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AyasdiAI for Healthcare: Intelligent Application Suite

WHITEPAPER

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Introduction

Few industries are as well positioned for artificial intelligence as healthcare. From payer to provider, there exist terabytes of data, strong incentives and an emerging sophistication and appreciation for what AI can achieve. Together, these elements are powering massive changes across the healthcare landscape. At the heart of the movement for both payer and provider, is value-based care. While both are united in the goal, the fact is that value-based care is still elusive for many. Part of that challenge lies in how the problem is viewed. Value-based care is not compartmentalized – it is integrated. It benefits from looking across an entity's entire data landscape. With that view, however, comes complexity, multi-structured data, and subtle signals.

AyasdiAI's suite of healthcare applications uses its award-winning approach to machine intelligence to overcome those challenges and deliver orders of magnitude improvements in clinical variation, population health, denials management, and fraud, waste, and abuse.

Clinical Variation Management

With pressure to decrease cost and improve care delivery, providers face new initiatives to transition from volume-based models into value-based models. The good news is that there is a tremendous amount of data captured in EMR systems that can fuel essential initiatives to provide better care while reducing hospital costs.

Clinical Variation Management from AyasdiAI is a cornerstone application for a broader clinical transformation that will touch every part of the delivery chain – from how hospitals are organized, the conversations they have with their doctors, the confidence with which they take on risk-sharing arrangements with payers, and most importantly the care they deliver to their patients. The key lies in finding the patterns and relationships that matter in complex, multi-structured clinical and billing data. AyasdiAI's Clinical Variation Management application:

- Discovers what's going on in the hospital
- Surfaces the best care practices
- Builds new care paths to be added to coordination systems
- Continuously improves the care paths

Discover What's Going on in Your Hospital

To discover variation in a hospital, it needs to know all the executed care events for a specified treatment. Using machine learning, hospitals can mine through the thousands of data points in their EMR that represent unique events for each procedure. Merging the claims data with clinical data provides the added benefit of associating the cost with each step in care. These data points are sequenced by time and presented in a simplified visual format so it is easily consumable by clinicians, who can then identify which care events consume the majority of the dollars and if those dollars translate into positive patient outcomes.

Surface Your Best Practices

Each hospital can define which metrics should be measured, for example, length of stay, readmission, or hospital costs. Machine intelligence then calculates several candidate pathways based on the group of patients who have the most desirable outcomes. As the pathways are generated, doctors and nurses can easily compare them to surface the significant differences and how those differences impact patient outcomes. They can then apply their domain knowledge to determine if the variation is unwarranted or if it correlates to a positive patient outcome, thus built into the best practice.

Figure 1: A computed clinical pathway in a patient group.

Build New Care Paths to be added to Care Coordination Systems

The identified best practices serve as a care path template to be leveraged across the hospital through integration with the EMR. While these care process models represent a distilled view of best practices by the best doctor, each physician still has the power to build on it by adding and subtracting events based on their clinical knowledge. Because there is no one-size-fits-all for patient care, generating targeted care paths based on patient comorbidities and other defined metrics is vital. Each patient treatment group can surface a new best practice targeted to that patient population. Automating these data-driven care paths reduces the time clinicians spend on manually reviewing and evaluating third-party studies and increases the time to provide better, tailored patient care.

Physicians are alerted with reliable recommendations to provide the right care to the right patients at the right time. Patients receive better care to achieve better outcomes. Adopting the improved care paths helps to standardize care and reduce unwarranted clinical variation.

Provide Continuous Improvement

With each data import, hospitals can continuously uncover new best practices that may not have been widely adopted throughout the hospital. Providers can gauge the performance of new pathways by

measuring the variations that occur after implementation. As physicians incorporate new medical treatments, they can immediately determine if these techniques are indeed improving patient outcomes.

Integrating new best practices into care coordination systems, physicians can open up a patient chart and simultaneously compare their diseases state to that of the local patient population and have a prescribed best practice at their fingertips. Utilizing patient data to manage clinical variation has the potential to revolutionize the way we think about care quality and patient satisfaction. New advances in data analytics using machine learning can allow healthcare providers to leverage their vast amounts of data for both operational excellence and optimal patient care.

Measure Adherence

Typically, measuring adherence is a huge operational challenge since it involves every aspect of the patient's stay at a hospital. AyasdiAI's CVM adherence module allows providers to track adherence at the facility, physician group, or individual physician level. The adherence module is not only a monitoring tool that works alongside CVM for newly implemented care paths but is also a stand-alone resource for a provider with existing care paths who wants to measure the performance of their physicians and facility according to their set guidelines.

The adherence module can provide value to everyone in the patient care journey, from administrators to physicians to labs and procurement. Users can drill down into the performance of every physician and facility on the steps taken in adherence to the given guidelines. The module automatically calculates adherence both on the individual events occurred as well as total care path level to create a comprehensive report that compares physician performance across the board with details down to a single lab test. Furthermore, the adherence module allows the inclusion of co-morbidities such as diabetes, hypertension, and/or obesity providing transparency about patient health and how it relates to the care provided. This level of granular detail becomes the basis for a data-driven discussion of actions taken by physicians and if it is in the best interest of the patients and hospital.

Population Risk Stratification

Today's new health economy is bringing a paradigm shift from volume-based care to value-based care, where providers are being paid for the value of care they deliver to individuals. With this new focus on value, it is critical for both healthcare providers and payers to effectively manage the risk of patients and share risk as they participate in value-based payment models. What is profit today may very well be cost in the future, and without a proactive strategy for managing population health, health systems risk the financial well-being of their organization.

Traditionally, risk assessment has been reactive, based on predetermined historical characteristics, such as chronic conditions or hospital admissions. It is often limited to claims data and is unable to discern modifiable risk factors such as prescription drugs and individual procedures, which if identified, can help improve an individual's course of care.

Beyond Traditional Risk Assessment

AyasdiAI's Population Risk Stratification application uses machine intelligence to discover nuanced sub-populations automatically, predict future risk trajectories, drivers of risk, and inform the most effective interventions for delivering the best outcomes– all while understanding your patients' multi-faceted characteristics. By analyzing patient records, financial data, and socio-economic data, the Population Risk Stratification application allows healthcare organizations to manage population health proactively and continuously.

The Fine-Grained Population Problem

With the size and complexity of patient data, it is impossible to manually discover, with accuracy, patient groups that share similar risk factors. Those patients that are high-risk today are often the group that is deemed to be high risk in the future. It is more important to understand those patients who will have the highest escalation of risk over time to manage care, preempt adverse events and control costs.

The Population Risk Stratification application identifies, and groups patients based on similar predictive signatures. Patients may share similar conditions, but will also share other determining characteristics, whether it be procedures received, medications prescribed, or the type of coverage they have. It determines not only which groups are projected to have the highest escalation of costs, but other outcomes, such as which conditions are likely to be prevalent for each group and the predicted change in utilization.
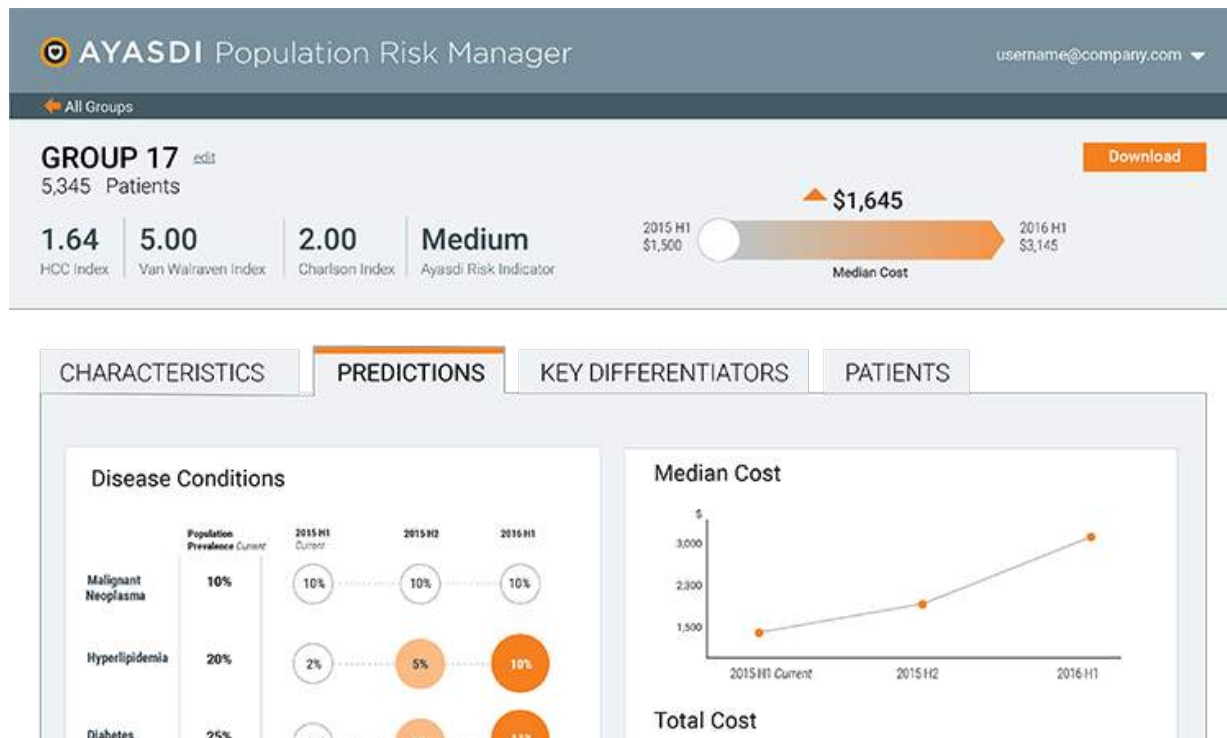

Figure 2: AyasdiAI's Population Risk Stratification Application

AyasdiAI Population Risk Manager provides transparency into which key differentiators are driving the various predictions– revealing what is unique about these groups that make them high- or low-risk.

Armed with information on risk profiles and drivers of future risk, clinicians and others across the care continuum can better assess individuals and the best course of care, and more confidently prescribe and justify care programs for each.

Advanced Analytics for Fraud, Waste, and Abuse Detection

Healthcare fraud, waste, and abuse costs exceed hundreds of billions of dollars annually in the U.S. Payers are consistently challenged by the limited resources at their disposal to process the growing number of claims and make timely payments. At the same time, they need to monitor for suspicious claims to prevent revenue losses continuously. Identifying new patterns of aberrant behavior is a slow process, requiring many analysts to compare reports from different sources before they can confirm a new trend. This allows sophisticated fraudsters to evolve their strategies and outpace current detection models rapidly.

The major issue is the volume of investigations, most of which do not result in detection of suspicious activity. These false positives can run up to 90 percent of all investigations and as a result, can cost payers millions of dollars per year. AyasdiAI's FWA application utilizes unsupervised learning to quickly discover subtle, new patterns and anomalies within complex claims data. These insights can be incorporated into an existing rules framework to minimize unnecessary claim payments and improve payment integrity.

Current analytical techniques are hypothesis-driven, and they are heavily reliant on business analysts and special investigation units (SIUs) using their experience to determine the features to incorporate into these fraud detection rules or models. Moreover, the models developed using conventional machine learning techniques tend to be over-fit as they attempt to describe all the underlying claims data.

AyasdiAI rapidly correlates and analyzes thousands of attributes simultaneously and groups data points that are similar to reveal patterns and outliers through visual networks. The software automatically lists the statistically significant features that characterize these patterns and outliers. These features can then be used to develop more effective, localized fraud detection rules and models. AyasdiAI's machine intelligence software helps payers and/or providers achieve the following:

- Identify new patterns of aberrant behavior
- Validate and improve existing detection models
- Prioritize fraud leads for SIU teams
- Improve detection in the pre-payment cycle

Accelerating Time to Insight

AyasdiAI's machine intelligence software shortens the time to insight for analysts. Without the continuous cycle of guessing and checking various hypotheses, analysts can quickly zero in on the key characteristics of fraud to create new rules or update existing models. It helps payers and/or providers keep pace with ever-changing fraudulent techniques and regulations. A large payer had previously spent two to three months on a single model to detect overpayment for a designated specialty. Using

AyasdiAI, the payer was able to quickly surface the combination of features that represented overpayment and created new models within just two weeks.

Comprehensive Analysis of Complex Data

AyasdiAI's software evaluates all the relationships across the entire claims data set to find various patterns and relationships. The result is a holistic representation of all their claims data, helping them understand the similarities as well as the differences. By leaving nothing out, the SIU doesn't miss subtle insights and signals.

Unbiased Results

A data-first approach to analysis eliminates personal biases and preferences when it comes to choosing machine learning algorithms to apply to the data. AyasdiAI's software can apply hundreds of combinations of algorithms to the data to find highly nuanced sub-segments and patterns in the data. Machine intelligence effectively constructs an ensemble of models. Each model is responsible for a different segment of the data. This eliminates the need to create or choose a single detection model that works well on all of the data.

AyasdiAI's machine intelligence software brings together advancements in machine learning and topological data analysis to rapidly uncover new trends in claims data. As data increases in complexity, traditional tools and methods are unable to holistically analyze the data and discover the relationships between the variables. Using AyasdiAI, payers and/or providers are better equipped to detect rapidly evolving forms of fraud, waste, and abuse, uncovering even subtle patterns of aberrant behavior.

Improving Denial Management Using Machine Intelligence

Rejected or denied claims represent hundreds of billions of dollars in lost revenue for healthcare organizations each year, costing them about 5% of their net revenue stream. While the recommended rate of denials is under 4%, the actual rate for many healthcare organizations is around 20%. The most efficient way to reduce the amount of lost revenue is to target the cause of denied claims – something that is very difficult to do using Excel and existing revenue cycle management solutions.

AyasdiAI for Denials Management is a purpose-built software application that helps healthcare providers rapidly uncover complex denial patterns and their precise drivers. The application uses machine intelligence to uncover all the patterns and relationships within a provider's claims-related data. Hospitals benefit from using AyasdiAI for Denials Management to conduct a retrospective analysis of hotspots of denied claims and determine the causes for denials. The uncovered drivers help them proactively optimize their processes to prevent future denials.
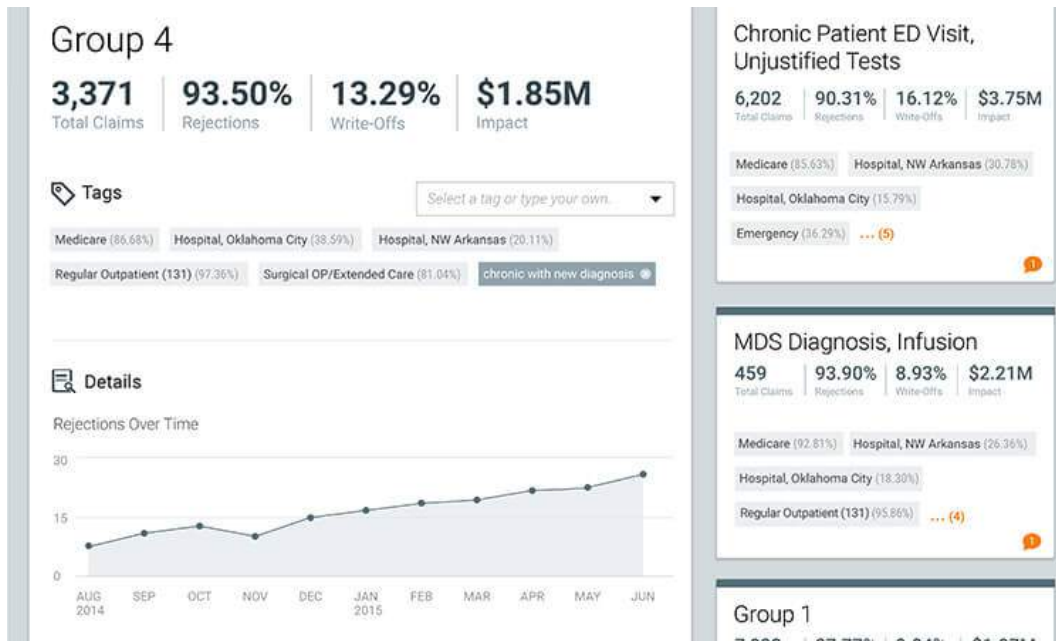
Figure 3: A card view of AyasdiAI's Denials Management Application.

The Benefits

Gain a Holistic View of All Claims: AyasdiAI for Denials Management helps uncover highly nuanced relationships and patterns hidden within historical claims data. The software ingests all the claims data and creates a visual network of all the claims based on a notion of similarity. The topological model can then be colored by any attribute of interest, like the payer type or denial reason category, to surface subtle patterns in the claims data.

Surface Underlying Denial Patterns and Hotspots: Coloring the topological model by whether a claim was denied or rejected reveals hotspots of denied claims within the network. By drilling into a hotspot, an analyst can determine the characteristics that drive denials and that differentiate them from the rest of the claims. The software application efficiently distinguishes denied claims by surfacing the unique combination of diagnosis codes, payer, and procedure attributes that characterize these denied claims. Based on these attributes, claim analysts can create profiles of claims known to have a high risk of denial.

Speed Payment Reimbursement: The average cost of re-working a claim is $25. With hundreds of denied claims pouring in each day, providers need an efficient way of prioritizing claims for resubmission. If a newly denied claim is recognized to have similar attributes as the claims reviewed in a hotspot, it can be quickly categorized and prioritized for correction. The reason for denial is likely to be the same, which limits the investigation effort required, significantly improving the efficiency of the billing team and the overall claims denial management process.

Proactively Prevent Denials: The insights discovered by analyzing denied claims can be used to proactively improve upstream coding changes by the medical staff that will avoid future denials. Instead of evaluating individual denied claims, a domain expert evaluates groups of similarly denied claims and suggests process improvements using the underlying characteristics of each of these groups.

Summary

As the movement towards consumer-centric, value-based care progresses, health providers continue to find innovative measures to actively engage members to lead healthy lifestyles, and embrace targeted personalized care, while minimizing waste and denials. AyasdiAI intelligent applications for healthcare deliver enterprise-wide capabilities that touch every aspect of the patient and providers journey, making the process smarter, efficient, and ever improving towards the goal of better care management.

Clinical Variation Management from AyasdiAI is a cornerstone application for a broader clinical transformation – a transformation that will touch every part of the healthcare delivery chain – from how hospitals are organized, the conversations they have with their doctors, the confidence with which they take on risk-sharing arrangements with payers and most importantly the care they deliver to their patients.

Using the Population Risk Stratification application, organizations can discover the most nuanced sub-populations and accurately predict future risk trajectories and drivers of risk. Intelligent applications inform the most effective interventions for delivering the best outcomes allowing more effective management of risk-based contracts and the ability to foresee and plan for products and services that will be necessary over time. This type of holistic approach made possible with AI allows health plans to manage population health proactively and continuously.

AyasdiAI's application for Fraud, Waste, and Abuse management brings together advancements in machine learning and topological data analysis to rapidly uncover new trends in claims data. As data increases in complexity, traditional tools and methods are unable to holistically analyze the data and discover relationships within the variables. Using AyasdiAI, payers and/or providers are better equipped to detect rapidly evolving forms of fraud, waste, and abuse, uncovering any subtle patterns of aberrant behavior to increase the accuracy of detection models and minimize the dollars lost.

Traditional approaches to identifying the causes of denied claims are rudimentary and require manual investigation of individual claims. AyasdiAI for Denials Management provides hospitals with a holistic view of all of their claims data. It discovers highly nuanced relationships between all the variables within claims and their correlation to denials. With a complete picture of the causes for denials, organizations can go beyond just managing denials. They can prevent them.

To find out how to leverage AyasdiAI's intelligent application suite contact us at sales@ayasdi.com or visit ayasdi.com to arrange a demonstration.

About Symphony AyasdiAI

Symphony AyasdiAI, part of the SymphonyAI Group, is the world's most advanced artificial intelligence software company. Symphony AyasdiAI helps organizations discover new and valuable insights in enterprise data. With unprecedented accuracy, transparency, and speed. Built upon over a decade of research and experience, Symphony AyasdiAI delivers insights to Fortune 500 companies and public sector organizations to capture growth, avoid risks and manage inefficiencies.
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