe. Reduced productivity, treatment costs, and trade restrictions can have a significant impact on the livestock industry. Therefore, cattle owners and industry stakeholders are more willing to invest in diagnostic solutions to protect their herds and investments. As cattle populations rise globally, the demand for bovine tuberculosis diagnosis services extends beyond individual countries. This expansion provides opportunities for diagnostic companies to broaden their market reach and cater to the needs of diverse regions.

Key Market Challenges

Diagnostic Accuracy

One of the primary challenges in bovine tuberculosis (bTB) diagnosis is achieving high diagnostic accuracy. Traditional methods, such as the tuberculin skin test (TST), have long been used as a standard diagnostic tool. However, this method can yield false-

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positive or false-negative results, which can lead to misdiagnosis. False-positive results may occur when an animal is incorrectly identified as infected, leading to unnecessary culling or treatment. On the other hand, false-negative results may cause infected animals to be overlooked, potentially spreading the disease further within herds. Achieving a balance between sensitivity (the ability to correctly identify infected animals) and specificity (the ability to accurately identify uninfected animals) is crucial to ensuring reliable results. As a result, researchers are working to develop more advanced diagnostic techniques, such as molecular-based tests, to improve the accuracy, reliability, and speed of bTB detection, thus helping to better manage and control the disease.

Early Detection

Early detection of bovine tuberculosis (bTB) is essential for preventing the spread of the disease within cattle herds and minimizing its impact on both animal health and productivity. Timely identification of infected animals allows for prompt isolation and treatment, preventing the disease from spreading to other animals, which can ultimately help reduce transmission rates. Additionally, early detection helps in maintaining herd health and ensures the continued productivity of affected animals by reducing the economic losses associated with bTB, such as decreased milk production, poor growth rates, and increased veterinary costs.

However, achieving early detection is particularly challenging due to the nature of bTB. The disease can remain latent in cattle for extended periods, sometimes even years, before clinical signs appear or the infection becomes detectable through standard diagnostic tests. During this latent phase, infected animals may not show any outward symptoms, making it difficult to identify them until the disease progresses further. As a result, diagnostic methods must be highly sensitive and capable of detecting bTB in its early stages, even before visible symptoms manifest. This challenge emphasizes the need for more advanced and efficient diagnostic techniques to ensure effective early detection and control of the disease.

Zoonotic Risk

Bovine tuberculosis (bTB) is a zoonotic disease, meaning it can be transmitted from cattle to humans, posing a significant public health risk. The zoonotic nature of bTB primarily spreads through the consumption of unpasteurized milk or close contact with infected animals, particularly in regions where such practices are common or where animal-human interactions are frequent. In humans, the disease can lead to severe

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respiratory issues and, if left untreated, can be fatal. This makes the zoonotic potential of bTB a major concern for both veterinary and human health sectors.

To reduce the risk of bTB transmission from cattle to humans, effective disease management in cattle herds is critical. This includes regular and accurate diagnostic testing, isolating infected animals, and implementing stringent control measures such as culling, vaccination, or antibiotic treatment where appropriate. Timely interventions are crucial to prevent the spread of the disease within cattle populations and limit the potential for human exposure. Furthermore, surveillance programs and public awareness campaigns are essential for educating both farmers and consumers on the risks and the importance of proper handling and consumption of animal products. By prioritizing accurate diagnosis and rapid response, the zoonotic risks of bTB can be mitigated, protecting both animal and public health.

Key Market Trends

Advancements in Molecular Diagnostics

Molecular diagnostic techniques, such as Polymerase Chain Reaction (PCR) and next-generation sequencing (NGS), are rapidly gaining prominence in the diagnosis of bovine tuberculosis (bTB) due to their significant advantages over traditional methods. PCR works by amplifying specific DNA sequences of Mycobacterium bovis, the causative agent of bTB, making it possible to detect even minute quantities of the pathogen in animal samples. This high level of sensitivity allows for the early detection of infected animals, even in the absence of clinical symptoms, which is crucial for preventing the spread of the disease within herds. In June 2020, the OIE (World Organisation for Animal Health) hosted the seventh International Conference on Mycobacterium bovis in Ireland. This conference had the primary goal of raising awareness and fostering collaboration among global industry stakeholders and key players to control and eliminate M. bovis. These proactive efforts by organizations and companies are driving opportunities for market expansion.

Next-generation sequencing (NGS) takes molecular diagnostics a step further by providing a comprehensive view of the genetic makeup of M. bovis. NGS enables not only the detection of the pathogen but also the characterization of its genetic structure, allowing for the identification of specific strains and potentially the detection of antibiotic resistance. This is particularly valuable for monitoring and controlling the spread of different strains of bTB, as well as for developing more targeted interventions.

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Point-of-Care Testing

The development of rapid, point-of-care diagnostic tests for bovine tuberculosis (bTB) is an important and growing trend in the market, driven by the need for more efficient and accessible diagnostic solutions. Traditional bTB testing methods often involve sending samples to centralized laboratories, which can be time-consuming and costly. This process involves transportation logistics, waiting for test results, and potential delays in implementing control measures. In contrast, point-of-care tests allow for immediate diagnosis directly at the farm, clinic, or veterinary practice, significantly reducing both the time and cost associated with traditional diagnostic procedures.

These rapid tests provide quick and accurate results, enabling farmers, veterinarians, and animal health professionals to make faster decisions regarding disease management. This is particularly important in controlling bTB, as early detection and intervention are key to preventing the spread of the disease within cattle herds. By identifying infected animals promptly, it becomes possible to isolate or cull affected individuals, reducing the risk of transmission to other animals. Furthermore, point-of-care tests can assist in managing trade and export requirements, as many countries require proof of bTB-free status before allowing animal shipments.

The convenience and affordability of point-of-care tests make them particularly beneficial in remote areas or regions with limited access to advanced laboratory facilities. These tests often require minimal training and can be easily integrated into routine herd management practices. Additionally, as technology improves, point-of-care tests are becoming more accurate, with advancements in sensitivity and specificity reducing the likelihood of false positives or negatives.

Serological Assays and Antibody Detection

Serological tests, which detect specific antibodies produced by the immune system in response to bovine tuberculosis (bTB) infection, are gaining increasing attention as an effective complementary approach to traditional diagnostic methods. Traditional methods such as the tuberculin skin test (TST) and interferon-gamma assays (IGRA) have long been used to detect bTB, but they each have limitations. The tuberculin skin test, for example, can sometimes produce false positives, particularly in animals exposed to non-pathogenic mycobacteria, and interferon-gamma assays, while more accurate, require specialized laboratory equipment and trained personnel. In contrast, serological tests detect the animal's immune response, specifically identifying antibodies generated in response to Mycobacterium bovis, the bacteria responsible for

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bTB.

Serological assays offer the advantage of being simpler and more cost-effective than some traditional diagnostic methods, and they can be performed on-site with minimal equipment, making them more accessible in rural or resource-limited areas. By detecting antibodies in blood or serum samples, these tests can help identify infected animals, especially in cases where clinical symptoms may not yet be visible. Additionally, serological tests have the potential to screen large numbers of animals quickly, facilitating herd-wide surveillance and helping to manage the disease before it spreads further within a population.

Segmental Insights

Tests Insights

Based on the category of Tests, the traditional testing methods is a fastest growing segment market presence and contributed significantly to revenue in 2024. Among these traditional tests, the Single Intradermal Comparative Cervical Tuberculin (SICCT) test stands out as the most widely used clinical examination technique worldwide for detecting bovine TB in different types of herds and cattle. The Agriculture and Horticulture Development Board in the UK even recommends SICCT as the primary screening test for TB in cattle. This test involves injecting two types of tuberculin (bovine and avian) into the neck skin layers of animals, with the results being read 72 hours after the injection. The test's specificity and sensitivity at a standard interpretation are exceptionally high at 99.98%, factors that instill trust and drive product usage, thereby enhancing the growth of this market segment.

On the other hand, the molecular diagnostic tests segment is expected to experience a CAGR in the bovine TB diagnosis market during the forecast period. This growth is attributed to increased research and development efforts by key industry players aimed at developing more advanced and reliable molecular diagnostic products. These innovations include the adoption of rapid and precise diagnostic tools like real-time PCR for confirming bovine TB. For instance, in February 2020, Idvet introduced the ID Gene Mycobacterium tuberculosis complex Duplex qPCR (product code IDTUB-50 and IDTUB-100). This test kit comes with pre-prepared reagents, a positive control, and an external internal control. It can be used to analyze lymph nodes and peripheral tissue samples from cattle and various other livestock animals.

Regional Insights

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In the bovine tuberculosis (TB) diagnosis market, Europe took the lead and captured a significant share of revenue in 2024. The strong European presence can be attributed to several factors, including the presence of major industry players, the implementation of strategic initiatives aimed at expanding market reach, government programs dedicated to eradicating bovine TB, and a substantial cattle population.

In the Asia Pacific region, the market is poised for rapid growth, with a projected CAGR in the coming years. This growth can be attributed to increasing awareness about the disease in developing nations and the rising disposable income in key markets. The increasing demand for timely and accurate diagnosis of bovine TB, particularly in countries like India, is further fueling market expansion.

Key Market Players

IDEXX Laboratories, Inc.

PBD Biotech Ltd

Zoetis Inc.

Innovative Diagnostics SAS

Thermo Fisher Scientific Inc.

Enfer Group

AsureQuality Australia Pty Ltd.

Bio-Rad Laboratories, Inc.

Bionote USA Inc.

Neogen Corporation

Report Scope:

In this report, the Global Bovine Tuberculosis Diagnosis Market has been segmented

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into the following categories, in addition to the industry trends which have also been detailed below:

Bovine Tuberculosis Diagnosis Market, By Tests:

Molecular Diagnostic Tests

Serological Tests

Traditional Tests

Bovine Tuberculosis Diagnosis Market, By Region:

North America

United States

Canada

Mexico

Europe

Germany

United Kingdom

France

Italy

Spain

Asia-Pacific

China

Japan

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India

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Bovine Tuberculosis Diagnosis Market.

Available Customizations:

Global Bovine Tuberculosis Diagnosis market report with the given market data, TechSci 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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