FROST & SULLIVAN

ETIOMETRY

2022
ENABLING TECHNOLOGY LEADER

UNITED STATES CLINICAL DECISION SUPPORT FOR CRITICAL CARE INDUSTRY

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Etiometry excels in many of the criteria in the clinical decision support for critical care space.

AWARD CRITERIA

Technology Leverage	Customer Impact
Commitment to Innovation	Price/Performance Value
Commitment to Creativity	Customer Purchase Experience
Stage Gate Efficiency	Customer Ownership Experience
Commercialization Success	Customer Service Experience
Application Diversity	Brand Equity

The Need to Streamline Data in ICUs

Intensive care units (ICU) are challenged with the need to aggregate patient data from disparate sources and comprehend and communicate them quickly. Data volumes and the speed at which they generate in ICUs are high. Asynchronously reported data elements with different output formats and frequencies make it difficult for clinical organizations to assimilate data, identify relevant signs of a physiological or medical decline, and respond to them timely. The core economic problem in ICUs is that the longer a patient stays in the hospital, the less money the hospital makes. Hospitals lose more money if patients' stays are prolonged. Additionally, clinical staff shortages lead to associated clinical burnouts and hospitals relying on less experienced clinicians.

Etiometry is a US-based company founded in 2010 that offers clinical decision support in critical care. It differentiates itself in the ICU space with a core visualization software that provides the full longitudinal context of captured data. By consolidating data, the Etiometry Platform presents comprehensive clinical data on a single screen and delivers critical information for immediate patient care. The Etiometry Platform enables risk estimation, efficient communication, and data archives for research and quality improvement through three integrated software components:

- T3 Data Aggregation and Visualization Software
- Risk Analytics Engine™
- Quality Improvement System (QIS)

Automatically Capturing Data and Displaying Access to Multiple Data Streams

Etiometry began by enabling the Etiometry Platform to take data from several sources, such as electronic health records (EHR) and bedside monitoring devices, and consolidate them into one view for clinicians to visualize a patient's trends efficiently. The platform enables ICU staff to visualize 12 hours of patient data and understand the trends of the patient's health, as well as to scroll back to see as much as two week of patient data. This capability is helpful for intensivists, even those starting new shifts, to make immediate decisions regarding patient care. Following the successful launch of the initial part of the platform, Etiometry started its work on risk algorithms, with four already approved by the US Food and Drug Administration (FDA). It has also obtained Health Canada medical device licensing for the four algorithms and recently received CE Mark in the European Union for its algorithms.

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>
> *– Dr. Bejoy Daniel,*
> *Senior Industry Analyst*

The first FDA-cleared risk algorithm is the IDO2 Index™ (inadequate delivery of oxygen). The algorithm uses mathematical models of human physiology from devices connected to the system to provide a risk score. It received FDA clearance in October 2016.

Etiometry is committed to developing and making available diagnostic algorithms. In 2019, it launched the IVCO2 Index™ (inadequate ventilation of carbon dioxide), which also provides a risk score. In July 2022, Etiometry received FDA clearance on two more risk algorithms: the HLA Index™ for hyperlactatemia and ACD Index™ for acidemia. These algorithms provide risk scores and enable critical care clinicians to assess a patient's deterioration due to inadequate oxygenation and ventilation.

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Embedded and Integrated with Hospital Protocols and Workflows

Etiometry's solutions resonate with customers as the company has developed a function to embed key hospital protocols in the software. By doing so, Etiometry enables the automated tracking of a patient to start a given protocol based on the hospital's eligibility criteria. Once the protocol is initiated, the software tracks the patient's performance under the protocol and assesses the patient against predetermined physiological thresholds. The clinical team can understand how the patient is doing at a mere glance.

Etiometry's Clinical Management Applications (MAPs) embed clinical protocols into the Etiometry Platform and integrate the platform with workflows in the hospital. Etiometry can identify all data factors that are part of the protocol and assess the patient for eligibility to undergo the protocol. Once patients are enrolled, the data matrix is tracked on an ongoing basis and made available for visualization by the bedside clinician. Using the Etiometry Platform, the clinician can determine if a patient fulfills certain criteria, while the ICU team can review the case and decide if any care intervention should be performed

based on the protocol. Etiometry gains a competitive edge in the market because of its platform's ability to automate patient assessment for protocol eligibility and adherence. This automation reduces the number of manual hands-on tasks required in checking patient eligibility and understanding whether patients are being managed successfully under the protocol, such as clinicians and ICU staff seeking data from various sources and understanding the meaning of the data to determine the next step.

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Several companies have generalized high-level algorithms and risk scores for the patient. However, Etiometry offers novel and robust algorithms focused on key physiological pathways of deterioration. By alerting physicians to a patient's risk of a specific pathway of deterioration, the platform serves as a guide to help ICU staff take the proper steps to correct the patient's negative course.

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The Etiometry Platform captures and keeps data in the Etiometry QIS, a key attribute to how Etiometry facilitates quality improvement and clinical research. Automated monthly reports are sent to the hospital to help it in the following ways:

- Understand the extent to which its protocols and key workflows are being adhered
- Ensure timely care is initiated for patients
- Analyze and generate reports to determine the effectiveness of each care protocol
- Segment and stratify patients in order to understand treatment and workflow efficacy patterns

Predicting Patient Trends with Risk Analytics

ICUs are encumbered by large data volumes and the high speed at which data is generated. Many clinical organizations face difficulty in assimilating data to ensure their staff can efficiently address signs of physiological or medical declines. Analyzing the continuous data stream at the bedside is an ongoing challenge for physicians, driving the need for stronger computing power and new analytical techniques using artificial intelligence (AI) and machine learning. Frost & Sullivan believes this need to be the cornerstone of the Etiometry Platform, which capitalizes on technological advancements to offer personalized risk analytics for bedside care. The market competition is presently focused on using AI and machine learning to predict the probability of outcomes or events based on historical population data, demonstrating value in individualized critical care.

Etiometry has developed its platform to understand the physiology of specific clinical conditions and provide insights with the Risk Analytics Engine™. Etiometry's risk analysis method is unique as it is an analytics system that models specific physiological conditions to create a digital patient. The algorithms work dynamically and use a comprehensive human physiology model that considers many factors influencing a patient's condition. They continuously adapt to the patient's changing condition and provide

insight into the cause and the direction in which the patient is headed. Frost & Sullivan commends Etiometry for designing a model-based risk analytics framework that is both comprehensive and scalable to address multiple patient risks and conditions.

Etiometry's stage-gate process involves developing and releasing new algorithms with FDA clearance to enhance its platform. To date, Etiometry has seven solutions cleared by the FDA and four approved algorithms for use with pediatric patients. It is now expanding its platform to obtain FDA clearance for its algorithms to be used in both pediatric and adult patients, as well as neonatal patients. Its four algorithms for pediatric patients are also licensed for use in Canada and in the European Union. The IDO2 Index™ is also licensed for use in adult patients in Canada and in the European Union.

A Diversifying Business Model

Etiometry has been diversifying its business. As of early 2020, it was heavily focused on pediatric cardiac cases in the ICU, representing most of its installations. Since then, the company has initiated a two-fold commercial expansion strategy that strengthens its standing in pediatric care (including neo-natal) while it ventures into critical adult care settings.

As of August 2022, Etiometry has deployed its solutions in US pediatric hospitals and multiple units in a hospital, such as operating rooms (OR), emergency departments, and step-down units. For critical adult care, the Etiometry Platform is installed in at least seven hospitals across cardiac ICUs and ORs, medical ICUs, emergency departments, and a neurology ICU. Because the platform can cater to different therapeutic areas in addition to cardiovascular, Frost & Sullivan believes that Etiometry is capable of expanding its reach throughout the hospital. The Etiometry Platform provides physicians and ICU staff with a holistic, relevant, and insightful view of all patients, boosting the staff's ability to provide exceptional bedside care and lessening their burden of manual tasks, such as reviewing different data sources to assess a patient.

The Etiometry Platform has significant utility in academic research centers. It can collect and store all visualized data to facilitate learning. Researchers can study a case, identify any shortcomings in patient care, and draw conclusions as to how issues can be prevented or better managed and the care process improved in the future.

Etiometry works toward attaining a foothold in hospitals by demonstrating the quality, reliability, and efficiency of its platform in addressing critical care needs and outperforming larger companies and their technologies. Etiometry integrates with leading system providers that are the sources of some of the data used in its analytics. The company's strength also lies in its expertise in connecting to and pulling data from all sources relevant to healthcare.

Improving Efficiency and Compliance

Etiometry continues to add to its customer base with several new hospital partners adopting the platform over the past few years. Many of Etiometry's partner hospitals have been with the company for many years and to date, the company has not lost a single customer, which speaks volumes about its high customer satisfaction and the value customers get from the platform. Users of the platform include physicians, respiratory therapists, and nurses. The Etiometry Platform is an end-to-end data management

tool with robust applicability. For example, a nurse covering a shift can quickly assess and understand a new patient's condition by viewing the data on the Etiometry Platform. The platform saves costs and time as, traditionally, the nurse would have to refer to multiple data sources, including the EHR and various monitoring devices, or call another nurse or the intensivist for assistance. By ensuring efficient knowledge transfer, minimizing workloads, and accelerating clinical decision-making, the Etiometry Platform has become a force multiplier in hospitals amid hospital staff shortages.

The Etiometry Platform can integrate with other platforms and existing infrastructure. To support user adoption, Etiometry offers flexible and comprehensive training to its primary end users: physicians, respiratory therapists, and nurses. For other end users, Etiometry collaborates with the hospitals to decide on the best training method and format: classroom, virtual, or bedside. Etiometry facilitates user adoption training throughout its contract with the hospital at no additional fee. Etiometry reports a 100% renewal rate for its contracts, which include top hospitals in the United States. The high customer retention rate and brand loyalty reflect the effectiveness and reliability of the Etiometry Platform.

The COVID-19 pandemic has resulted in an overworked healthcare system due to clinical staff shortages and put hospitals in triage mode. With its platform, Etiometry does not claim to replace clinical staff or assign more patients to the care of one staff. Etiometry's value proposition is to elevate the performance of clinical staff in caring for every patient through efficient data aggregation, data visualization, knowledge transfer, and automation. The Etiometry Platform alerts staff to areas requiring urgent attention in patient care, and thereby enables clinical staff to focus their attention on those patients who need it at any given time. Frost & Sullivan anticipates the increased use of Etiometry's solutions to lead to better clinical outcomes, shorter hospital stays, and enhanced revenue opportunities for hospitals.

Conclusion

Etiometry offers a clinical decision support platform with a unique data aggregation and visualization approach using risk algorithms. The company consistently works on refining its platform, having released four algorithms cleared by the FDA. Using AI and machine learning, the Etiometry Platform equips clinical staff with valuable insights into a patient's pathway of deterioration and the physiology of specific clinical conditions to ensure effective bedside patient care. By tracking a patient's performance and providing staff with a bird's eye view of the patient's condition and trends, the platform accelerates clinical decision-making and guides staff into taking proper and timely action. This revolutionary tool also automates the assessment of patient eligibility for a protocol, integrates with workflows and existing infrastructure, and ensures efficient data handover between clinical staff.

For its strong overall performance, Etiometry earns Frost & Sullivan's 2022 United States Enabling Technology Leadership Award in the clinical decision support for critical care industry.

What You Need to Know about the Enabling Technology Leadership Recognition

Frost & Sullivan's Enabling Technology Leadership Award recognizes the company that applies its technology in new ways to improve existing products and services and elevate the customer experience.

Best Practices Award Analysis

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage	*Customer Impact*
Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance	**Price/Performance Value**: Products or services provide the best value for the price compared to similar market offerings
Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation	**Customer Purchase Experience**: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints
Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions	**Customer Ownership Experience**: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service
Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate	**Customer Service Experience**: Customer service is accessible, fast, stress-free, and high quality
Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments	**Brand Equity**: Customers perceive the brand positively and exhibit high brand loyalty

About Frost & Sullivan

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The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.
Learn more.

Key Impacts:

- **Growth Pipeline:** *Continuous Flow of Growth Opportunities*
- **Growth Strategies:** *Proven Best Practices*
- **Innovation Culture:** *Optimized Customer Experience*
- **ROI & Margin:** *Implementation Excellence*
- **Transformational Growth:** *Industry Leadership*

The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)