



- THE STATE OF HEALTH ANALYTICS IN 2013:
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The State of Health Analytics in 2013: Improving Quality and Lowering Costs

Introduction

Spurred in part by federal incentives for electronic health record (EHR) adoption under the Health Information Technology for Economic and Clinical Health Act (HITECH), the U.S. healthcare system has become increasingly digitized. Simultaneously, federal regulations and market pressures are transforming the healthcare landscape as organizations seek to improve cost containment and quality of care. The shift from paper-based, fee-for-service care to a value-based paradigm has been supported by health information technology capable of collecting electronic data from robust health information systems. In fact, electronic healthcare data analysis is a critical component for new healthcare delivery models, such as accountable care organizations (ACOs). Healthcare organizations can use analytics to harness real-time information from a variety of data sources to respond to the needs of patients and providers in a timely manner, improve quality, reduce costs, identify and track disease outbreaks, and manage large patient populations.

While the importance and practice of analytics has rapidly grown in the healthcare industry over the last decade, it is unclear how and for what purpose data intelligence is being leveraged by many organizations. This paper presents the results of a national survey on how healthcare organizations are using data analytics to improve care. A case study from Baptist Health in Kentucky is provided to demonstrate successful real-world applications of analytics in action.

Methodology

eHealth Initiative (eHI) collaborated with the College of Health Information Management Executives (CHIME) to conduct a national survey assessing the use of data and analytics across healthcare organizations. Comprised of 16 questions, the survey examined attitudes toward data use, trends in business use cases for data and analytics, the technological solutions employed by organizations, and associated challenges and barriers. The survey was disseminated online to chief information officers and other C-level executives at a variety of healthcare organizations including provider groups, hospitals, health systems, and health information exchange organizations. The survey was fielded over a four-week period from May 30 to June 28, 2013.

Results

In total, 102 organizations responded to the survey, representing an array of healthcare stakeholders including hospitals (37%), integrated delivery networks (33%), academic medical centers (13%), and others (See Figure 1).

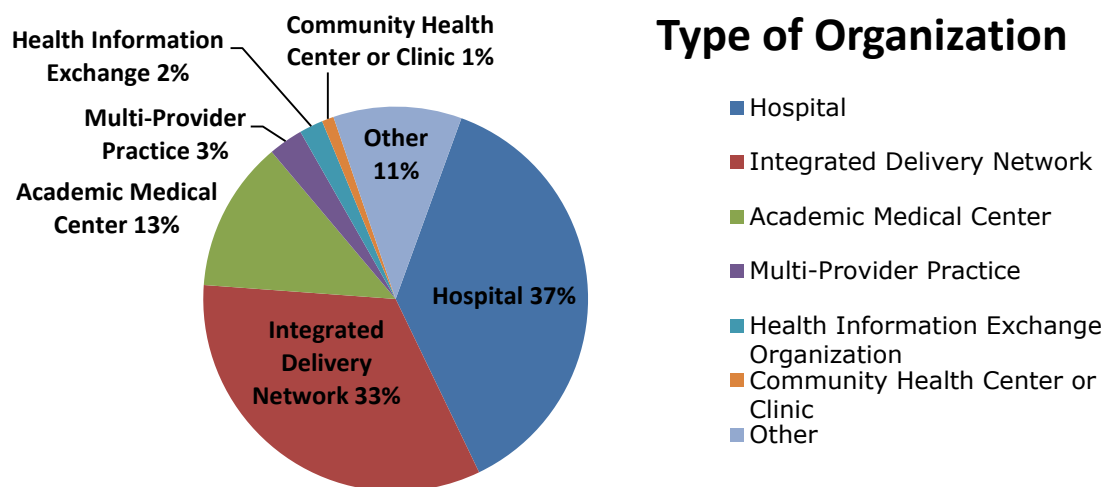


Figure 1: Types of Organizations Responding to Survey

Respondents' attitudes toward data and analytics reflect a common understanding of the potential impact and benefits of using data and analytics to help drive organizational decision-making and action. A large majority (82%) indicated that bi-directional sharing of clinical and/or patient data with local healthcare organizations is important or very important to their organization. It is likely that increased pressure to meet data sharing requirements under the federal EHR Incentive Program has contributed to this belief. Additionally, nearly 80 percent of respondents felt that leveraging big data and predictive analytics is important to their organization's strategic plans and priorities. However, the reality on the ground may not match the desires of respondents. Eighty-four percent believe that the application of big data and predictive analytics is a significant challenge for their organization. Only 45 percent of respondents feel that their organization has implemented a flexible and scalable plan to adapt to the growing volume, liquidity, and availability of electronic health data.

Nonetheless, survey results indicate that most respondents have begun to apply data analytics for a number of different functions. Discussed below are five key analytic applications that respondents reported in the survey.

Revenue Cycle Management

With total healthcare costs rising at an alarming rate, healthcare organizations must carefully manage their revenue cycles to remain profitable. Revenue cycle management (RCM) refers to the process of managing claims, payments, and revenue generation and relies heavily on a combination of claims data, clinical data, and analytics technology. Poor RCM can negatively impact an organization's bottom line, as claims submission errors and denied claims require time and resources to correct or resubmit. Estimates of the economic burden of denied claims on providers reach up to \$10 billion;¹ denials not only impact 10-20 percent of all claims, but also represent upwards of 90 percent of missed revenue

opportunities.ⁱⁱ Analytic tools can help healthcare organizations determine patient eligibility, validate coverage, authorize services, assess payment risk, manage submissions, and track performance.

RCM was one of the most commonly reported uses of data and analytics. Nearly 90 percent of respondents use analytics for RCM. The most common use case for analytics in RCM was managing accounts receivable metrics (82%), including denial rates, take back rates, claim/payment volumes and outstanding receivables. Fifty-six percent of respondents use analytics for evaluating key performance indicators with regional, state, or national benchmarks. Revenue cycle management is reported as a priority business area for applying analytics over the next two years by 63 percent of respondents. As economic uncertainty and rising healthcare costs remain substantial challenges for the foreseeable future, it is clear that organizations must continue to apply analytic resources to managing their revenue as best as possible.

Resource Utilization

Much like RCM, resource utilization is another critical component of a healthcare organization's bottom line. Healthcare organizations are expected to simultaneously improve patient outcomes and reduce costs, yet must do so using finite resources. For example, innovative new treatments may be effective, but they can also be expensive or require intensive care. Even with adequate financial resources to offer such services, poor utilization can contribute to system bottlenecks and other waste. The Institute of Medicine has estimated that \$765 billion is wasted annually through inefficient service delivery, excessive administrative costs, and other causes.ⁱⁱⁱ Analytic tools can help healthcare organizations better track and manage their workforce, patient volumes, services, and supply chain.

Despite the massive amount of waste in the U.S. healthcare system, organizations are less likely to apply analytics to resource management than to RCM. Seventy-nine percent of respondents indicated that their organization was using analytics for resource management. The most common reported use was estimating patient volumes, length of stay, and/or waiting times (66%), followed closely by inventory and supply chain management (46%). Only 56 percent responded that redesign and optimization of workflow and/or their supply chain would be a key analytics use case over the next two years. Though a significant number of organizations apparently realize the importance of more effectively managing resources, it is plausible that others are unwilling or unable to recognize the inefficiencies in their own systems and have therefore not devoted analytic capabilities to remedy them.

Prevention of Fraud and Abuse

Fraud and abuse is another important contributor to the poor financial health of many healthcare organizations and the U.S. healthcare system as a whole. In fact, fraud and abuse account for between 3-15 percent of annual healthcare expenditures. Fraud refers to a calculated misrepresentation of facts aimed at convincing payers to process a false claim for financial gain. Similarly, abuse refers to neglect of accepted business or medical practices resulting in higher reimbursements. While fraud is a willful act, abuse is unintentional. Common forms of fraud and abuse include improper coding, billing for services not actually provided, and providing unnecessary medical services given the patient's condition.^{iv} Analyzing billing and claims data can assist organizations in identifying fraud and abuse by predicting

expected service utilization and comparing it to actual billing information. Trends and patterns in claims data can help organizations create a baseline for behaviors indicative of fraud and abuse and further investigate as necessary.

Fraud and abuse prevention was the least commonly reported use of analytics. Thirty-four percent of respondents were not using analytics to prevent fraud and abuse, and only 26 percent of respondents viewed the use of analytics for fraud and abuse as a key business area in the coming years. Cost trending and forecasting (38%), care utilization analysis (35%), and actuarial and financial analysis (28%) were the most common analytic applications for preventing fraud and abuse.

Population Health Management

Population health management is quickly becoming one of the most important components of improving the U.S. healthcare system. As the basis for new care delivery models like ACOs, population health management entails a strategic approach to care focused on improving outcomes for entire populations, rather than just those individuals seeking healthcare. Population health management requires organizations to define a population, identify gaps in care, stratify risks, engage patients, manage care, and measure outcomes.^v Population health management encompasses education, outreach, prevention, treatment, and assessment to reach people before, during, and after they need specific medical care. Analytics is of monumental importance to population health management, given the vast amount of important health-related data to consider when caring for an entire population. Data analysis can assist healthcare organizations in recognizing populations consuming the most resources or at greatest risk for hospital readmissions, enabling them to target high-risk groups to reduce costs and improve outcomes. Analytics can also help identify trends in disease prevalence, determine the comparative effectiveness of treatment options, and derive best practices.

Of all the use cases for data and analytics explored by the survey, population health management was the most uniform in terms of equally applying analytics for different functions (see Figure 2).

Population Health Management

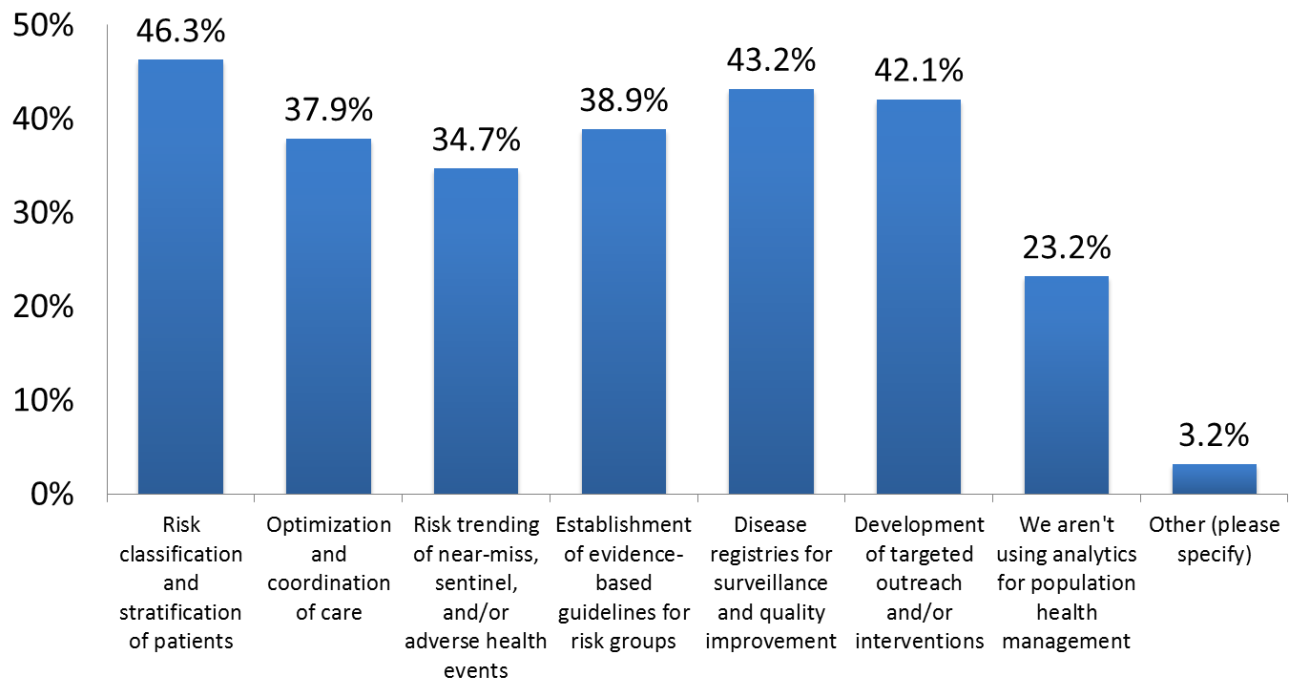


Figure 2: Analytic Functionalities for Population Health Management

As demonstrated above, there are diverse analytic approaches to population health management, ranging from risk stratification to leveraging disease registries to trending adverse events. Although nearly a quarter of respondents are not yet using analytics for population health management, more than 80 percent of respondents identified it as a key analytics business area in the coming years. With population health playing such a prominent role in health reform efforts, it is not surprising that a substantial number of organizations are looking to devote analytic resources to caring for all patients in their service areas.

Quality Improvement

The passage of the Patient Protection and Affordable Care Act in 2009 signaled a shift in federal reimbursement from fee-for-service to a value-based system rewarding quality of care, sending ripple effects across the healthcare industry. The Agency for Healthcare Research and Quality has determined that quality problems include the broad categories of variations in services, underuse of services, overuse of services, misuse of services, and disparities in quality.^{vi} Analytics can support quality improvement efforts. For example, analyzing health outcomes data for different services can pinpoint effective treatments that are not provided consistently across a patient population or geographic area.

Quality improvement was the most commonly reported use case for analytics, with more than ninety percent of organizations reporting various applications. Two quality improvement functionalities, inpatient care utilization and outcomes analysis (80%) and adverse event reporting (75%), were among

the most commonly used analytic functionalities across the entire survey. Operating room analytics and outpatient care outcomes analysis were also commonly reported (52% and 43% respectively). Quality improvement is foremost in the minds of healthcare organization leadership, with 88% of respondents identifying it as a key business area in the next two years. However, other points on the continuum of care, such as long-term care and behavioral health have yet to witness large investments in analytics resources.

Analytics in Action

As the survey findings demonstrate above, the use and application of health data and analytics is diverse. The following case study illustrates how Baptist Health used analytic tools to improve the quality of care for heart failure patients and reduce costs.

Baptist Health

Baptist Health is a 2,100 bed health system that owns and operates seven acute-care hospitals in Kentucky. Baptist Health also maintains a not-for-profit provider-sponsored health plan, two surgery centers, occupational medicine clinics, diagnostic centers, urgent care centers, and physician offices. Like many other health systems, Baptist Health has experienced high rates of readmissions due to the historical lack of incentives to more effectively manage chronically ill populations. Under traditional fee-for-service models of care, readmissions represent an important source of revenue. However, to increase quality, improve patient outcomes, and encourage a value-based approach to care, the Center for Medicare and Medicaid Services (CMS) has begun withholding regular reimbursements for hospitals that have too many 30-day readmissions for targeted conditions including congestive heart failure. Recognizing the importance of reduced readmissions, Baptist Health has launched an innovative program to analyze data and re-educate providers to reduce readmissions for patients with congestive heart failure (CHF).

A typical Medicare beneficiary with congestive heart failure often places significant strain on a hospital's resources. Each patient may see two primary care providers and five specialists in a given year, and the average cost of a 30-day readmission for CHF reaches \$13,000. Readmissions tend to be more resource-intensive to treat, and may represent care that has not been optimally coordinated. To reduce these costs and meet new quality standards, Baptist Health's readmission reduction initiative focused on readmission risk analysis, care transitions, post-discharge support, and quality measurement.

Using available data from different points along the care continuum, one of the overall goals of the initiative was to develop a single, concurrent database supporting multiple metrics for a wide array of stakeholders so as to be timely, relevant, and actionable at the point of care. Providers were able to access the database via a dashboard displaying progress on a set of "Appropriate Care Measures," which served as benchmarks for quality care and could be analyzed to determine improvement. Providers worked to identify at-risk patients using an assessment approach and communicated this to caregivers while the patient was still in the hospital. Patient stratification and risk identification were crucial in determining which patients were most likely to be readmitted and subsequently targeting interventions for them at the point of care.

To support the analytic components of the initiative, Baptist Health also took steps to increase education among its staff and alter traditional care roles. For example, clinical pharmacists were added to high-volume CHF units. Pharmacists supplemented discharge education and medication reconciliation, reducing the risk of miscommunication or adverse drug events that could ultimately result in readmission. Analysis of the data revealed that pharmacist support contributed to more cost-effective prescribing practices.

Similarly, Baptist Health focused other efforts on improving hospital discharge processes and care transitions. Case managers were available via telephone following emergency department discharge to follow up with patients and check for compliance with post-discharge instructions. A new handoff tool incorporated patient information from the perspectives of Baptist Health's hospitals and nursing homes to improve collaboration and communication. Moving forward, Baptist Health is working to create a universal transfer form. These efforts have reinforced education and increased the awareness of emergency department staff and other providers on high-risk patients and their specific needs.

As a whole, Baptist Health's CHF reduction initiative is a successful example of combining data analysis with new approaches to care delivery to improve quality and reduce costs. Data was merged from multiple sources across Baptist Health to present a full picture of the causes of CHF readmissions. This data was analyzed to identify at-risk patients, determine resource utilization rates, and assess progress on a set of quality benchmarks. Dashboards offered providers the tools needed to use this data at the point of care, and education affirmed new roles and responsibilities. As a result Baptist Health was able to achieve its goals and reduce readmissions for CHF patients at relatively low costs.

Key Challenges

The overwhelming majority of CIOs (79%) recognize that healthcare data analysis is a critical component for new healthcare delivery models and have indicated that leveraging big data and predictive analytics is a key priority. As explored above, organizations are already planning to harness information from a variety of data sources to improve quality, reduce costs, identify and track disease outbreaks, and manage large patient populations. Despite the growing importance of data and analytics, healthcare organizations still face significant challenges. In fact, most respondents (84%) view the application of big data and analytics as a significant challenge overall.

Unfortunately, many organizations project that implementing data and analytics to improve care will become more difficult in the future. Respondents identified lack of staff, lack of funding, regulatory and compliance requirements, privacy and security, and difficulty accessing/using analytic tools as issues that would be more difficult to manage in the next year. Survey results reveal three major areas of concern:

- Data accessibility
- Ill-equipped workforce
- Difficulty demonstrating return on investment

Successful use of analytics will depend upon an organization's ability to overcome these three barriers. Each area is discussed in detail below.

Data Accessibility

Analytics requires access to critical pieces of data. Patient data from a variety of sites, such as providers, labs, pharmacies, clinicians, and other stakeholders needs to be collected and integrated. Many organizations struggle as they attempt to obtain data from different sources. Over a third of survey respondents (37%) are having difficulty gaining access to data that is outside the organization (e.g. from another provider's system). Even more concerning is the fact that almost a third of respondents (28%) are struggling with access to data that is captured inside their own organization. Once data is collected, it must be combined in a manner that facilitates analysis. However, 40 percent of respondents indicated that data integration is a barrier to their use of analytics.

Ill-Equipped Workforce

Workforce issues remain a significant obstacle for CIOs. Most employees do not have the appropriate skills to support advanced analytics. Currently, the majority of organizations (76%) do not have sufficient trained staff to collect, process, and analyze data. In response to this gap, organizations (26%) are attempting to hire more full-time staff but have not found sufficiently trained candidates. Without internal staff to support analytics, some organizations (16%) are employing consultants and third-party organizations to assist with analytics.

In many organizations, adequate funding has not been assigned to support staffing needs for analytics. This problem starts at the top as executives must deal with competing priorities and demands. Given all the challenges organizations face today, a third of respondents (34%) report that senior leadership has not prioritized data analytics as a critical area for staffing. Without executive support and funding, it will be extremely difficult for organizations to advance these programs.

These difficulties are reflected by Baptist Health's experience. Though Baptist Health's leadership prioritized analytics, staff needed to be retrained to take advantage of the tools offered by their platform. Furthermore, the dashboard was specifically designed so that providers without analytic experience could view the information and understand it without impacting their workflow. Similar solutions may help alleviate the burden of workforce shortfalls for other organizations seeking to use analytics.

Difficulty Demonstrating Return on Investment

Garnering the support of executives will require CIOs to demonstrate a positive return on investment. Successful analytics programs focused on quality improvement and revenue cycle management will likely result in positive financial outcomes by reducing waste, improving administrative processes, and contributing to a reduced need for medical services. However, there is significant concern from many respondents that it will be difficult to justify the expense of implementing analytics, which can have technology costs and may impact productivity as workflows change. Only half the respondents (52%)

believe big data and predictive analytics will demonstrate a strong return-on-investment for their respective organizations.

Unfortunately, it will be difficult to demonstrate a financial benefit without having the staff and tools in place to accomplish the work. An initial investment in analytics is crucial for forecasting the impact of future programs and acclimating staff to the impact analytics tools may have on their workflow.

Conclusion

New technologies and federal health reform efforts have pushed big data and analytics into a prominent role in healthcare. Results from a national survey of healthcare organizations demonstrate that organizations are planning to use analytics to support revenue cycle management, resource utilization, fraud and abuse prevention, population health management, and quality improvement. CIOs will face a number of challenges as they delve into these new areas, and it will be vital for executives to share their success strategies as the field advances. Examples like Baptist Health are a step in this direction, as they demonstrate how healthcare organizations can successfully implement analytics to improve care while effectively equipping staff to use the new tools at their disposal.

ⁱ Fuhrmans V. "Fights Over Health Claims Spawn a New Arms Race: Insurers and Doctors Try for Upper Hand; Firms Help Both Sides." *The Wall Street Journal*. (2007). <<http://online.wsj.com/article/SB117141549626107896-search.html>>.

ⁱⁱ Andrews J. "Visibility key to efficient revenue cycle management." *Healthcare IT News*. (2010). <<http://www.healthcareitnews.com/news/visibility-key-efficient-revenue-cycle-management>>.

ⁱⁱⁱ Smith M, Saunders R, Stuckhardt L, and McGinnis JM. "Best Care at Lower Cost: The Path to Continuously Learning Health Care in America." *Institute of Medicine*. (2012). <<http://www.iom.edu/Reports/2012/Best-Care-at-Lower-Cost-The-Path-to-Continuously-Learning-Health-Care-in-America.aspx>>.

^{iv} Rudman WJ, Eberhardt JS 3rd, Pierce W, and Hart-Hester S. "Healthcare fraud and abuse." *Perspectives in Health Information Management*. 16.6 (2009): 1g.

^v Institute for Health Technology Transformation. "Population Health Management: A Roadmap for Provider-Based Automation in a New Era of Healthcare." *Institute for Health Technology Transformation*. (2012). <<http://ihealthtran.com/pdf/PHMReport.pdf>>.

^{vi} Crosson K. "Improving Health Care Quality: Fact Sheet." *Agency for Healthcare Research and Quality*. (2002). <<http://www.ahrq.gov/research/findings/factsheets/errors-safety/improving-quality/index.html>>.