



Effective Patient Management Using Business Analytics

Whitepaper

Introduction

In 2013, America, spent \$3 trillion equivalent to 15% of the GDP on healthcare. According the CEO of Aetna “The health care system wastes more than \$765 billion each year – that’s 30 percent of the health care spending.” The healthcare industry is also in a tumult with the recent changes in healthcare laws demanding a radical transformation in the current scenario in not only driving down costs but also ensuring the improvement of care.

The Affordable Care Act (ACA) provides more Americans access to affordable, quality health insurance, and aims to reduce the growth in health care spending in the U.S. One of the ways the ACA has manifested is- the steady move away from sick care, which revolves around hospitals, to a greater focus on wellness and disease prevention. That's good for health care, but can force hospital cuts. At the same time, the ACA is magnifying Medicaid-related problems — such as slow and declining reimbursements— by increasing the number of people on the state and federal insurance program¹.

The implementation of Health IT and Analytics will not only help reduce inefficiencies, redundancies and administrative costs but will also significantly contribute to improved patient care. A new survey from the [American Health Information Management Association](#) finds that 95 percent of the more than a thousand healthcare industry professionals queried believe that "high-value information" is essential for improving patient safety and care quality.

This paper discusses the use of business analytics in health care with a special focus on the use of business intelligence in effective patient management.

Analytics in Healthcare

How can we provide safer, more cost-effective care to patients? What’s the financial payoff for quicker recoveries and short hospital stays? What’s the right mix of services at a particular location to ensure optimal care? The mountains of information available with providers can be better leveraged to answer these tough questions, nurture future growth and drive high quality care.

Analytics can improve patient care by improving treatment pathways, measuring and improving outcomes, reducing medication errors etc.

Some of the non-clinical areas in which the use of business analytics will have most benefit in shortest time are in cutting administrative costs, increasing reimbursement rates, reducing payments for fraudulent claims and improving efficiencies in procurement.

How can Analytics Help?

With the implementation of electronic health records now, the amount of clinical data ripe for research and analytics is on the rise. For many healthcare provider and payer organizations, analytics can provide answers to previously unidentified questions about costs, revenues, trends, treatment outcomes. Analytics can also highlight correlations that would enhance profitability or quality of patient care.

Analytics in healthcare can contribute to improvement in three main areas- financial management, healthcare management and operational management.

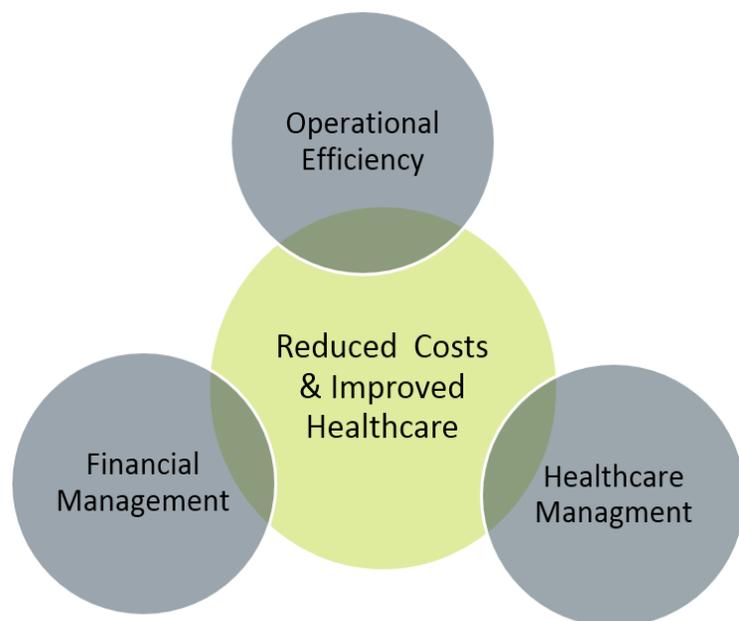


Fig: Benefits of Analytics in Healthcare

Analytics can improve the bottom line for a provider by enabling better revenue management, effective cost control measures and vendor analysis. Analytics can also help in the discovery of new revenue opportunities, supply cost optimization and more efficient fraud identification.

Operational efficiency can be gained by optimizing workforce utilization. Some of the ways this can be done are by improvements in scheduling of doctors and nurses, tracking sickness/absence of staff, and by relating employee output to cost.

Administration costs in terms of maintaining, transmitting and sharing information can be reduced. The time to access patient records is also reduced. People costs can be significantly reduced by analyzing and encouraging good performance.

Benefits in Patient Management

The ACA includes guidelines for the establishment of accountable care organizations (ACOs) under the Medicare Shared Savings Program. ACOs are organized groups of providers who get paid based on their patients' medical outcomes rather than on how many tests and procedures they perform. The new accountability measures for insurance companies also stress the need for improved care and better patient management.

Better healthcare can be provided by using analytics to improve patient scheduling, planning for predictable/seasonal changes in disease numbers, reducing medical errors, standardizing clinical care, reducing repetition of medical tests and sharing relevant information securely among clinicians.

Analysis of historical data can help in identifying the cost effective and ineffective treatments. Better disease management is possible by targeting early prevention rather than late stage expensive ones. Better understanding of trends enables better preparation - for e.g. influenza during a particular season. Quality of healthcare can also be improved by identifying risk factors and improving efficacy of care.

Efficient ways to ensure compliance to national and international health standards can be planned and achieved. The patient data can be presented differently to payers and providers to enable better decision making.

Analytics can generate insights that significantly improve the value of patient care. A new study published in the July 2014 issue of [Health Affairs](#) shows how big data analytics is helping pave the way toward reduced costs, with respect to patient management. The 6 key factors identified are:

Managing high-cost patients

5 percent of patients account for about half of all U.S. healthcare spending. These high cost patients can be identified by trends in patient history and actionable methods can be arrived at to handle them.

Readmissions

As many as one-third of readmissions may be preventable – by customizing interventions to patients (analyzing patient history), monitoring specific high risk patients after discharge and ensuring a low ratio false positive (rate of patients flagged for an intervention to patients who actually experience a readmission).

Triage

Effective triage is key to foreseeing complications when a patient first receives care in the hospital setting. This is important, to manage staff and bed resources, to ensure the patient is sent to the correct unit for care and overall it informs the management of the patient's care. Analytics makes triage timelier and easier as data from multiple sources are combined and are accessible at a single click.

Decompensation

As patients' conditions worsen, certain organs may fail to adequately compensate for the systemic stress of a disease. But there is often a period in which physiological data can be used to determine whether the patient is at risk for decompensating. Effective analytic systems in this area must use multiple data streams to detect decompensation, as many new technologies are becoming available that can be used to better monitor patients.

Adverse events

Adverse events are expensive, and can result in high rates of morbidity and mortality. But they're preventable at high rates, especially in three areas – renal failure, infection and adverse drug events. These are specific opportunities where analytics can realize cost savings.

Treatment optimization

When it comes to chronic diseases affecting multiple organ systems, correctly managing these systemic problems is essential to keep costs down. Analytics can greatly contribute to cost savings in the management of chronic diseases.

Key Components of Patient Management

Areas where business intelligence applications can be used to ensure improved clinical success are,

- Improvements in business process efficiency by tracking and analyzing pain points
- Patient registries to help identify high cost patients, track length of stay etc.
- Outcomes analysis to determine readmission and success rates
- Quality program reporting
- Care team support
- Patient safety and risk management reporting and analysis
- Patient satisfaction - including physician feedback and opinions on admission/discharge process, diagnostics, accommodation, nursing, nutrition etc.)

A selected list of metrics that can be tracked by business intelligence applications are,

- Mortality
- Average length of stay
- Denials summary- by specialty or by payer
- Medication errors
- Clinical outcomes of a disease by age and/or by time to treat
- Analysis by disease- number of cases admitted, treated, partially or fully recovered

Business intelligence also allows patient related documents like discharge summary, patient medical profile, patient details/history to be viewed in multiple formats like excel, word, pdf etc. The documents can also be shared securely among providers.

How to Implement Healthcare Analytics?

The process of implementing a Healthcare Analytics software is similar to any other software development lifecycle. It involves gathering requirements, design, development and validation. But there are a few key points to keep in mind to ensure a successful BI implementation².

- 1. Get the right data at the right time** - It is essential to ensure that there is sufficient data available to plot the progress in critical areas. This would require first analyzing business processes and trends in the business. Secondly, the frequency at which the data will need to be reported on, for each department within the organization needs to be identified.



Fig:
Implementing
Healthcare
Analytics

2. Define where the data is - The majority of the analyses will be applied against existing data that has been collected through the hospital system and internal applications. But there will be some data that will need to come from third party entities and other public or federal groups.

3. Share the value with the rest of the group - In most successful organizations, the executive team realizes that in order to keep the finger on the pulse, one must have a near real-time exposure to stats, scorecards and other meaningful measures. So it would be beneficial to share the capabilities and value of BI within the organization’s context with the management and executive teams.

4. Define reporting and analysis intervals - For the data to be properly analyzed and have meaningful use, it must be obtained from the production system at different intervals. This will be stored at different processing data repositories. But in order to avoid performance issues, one must plan the different extraction and processing frequencies ahead of time.

5. Select the right tool for you - There are a variety of BI tools, from spreadsheets, to OLAP and reporting tools. Some are open sources, while others are provided under the SaaS model. But really, the tools that need to be implemented would depend on several things: overall data size, current platform, in-house skill set, physical architecture, mobile app capabilities and support.

Another component to selecting the right tools is actually identifying the analytical data model for your specific needs. There are several third party vendors that specialize in business performance management and can reduce the customization and building time for the healthcare organization.

6. Hire help if you are not sure - Many healthcare organizations have the talent needed to implement the BI. However, given the complex requirements (that require a deep understanding of the data model, metadata, data integration complications, quality, analytics, and different management metrics) it is usually recommended to work with a third party vendor, if budgets permit, to ensure that at least the initial implementation is done right, and in a timely fashion. It also important to ensure that the internal team is involved in all the steps so that they can take over and ensure that future BI needs are met internally and kept in-house.

Use Cases of Successful Implementation

Health care organizations are always looking to reinforce operations so that the entire organization is running at peak efficiency, particularly in the face of competition. This requires an in-depth understanding of how well the organization is

operating relative to its own historical trends, its peers, and the overall market. Instead of measuring performance in absolutes, decision-makers can use key performance indicators to gain a bigger picture of organizational efficiency. Rather than absolute measures, such as patients per month or revenues per service line, administrators can track performance relative to market growth, strategic objectives, or peer groups.³

The Pain Center of Arizona is a network of clinics spread across multiple locations in Arizona. The organization is using business intelligence to optimize a wide range of activities from patient management, referral management, staffing and billing to even marketing. Better information leads to better decision making. For example, it is easier to select the most appropriate service mix for a region, determine best partnerships with referring providers or payers or define initiatives that result in reduced costs per visit. Technology has essentially become the glue for its various departments, linking critical information together to help it learn more about the process of care delivery and where to make adjustments and improvements.

Martin's Point Health Care offers another perfect example. As a not-for-profit organization, the company has to deliver services to its 126,000 members and patients in the most cost effective way possible, without compromising health outcomes or quality of care. The challenge of making people healthier and more satisfied while driving down medical expenses is never easy. But with business analytics in place, Martin's Point is producing clinical profiles of its patients and alerting physicians about potential gaps in care to prevent complications and reduce patient risks. For example, if a patient with diabetes needs specific tests done in a timely fashion, a report alerts the patient's primary care provider that the missing tests should be scheduled. The same technology is used to identify and track health plan members at risk for developing chronic disease or suffering a serious event such as a heart attack or stroke. This heightened, proactive insight capability helps Martin's Point continually monitor performance and implement improvements quickly and precisely to improve health outcomes⁴.

Conclusion

In a perfect world, health care organizations could focus 100 percent of their time on delivering top care to its patients. Unfortunately, in the current economic climate, with declining cash reserves, health care organizations must also keep a close eye on the business side of health care delivery, oftentimes making difficult decisions on allocating resources and prioritizing initiatives, be it financial or workforce-related.

To help contain costs, health care organizations can do more than identify and mitigate unforeseen shifts in volumes, resources, contracts, and quality measures; in the process, they can also more easily identify and action ways to improve the clinical outcomes for their patients.

Through detailed business analytic capabilities, decision-makers can assess how results change over time, in different locations and across various service categories. In practical terms, this level of insight makes it easier to make the tough calls on which resources, initiatives, locations, or services may no longer be sustainable. It allows decision-makers to target marketing efforts, roll out new service lines and improve productivity by streamlining workflow and eliminating inefficient processes.

For a successful implementation of BI and in a patient-centric environment, there are many complex tasks that need to be addressed. Some are related to showing value and engaging the leadership to back the initiative, and others relate to

all the technical requirements for a successful install and deployment. But whether you're focusing on cost-effective care, logistics, ER, nursing dashboards, cutting administrative costs, increasing reimbursement rates, reducing payments for fraudulent claims or improving efficiencies in procurement- all of these areas have meaningful data that will help ensure the organization's goals are met at all levels.

1 [Courier.com](http://www.courier-journal.com/longform/news/investigations/2014/04/26/doctors-worry-obamacares-impact-hospitals/8152137/) - <http://www.courier-journal.com/longform/news/investigations/2014/04/26/doctors-worry-obamacares-impact-hospitals/8152137/>

2 [Health IT Exchange](http://searchhealthit.techtarget.com/healthitexchange/meaningfulhealthcareinformaticsblog/top-7-steps-for-a-successful-business-intelligence-implementation-in-a-meaningful-use-era/) - <http://searchhealthit.techtarget.com/healthitexchange/meaningfulhealthcareinformaticsblog/top-7-steps-for-a-successful-business-intelligence-implementation-in-a-meaningful-use-era/>

3 [Health Care Blog](http://thehealthcareblog.com/blog/2010/05/03/the-changing-face-of-health-care-how-business-analytics-can-improve-performance-drive-efficiencies/) - <http://thehealthcareblog.com/blog/2010/05/03/the-changing-face-of-health-care-how-business-analytics-can-improve-performance-drive-efficiencies/>

4 [Health Care Blog](http://thehealthcareblog.com/blog/2010/05/03/the-changing-face-of-health-care-how-business-analytics-can-improve-performance-drive-efficiencies/) - <http://thehealthcareblog.com/blog/2010/05/03/the-changing-face-of-health-care-how-business-analytics-can-improve-performance-drive-efficiencies/>

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About Ducen

Ducen is a technology consulting company specializing in advanced business intelligence, data integration, application development, collaboration, and performance optimization solutions. At Ducen, we solve our customer's most challenging IT problems by giving them the tools they need to tap into critical business data to improve the decision-making process. Our end-to-end IT solutions incorporate the latest technologies and techniques to help our clients achieve increased sales, higher margins and improved profitability.

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About Analance™

Analance Business Intelligence (BI) software offers the latest in data analytics, helping customers uncover more meaning from data to drive smarter decisions and improve overall operational effectiveness. With Ducen's Analance BI suite, we help customers easily capture, integrate, visualize and analyze data to make more informed decisions that positively impact their business. Our leading edge solutions help to quickly and dynamically explore organizational data, investigate trends and patterns, uncover hidden facts and share insights across the organization.

Analance Business Intelligence platform offers a powerful administrative tool that is easy to deploy and maintain, providing maximum personalization for all your user groups. The software leverages operational data from relational and multi-dimensional sources to deliver highly enriched interactive reports. As a result, you get up-to-the-minute data to make more well-informed decisions that drive new levels of performance and productivity.

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