Smarter Healthcare across the Lifecycle with Analytics

Sponsored by IBM

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Executive Summary

Healthcare is rapidly evolving from volume-based care to value-based care. Analytics is at the forefront of this transformation. By delivering a single Analytics platform with AI capabilities for the healthcare care ecosystem (payers, providers and producers), IBM is helping healthcare organizations manage costs, innovate and improve patient outcomes.

The Growing Value of Integrating Data Analytics in Healthcare

Healthcare spending in the U. S. accounts for almost 18% of the GDP.[1] All stakeholders in the healthcare/life sciences ecosystem (Figure 1) – Payers (Governments, Insurers, Employers, etc.), Providers (Hospitals, Clinics, Physicians, Diagnostic Centers, Pharmacies etc.) and Producers (biopharmaceutical companies, clinical research organizations (CROs), medical device and diagnostic firms) – are collaborating and using Analytics in novel ways to reduce costs and risks, innovate and improve patient outcomes.

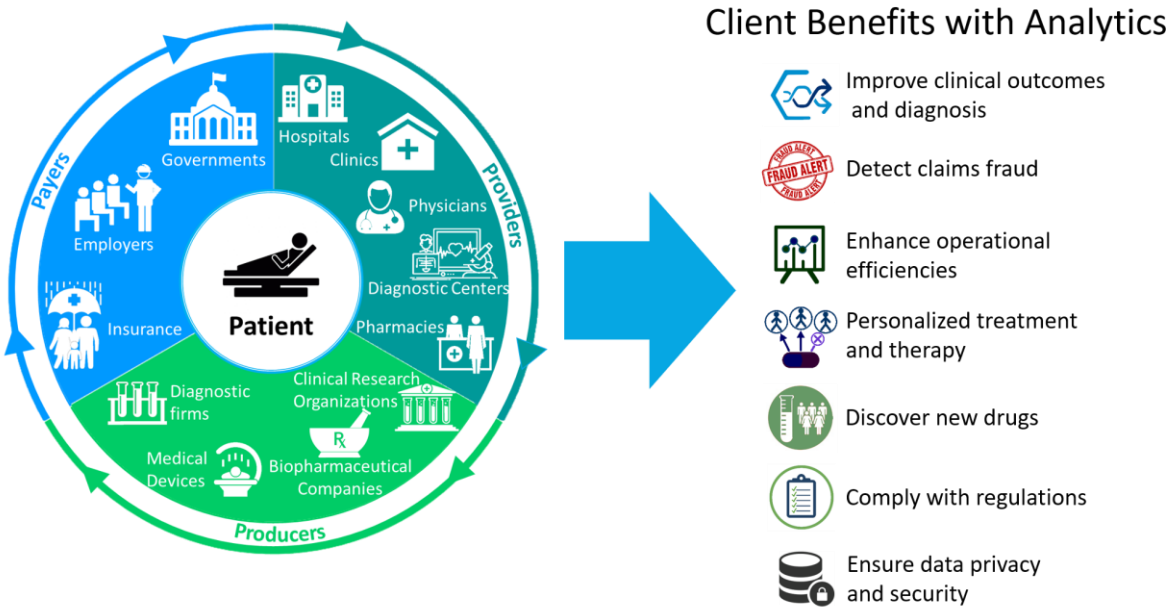

Figure 1: Healthcare/Life Sciences Ecosystem and Benefits from Analytics

For the healthcare ecosystem, Analytics is not only driving many benefits (Figure 1) but is also at the core of several emerging technologies (Figure 2) that are driving a transformation from volume-based care to value-based care: Secure Telemedicine, Electronic Health Records (EHR), Augmented/Virtual Reality, Internet of Things (IoT) and new forms of human-machine interactions based on Artificial Intelligence (AI)/Machine Learning (ML).

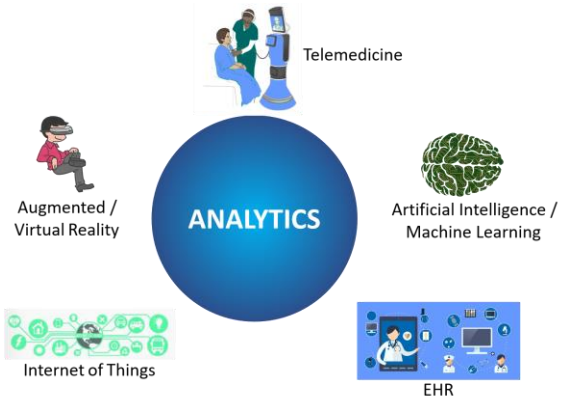

Figure 2: Emerging Technologies in Healthcare

For years, healthcare organizations have been aware that they are drowning in data but starving for insight. To get deeper and actionable

[1] CMS.gov, December 6, 2016.

Healthcare analytics market is expected to reach $29.84 billion by 2022, at a CAGR of 27.3%

insights from the massive volumes of data they possess, healthcare companies are investing in specific point Analytics solutions.

Figure 3 depicts some key high value use cases enabled by Analytics – from Saving Time and Cost to Health Information Exchange to Emergency Care to Fraud Detection and more. Consequently, the healthcare analytics market is expected to reach $29.84 billion by 2022, at a compound annual growth rate (CAGR) of 27.3%.[2] This growth is attributed to more government initiatives to increase EHR adoption, growing pressure to curb healthcare costs, availability of big data in healthcare, more venture capital investments, rising focus on improving patient outcomes and technological advancements such as advanced analytics.

Personalized medicine and value-based care driving need for integrated Analytics

Personalized medicine and value-based care are further driving the need to accelerate the speed and increase the scope of decision making. Siloed data analytics solutions are becoming more cumbersome and often unable to deliver the best patient outcomes especially as the volume, velocity and variety of data continue to explode. Analytics must be integrated throughout the entire healthcare value chain: planning, operations and service (Figure 3). IBM provides this single Analytics platform for healthcare organizations.

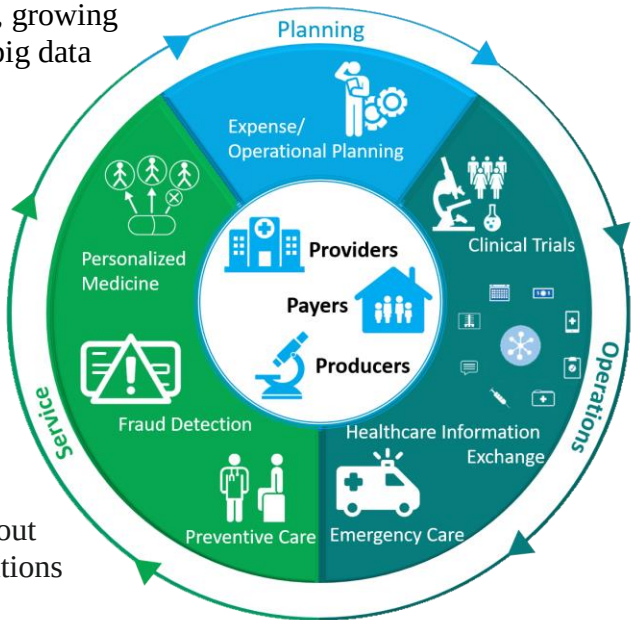

Figure 3: High Value Use Cases with Integrated Analytics

Accelerate Value with a Single Analytics Platform from IBM

The Analytics landscape is evolving rapidly; giving healthcare organizations unique abilities to progressively solve complex problems and to get higher value (Figure 4 – next page):

Rapidly evolving Analytics landscape enabling healthcare organizations to progressively solve complex problems to get higher value

- **Descriptive** analytics is dominant today and condenses data into nuggets of insights summarizing what is the plan and what happened.
- **Diagnostic** analytics examines and drills down into data in greater detail to understand the causes of events and behaviors and determine why did it happen.
- **Predictive** analytics uses a combination of several statistical, modeling, data mining, and **AI/Machine Learning** techniques to analyze data to make probabilistic forecasts about what will happen next.
- **Prescriptive** analytics goes beyond descriptive, diagnostic and predictive analytics and typically includes optimization to recommend what should we do.

Most organizations base their future actions predominantly on descriptive analytics (hindsight or past behavior) which is easy to understand. However, advanced analytics are more difficult to perform and implement: getting the required data is hard, and specialized software and integration protocols are needed to build a seamless analytics chain from descriptive through diagnostic, predictive, prescriptive and AI/ML.

[2] https://www.marketsandmarkets.com/PressReleases/healthcare-data-analytics.asp

IBM provides a single analytics platform for the entire lifecycle: descriptive to diagnostic, predictive to prescriptive with AI and Machine Learning capabilities

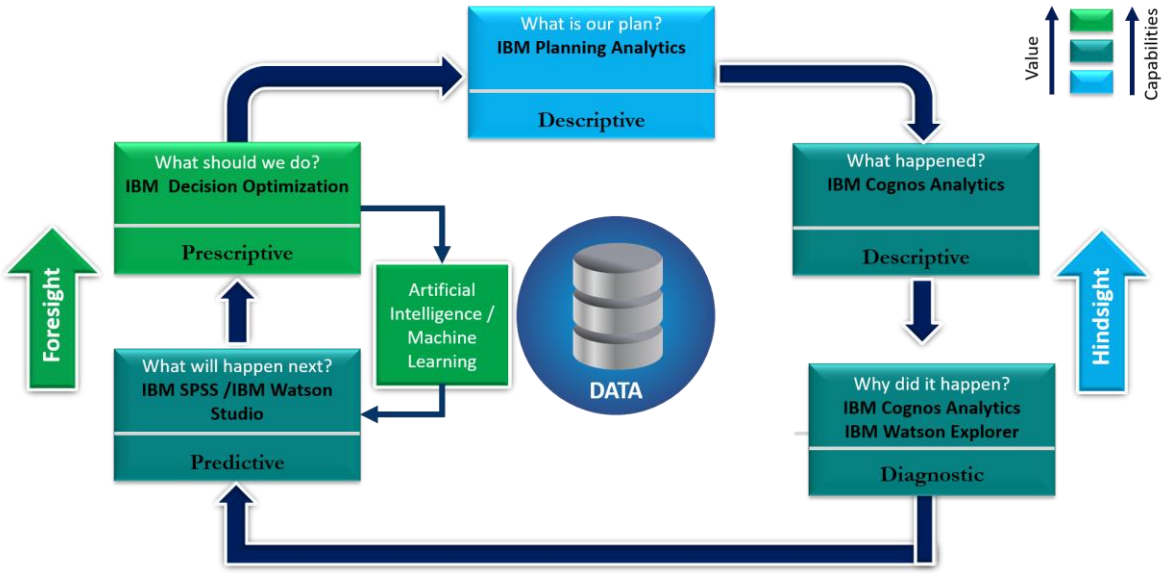

Figure 4: The Virtuous Analytics Lifecycle: IBM Analytics Portfolio (Value Increases Clockwise)

Advanced analytics has the potential of generating $300 billion of value per year for the U.S. Healthcare system.

Advanced analytics has the potential of generating $300 billion of value per year for the U.S. Healthcare system. But to date only 10 to 20 percent of this value has been realized because of a range of interoperability, data-sharing and regulatory barriers.[3]

By centralizing data and analytics to overcome these impediments, providers can better predict readmissions, and improve diagnoses and clinical decisions to lower hospital costs by 60 to 70 percent. The pharmaceutical industry can identify the right target population for drug development, which can reduce the time and cost of clinical trials by 10 to 15 percent.

The IBM Analytics portfolio (Figure 4) helps centralize data and analytics and provides the first and perhaps the only end-to-end ecosystem of data, analytics and AI capabilities and expertise. Available on the cloud, on-premises or in hybrid deployments, the IBM portfolio is an integrated solution that helps healthcare companies uncover insights from data to improve business processes and deliver better patient outcomes.

IBM Planning and Cognos Analytics provide a robust foundation to leverage all information across the organization

IBM Planning Analytics is a planning, budgeting, forecasting and analysis solution that has a customizable workspace for cost center owners and business managers. It can be deployed on-premises or in the cloud and helps organizations automate manual, spreadsheet-based processes and link financial plans to operational tactics.

IBM Cognos Analytics is an integrated business intelligence and analytics solution with several components designed to meet various organizational information requirements. It is a unified environment (on-premises or on the cloud) to support data discovery, ad-hoc analysis, managed reporting, score-carding, and monitoring of events and metrics. IBM is integrating more AI into Cognos to reflect the growing importance of "Smarter BI & Analytics" to make self-service analytics a reality for business users with:

- Easy to use smart data discovery capabilities for business analysts and data explorers

[3] McKinsey Global Institute, "THE AGE OF ANALYTICS: COMPETING IN A DATA-DRIVEN WORLD", December 2016.

With more AI and Machine Learning capabilities and solutions like IBM Watson Explorer, SPSS/Watson Studio and Decision Optimization, healthcare organizations can accelerate business value

- Automated predictive analytics and machine learning, enabling users to interact with data, systems and applications simply and conversationally via natural language; helping augment our understanding of the world with big data insights
- An integrated environment supporting self-service data exploration, dashboard and infographic creation and managed reporting
- Ability to understand and analyze data to better predict outcomes.

IBM Watson Explorer provides access to insights from all internal, external, structured and unstructured data, mitigating the risk of missing any key piece of data and helping to improve business performance and growth.

IBM SPSS provides an intuitive graphical interface, empowering users to build models without programming and quickly deliver predictive insights to applications across their organizations.

IBM Watson Studio accelerates the machine and deep learning workflows required to infuse AI into the business to drive innovation. It provides tools for data scientists, application developers and subject matter experts to collaboratively and easily work with data and use that data to build and train models at scale.

IBM Decision Optimization is a proven prescriptive analytics solution that enables healthcare organizations to solve a breadth of complex optimization problems using general programming language APIs like Python, Java, or with powerful optimization engines. As an integral part of IBM Watson Studio, users benefit from all its data science features.

This single analytics platform accelerates business value for healthcare organizations.

How Healthcare Organizations Benefit from IBM Analytics

By delivering a single analytics platform (Figure 5) with AI capabilities across planning, operations and service, IBM is helping healthcare organizations reduce costs, improve efficiencies, drive innovation and deliver better patient outcomes.

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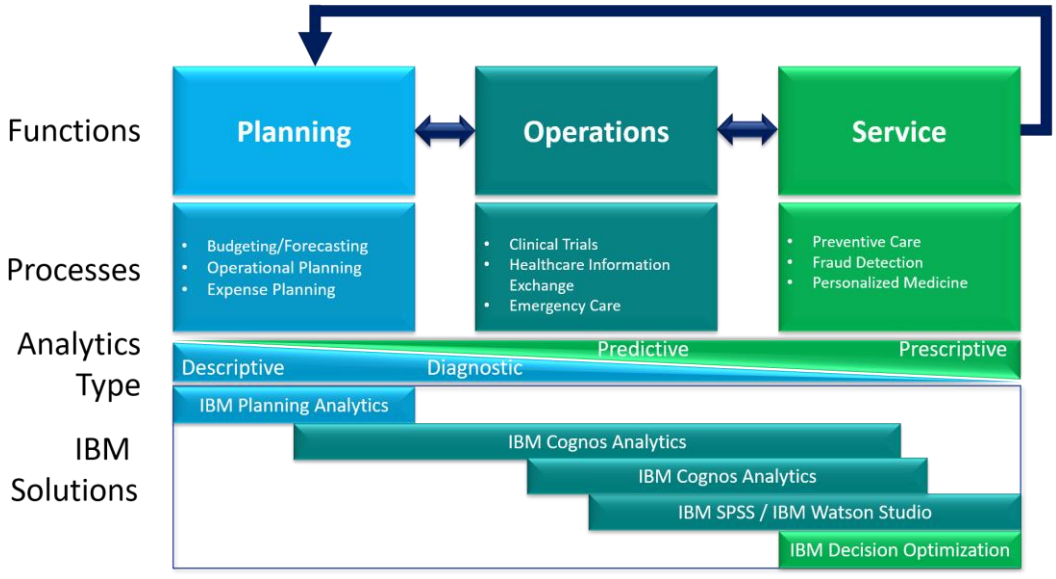

Figure 5: IBM Analytics Portfolio Streamlines Planning, Operations and Service in Healthcare

Integrates planning, operations and service

AI/ML alone could help U.S. payers and providers reduce fraud, waste and abuse by $20 billion to $30 billion

IBM provides a robust foundation and proven analytics solutions to help healthcare organizations reduce risks and costs, improve planning, streamline operations, innovate and deliver better patient outcomes

Planning: IBM Planning Analytics and Cognos Analytics help healthcare organizations analyze data across multiple sources for budgeting, forecasting and operational/expense planning. Executives can improve resource allocation, reduce patient waiting times, get real time alerts of risks and improve patient care by integrating operations and service data.

Operations: With better planning and with IBM Cognos Analytics and other IBM Analytics solutions that provide greater foresight, hospitals can improve emergency care, comply with regulations, ensure a patient's treatment is seamless as they move from one physician to another and get reports on potential drug interactions so that patient safety is never compromised. Pharmaceutical companies and CROs can optimize drug dosing and efficacy, identify the right target population, improve clinical trials administration and glean deeper insights from the data.

Service: With IBM SPSS/IBM Watson Studio, IBM Decision Optimization and other IBM Analytics solutions with AI/ML capabilities, physicians can personalize care with better disease prediction, precision medicine and prevention therapies. Hospitals and clinics can automate and optimize hospital operations, reduce costs and automate, speed up and increase the accuracy of diagnostic tests. Payers can identify high-risk patient groups, provide incentives to reduce risks, and lower fraud, waste and abuse (FWA). In fact, just AI/ML alone could help U.S. payers and providers reduce FWA by $20 billion to $30 billion.[4]

Summary and Recommendations

Analytics is a game-changing business opportunity for healthcare organizations to transition from volume-based care to value-based care. While many healthcare organizations are already invested in descriptive analytics that provide hindsight, leaders are investing in AI/Machine Learning capabilities that provide deeper and more personalized foresight on disease prediction, prevention and treatment, and potential fraud, waste and abuse. This requires a strong foundation to leverage all the data about current performance.

With Cognos Analytics and Planning Analytics, IBM is probably the only software company that provides this robust foundation and proven solutions across the entire analytics lifecycle: from Data to Descriptive, Predictive and Prescriptive Analytics with AI/Machine Learning capabilities. This foundation includes expertise in data and analytics governance, so organizations have confidence in their data.

With a flexible pricing model, the IBM Analytics solutions portfolio helps healthcare organizations reduce risks and costs, improve planning with greater foresight, streamline operations, innovate and deliver better patient outcomes.

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[4] https://healthcare.mckinsey.com/sites/default/files/2018_Using-machine-learning_Infographic.pdf