

Use of real-time analytics in Population Health

A SCALABLE HEALTH WHITE PAPER



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HEALTH

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EXECUTIVE SUMMARY

Population Health Management (PHM) considers many determinants of health including access to medical care, social and physical environments, genetics, and individual behavior to predict future population healthcare needs. PHM considers various types of data to guide healthcare programs and to estimate their value.

Unfortunately, this information is vast and unstructured and thus cannot be used effectively in its raw form. For example, CPOEs and other data from clinical decision support systems result in more and more data being generated by the healthcare industry every day. The data ranges from doctors' prescription scans, medical imaging, insurance, machine and sensor feeds to social media (Twitter feeds, Facebook posts and other social media platforms) and web updates. This data provides information about the entire population health and health trends. In order to gain meaningful insights that can assist PHM, this disparate data needs to be transformed into strategic business intelligence.

Fortunately, data scientists continue to develop better analytical applications from which to gain actionable insights. When deployed in the healthcare environment, analytical applications discover associations and patterns using the available information and create models and forecasts having the power to save lives, improve care and reduce costs. There is the potential to embrace this 'power' and produce results to address real-time requirements. Harnessing these insights - through data modeling and forecasting, real-time analytical tools and

applications and software - brings disparate data together into a coherent format. A robust analytics platform offers real-time information to the provider in a user-friendly environment.

The stock market and weather forecasts have demonstrated the benefits of real-time information. For PHM, its potential is limitless. For example – by analyzing lung related treatments, breathing related care and consumption of cigarettes by a certain segment of the population or the whole, healthcare practitioners can predict if there is a potential for the onset of lung cancer. By having this data in real-time, medical institutions and the government can start preventative measures such as anti-smoking campaigns, diet changes, and special social programs on awareness to reduce the onset of disease.

Real-time analytics has the potential to provide a level of detail and precision for a population or a segment helping track the relationship between care event, health considerations and the outcomes amongst the segment. Models prepared by real-time healthcare analytics enables health care decision makers to develop treatment protocols with a continuous 'engage & improve' cycle between care providers and care program owners for better outcomes.

This white paper discusses the effectiveness of adoption and use of real-time analytics in population health and how it is now a strategic imperative.



INTRODUCTION

In general, the purpose of real-time analytics tools and software is to model and connect the available data in a structured manner and transform the entire information into actionable insights to the healthcare provider.

Every day, there is more and more data being generated by the healthcare industry. Including CPOEs and data from clinical decision support systems. Every point of inquiry to every point of entry, driven mainly by regulatory compliances, has resulted in exponential growth of unstructured data.

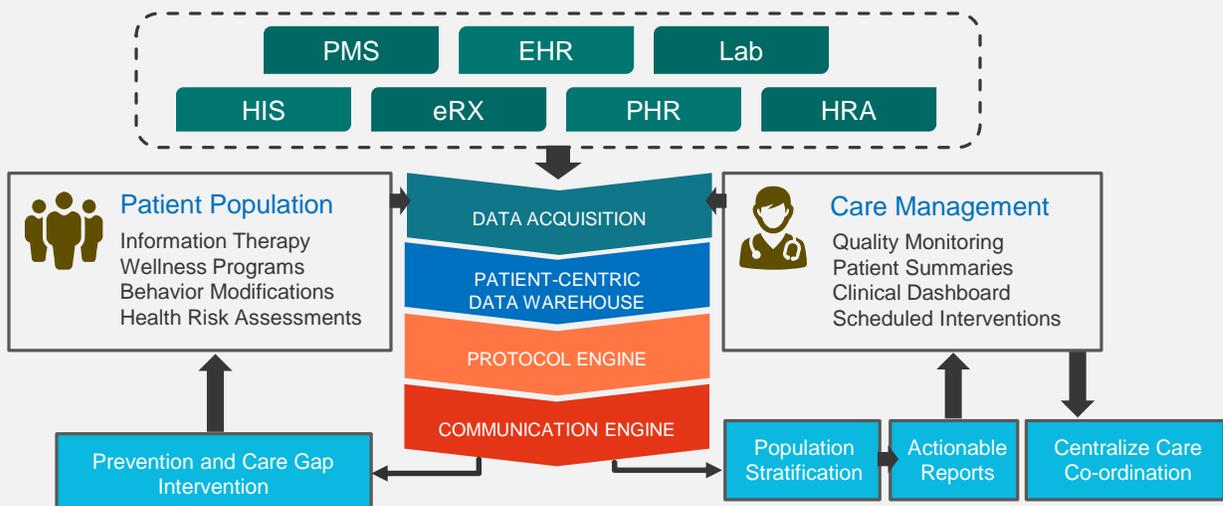
Along with the growth of structured and unstructured data, the outcomes from data analysis such as statistics, machine learning, data mining, and predictive analytics continues to grow as well. The ultimate objective is to transform data into beneficial outputs for better predictability, decision making, and planning for better population health.

Imagine the value of this data for offering health insights when generated on a population level. In the healthcare sector, addressing public health has become the driving force for PHM. More than

reducing the need for reactive interventions, healthcare providers are looking for data to help them proactively address undetected and untreated medical issues before they advance into symptomatic diseases. On a preventive level, data analytics can help providers to identify population segments who are at risk of developing a particular condition.

For PHM, the information that is gained from the aggregated analysis of massive amounts of population health data can provide healthcare organizations and decision makers valuable healthcare intelligence. Healthcare intelligence tools provides modeling, forecasting, and dashboard visualization tools to assist PHM. These tools and insights enable providers to make better decisions by improving operational efficiencies and more precise predictability.

Diseases and their associated data are both growing exponentially. Hence, it is critical for healthcare providers and decision makers to adopt tools, infrastructures, and techniques for better leveraging real-time analytics or risk losing competitive positioning to more innovative providers.



CHALLENGES FACED WITH POPULATION HEALTH AND HEALTHCARE DATA

With digital advances, the stakes have become increasingly high for healthcare providers and decision makers to predict the onset of diseases for earlier intervention resulting in better patient healthcare at lower costs.

PHM has been identified as the most critical element in developing better and evolved healthcare models that are sustainable, as well. While healthcare organizations strive to adopt best practices and technology solutions, they must first address the challenges to PHM.

Challenges to Population Healthcare Management

- Identifying and segmenting the population based on high risk and other factors.
- Creating, implementing and monitoring preventative care plans and practices.
- Communicating with individuals and broader communities.
- Categorizing and structuring of healthcare data.

Electronic Health Record (EHR) systems alone cannot provide the level of PHM that providers need to achieve better outcomes and reduced costs. The healthcare industry has rightly focused on the deployment and optimization of EHRs but to realize any significant benefits, these IT innovations are just a start.

EHRs act as great repositories for all critical data and patient records. But, very few organizations are equipped with the sufficient data analysis functionalities needed to support

risk categorization and give actionable insights and intelligence. The volume of healthcare data is huge and requires specific solutions for its specific functions - some to store, some to structure and others to structure and innovate with actionable results.

There is also a further challenge to PHM, very few health organizations have an appetite for IT investments related to Population Healthcare Management. Many providers have tightened IT budgets previously allotted to regulatory compliance and investments in healthcare technology. Hence, resource allocation has a higher priority than innovation.

Many PHM leaders are supportive of technological advances, but they have not realized the benefits real-time analytics can have when it comes to overall population healthcare. This is a result of organizations believing that just implementing digitization is enough, but care management requires various methods, modes and technologies. Also, the value that healthcare data can only be realized when it is leveraged and managed in the most efficient way.

The population might accept the idea of consumption, transfer, and analysis of data quickly to enhance customer care in general. However, when it comes to healthcare - trusting an automated output is a huge concern. Despite the very surety that real-time healthcare analytics offers, healthcare dictated by a machine is threatening to the average patient.

EVOLVING THE HEALTHSCAPE – REAL-TIME ANALYTICS AND POPULATION HEALTH

When it comes to giving and ensuring quality healthcare to a large, categorized or varied population, it takes both clinical and operational expertise to work in collaboration.

Consider a scenario where a patient is recently diagnosed with diabetes. When he visits the clinic, the physician immediately saves the new update of the diagnosis into the EHR. Following the entry, the patient gets enrolled into a diabetic specific program for which he receives an email. The program assigns certain activities, such as he has to step onto the scale every day at home. Whenever there is a significant change, the physician gets an update. This type of real-time feedback and projects exist today, but probably only as a pilot across certain segments of the population.

The point is, that with such devices and the subsequent data being generated, in an ideal scenario, the data will simply arrive and be acted upon. All in real-time standards.

Organizations can connect real-time analytics to healthcare. Healthcare providers need to identify and segment the population into categories, such as candidates who are at high risk in the future, those displaying early onset symptoms and patients suffering from chronic diseases. For this segmentation to be accurate and in real-time, both clinical and claims data need to be considered. Patients needs are ever increasingly complex, they are accessing care and help from various points and hence the entire mapping of the data needs to be extensive and also vetted for accuracy. While some health providers have put in place EMRs and support systems for systematic and efficient recording of patient data, leveraging EMRs is also required to offer

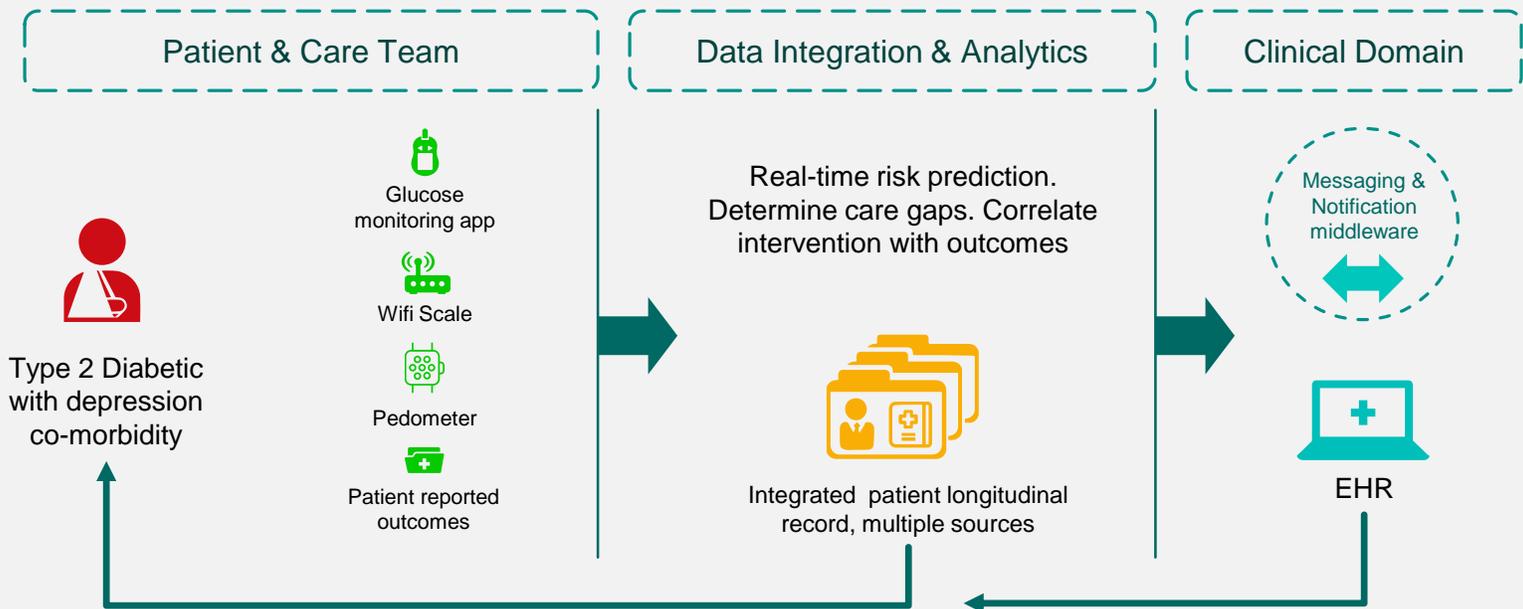
providers feedback that leads to measurable improvements in clinical and operational performance..

Traditional business intelligence (BI) software today only provides periodic reports in form of extracts and after-the-facts reports. These tend to be more quantitative in nature than actionable. Whereas a real-time analytics system or tool provides a continuous cycle of current and updated data along with content-rich and quality information. These actionable reports happen with the help of intelligent algorithms that track data footprints. The result is an automated action based on historical analytic models combined with live context and business. This allows the software to offer the required data at the point of inquiry, thus assisting human real-time inquiries within the user interface (UI).

Clinicians enter inquiry categories or monitoring factors and the system constantly maps and displays the information in real-time. Software tools now track all patients incidents, from admissions to discharge, checkups to lab results and instantly serve this information into analytic algorithms, which then populate risk modeling dashboards in real-time. These user interfaces (UI) or dashboards display this information in either patient specific or population-wide information based on categories of information - such as hemoglobin counts, blood pressure trends, diabetes risk and heart diseases.

The healthcare decision makers and providers use this information, models, and predictions to monitor populations, assess care formats and processes, alter care methods and plan for better care delivery.

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Healthcare apps offer healthcare practitioners real-time data to monitor patients at risk with Type 2 diabetes. In addition, historical data has shown that the prevalence of depression is significantly higher in patients with Type 2 diabetes compared with those without. Untreated comorbid depression can have serious clinical implications because depression contributes to poor self-care, reduced treatment adherence, and poor glycemic control. Data analytics can

combine these insights to offset broader population implications for known comorbidity factors.

Changes in patient data relative to glucose levels and other health considerations, such as fluctuations in weight or activity levels, are conveyed real-time to healthcare providers. Armed with these data points, practitioners can begin early intervention for both diabetes and depression.

REALIZING THE POWER OF REAL-TIME ANALYTICS IN POPULATION HEALTH – BENEFITS

By accepting digitization and combining it with healthcare protocols, providers are realizing the benefits that real-time analytics can provide from single-physician offices to multi-provider groups to large hospital networks to even governmental agencies.

Modern healthcare technology benefits -

Reduction of Costs – There is an increasing

concern as to how hospitals and care providers are losing money resulting from the failure to use available clinical data. A real-time analytics tool can:

- Help identify highly profitable and less useful services.
- Understand expensive treatments and their providers and how to mitigate expenses.

- Develop an efficient claims process that helps cut costs while improving operational efficiency.
- Curb a trend from reactive, last minute high-level investments in cures to a proactive preventative approach.
- Enhancing Patient Outcomes – The possibility of readmitted patients or patients undergoing the same treatment without experiencing its benefits is a challenge that needs to be addressed. A real-time analytics tool can:
 - Understand and enable key performance indicators to detect risks and analyze trends.
 - Use patient data from various sources and provide tangible predictions and suggestions of better care outcomes.
 - Translate clinical data and other related data into useful information displayed on user-friendly dashboards.
 - Help fine tune treatments while reducing lengthy hospital stays and readmissions.
- Offers improved tracking of the performance of newly enabled care methods or population treatment acceptance trends alongside their outcomes.

Helping critical decisions – Understanding whether an investment in new healthcare technology is required, or whether a new insurance plan will work or whether a certain new health campaign awareness is necessary. These are critical decisions. A real-time analytics tool helps:

- Model data to assist care providers in making better decisions related to investments in new healthcare technology.
- Predict certain cancers or other manageable diseases allowing insurance companies to come up with proactive plans to reduce progression in at risk populations.
- Create awareness campaigns to identify various high budgeted costs along with the potential costs of panic to the population. Hence, having real-time information that enables the provider to campaign for better health practices of prevention will help in the manage responses.

Enabling tracking of performance over time – determining whether a certain course of treatment is working or a prevention campaign is on the right path. This information is very important. A real-time analytics tools enables:

- Improved reporting and patient-centric care coordination.
- Ensures providers have complete patient information in real-time.

Real-time analytics tools and software develop data models that enable decision makers to design and prepare evidence-based solutions that lead to continuous improvement of the management of population health in the long run.

STRATEGY & TARGETS



Strategy & Targets



Strategy Definition



Opportunity Assessment



Scenario Analysis



ROI Assessment

Clinical Opportunities

A

Knee & Hip Surgery

B

Heart Surgery

C

Members with Chronic Conditions

Baseline Analysis

Category of Care-based Analysis

- Size, Growth trends, Drivers

Population-Based Analysis & Segmentation

- Variance Vs. National & Local Benchmarks

Data Aggregation



Centralized Data Store

Information Integration

Account History



Data Source

Medical Claim

Enrollment

Provider

Lab

RX

Client Team

CONCLUSION

Pilot projects using real-time analytics for better healthcare delivery are already showing promising results. It is no longer sufficient to just store aggregated data when organizations have the tools to mine actionable insights from high-value data resources. Healthcare providers and organizations are adopting intelligent systems and predictable tools that can be leveraged to outline high-risk population sets and proactively intervene. Data analytic tools assist healthcare providers in identifying and preparing for the emerging trends of healthcare trends. Insightful data creates opportunities for continuous improvement and networks that enhance population health management by focusing on patient state-of-health (SOH) stratification, chronic disease management, incentive management, and point-of-care management.

Data analytics of population health concerns enable a constantly improving healthcare system, collaborated networks and better population health.

About Scalable Health

Scalable Health is healthcare division of Scalable Systems focused on providing innovative products and solutions in healthcare and life sciences market.

www.scalablehealth.com

About Scalable Systems

Scalable Systems is a Data, Analytics & Digital Transformation Company focused on vertical specific innovative solutions. By providing next generation technology solutions and services, we help organizations to identify risks & opportunities, achieve sales and operational excellence to gain an innovative edge.

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