



## **Clinical Analytics in the World of Meaningful Use**

**Sponsored by Anvita Health**

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### **Background and Purpose**

In June 2010, HIMSS Analytics released a white paper that addressed the use of clinical analytics in the marketplace. At that time, most of the respondents participating in this research indicated that they were actively engaged in collecting and/or leveraging both clinical and claims data to enhance patient care cost, safety, efficiency and reducing healthcare costs. Given the changes in the market environment over the past several months, HIMSS Analytics launched a second research study to investigate how the use of clinical analytics may have changed. The costs of this research were underwritten by Anvita Health. This report will outline the study and discuss its primary findings.

In our previous research, it was noted that none of the applications in the EMR suite had reached market saturation. And, while utilization of each of these applications has increased in the past year, that is still the case.

It is this growth in EMR adoption which is one of the principal drivers of the increased use of clinical analytics, since it is the patient data captured by these applications that is the primary source of the information that healthcare organizations analyze using clinical analytics tools. Spurred by Title XIII of the American Recovery and Reinvestment Act (ARRA) adoption of these technologies is expected to continue to accelerate in the future. In July 2010, the Centers for Medicare and Medicaid Services (CMS) published the final rules on the Electronic Health Record Incentive Program. According to the Federal Register, “The HITECH Act statutorily requires the use of health information technology in improving the quality of care, reducing medical errors, reducing health disparities, increasing prevention and improving the continuity of care among health settings”.<sup>1</sup> In order to meet the goals of this statement and receive incentive payments, CMS identified a core set of 14 meaningful use objectives on which eligible hospitals need to focus to qualify for incentive funds provided through the new CMS Medicare and Medicaid incentive program. Additionally, eligible hospitals must achieve five of 10 menu set objectives to qualify for incentive funds.

In addition to a focus on meaningful use measures, the industry’s shift to the use of ICD-10 (International Statistical Classification of Diseases and Related Health Problems-10<sup>th</sup> revision), mandated for the coding of all inpatient and outpatient claims beginning in October 2013<sup>2</sup>, will also impact the use of clinical analytics. Conversion to the ICD-10 coding will dramatically

<sup>1</sup> HIMSS [http://www.himss.org/content/files/MU\\_Final\\_Rule.pdf](http://www.himss.org/content/files/MU_Final_Rule.pdf) Accessed January 2011

<sup>2</sup> Centers for Medicare & Medicaid Services <https://www.cms.gov/ICD10/> Accessed January 2011

increase the granularity, and therefore the value, of diagnostic datasets. For example, this change will increase the number of codes available for identifying diagnoses and procedures from 17,000 to 155,000.<sup>3</sup> This will improve the classification of patient interactions by expanding the information that is relevant to ambulatory and managed care encounters, offer expanded injury codes and enable the combination of diagnosis and symptom codes to reduce the number of codes needed to fully describe a condition.<sup>4</sup>

The increased granularity, combined with the increased electronic capture of clinical data will yield volumes of new data for which healthcare organizations will have the opportunity to translate into information that can be used to improve the delivery of healthcare in the United States. However, for this to be successful, healthcare organizations will need both the tools to review and analyze data and an environment, such as a data warehouse in which to store and stage the data for efficient analysis.

### **Study Population and Approach**

This study was designed to understand how healthcare provider and payer organizations are using and analyzing data to obtain clinical insight. In order to achieve this objective respondents were asked to not only identify the type of clinical information they were analyzing, but to also address the questions that their organization was trying to address using this data. Respondents were also asked to identify the ways in which they were sharing data with other entities, as well as to envision how the use of clinical analytics at their organizations would evolve in the future.

In order to obtain this information, Chief Medical Officers (CMOs) and Chief Medical Information Officers (CMIOs) from both the provider and payer communities were invited to participate in a series of focus groups and one-one-one interviews. One Chief Financial Officer (CFO) also participated in the research. Respondents from the provider community primarily represented hospital organizations. A total of 14 executives, including CMOs, CMIOs and CFOs participated in this research.

Individuals who expressed an interest in the project were asked to participate in a 60-minute focus group. Two focus groups were hosted via conference call. Both groups included individuals from the provider environment. A series of one-on-one calls were hosted to get feedback from individuals in the payer market. Consistent with the focus groups, all individuals were asked the same core set of questions. Each group/person was also asked a limited number of questions that were unique to their environment. The provider organizations represented in this research ranged from a 145-bed single hospital to integrated delivery systems with more than 2,500 licensed beds. Respondents from payer organizations were required to represent organizations with a minimum of 350,000 covered lives. Each participant was offered a small stipend following completion of the focus group session or one-on-one interview.

All focus groups and telephone calls were facilitated by HIMSS Analytics. The focus group questionnaire was developed collaboratively by HIMSS Analytics and executives from Anvita Health.

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<sup>3</sup> Department of Health and Human Services <http://www.dhhs.gov/news/press/2008pres/08/20080815a.html> Accessed January 2011

<sup>4</sup> Center for Medicare & Medicaid Services <http://www.cdc.gov/nchs/icd/icd10cm.htm> Accessed January 2011

It should be stated that while this small sample size is not meant to be representative of the market as a whole, the sample population does provide an excellent point for generating discussion around this topic.

## ***Findings***

### **Drivers for Using Clinical Analytics**

In the research conducted in 2010, two key drivers for using clinical analytics to translate data into information were identified. These were achieving a high quality of care and patient safety and increasing awareness about the costs associated with the provision of care. These two factors continue to be the principal drivers in the market, as respondents indicated that they are continuing to try to provide a high level of care to individuals in their service area, while carefully monitoring and managing costs.

One way in which organizations are framing the quality of care issues is within the context of meaningful use, which has become a powerful industry driver. Because of the financial carrot of incentives when meaningful use criteria are met, many healthcare organizations (HCOs) are evaluating how they are capturing and analyzing data. All of the respondents noted that they are carefully analyzing the data that is being generated during the care delivery process and mapping that data against the process measures, such as capturing flow sheet data and changes in vital signs that have been identified in the meaningful use criteria or entering orders using computerized practitioner order entry (CPOE). And, because organizations will be required to report on multiple measures to achieve the meaningful use incentives, they are driven to find ways to be able to capture and report successfully on all measures rather than focusing on only a handful of measures.

Cost control also continues to be a key driver for these organizations, and has become an area of heightened concern over the course of the past year. Healthcare organizations are under pressure to meet increased demands for services, while at the same time containing costs. Additionally, as HCOs shift to an environment in which Patient Centered Medical Homes (PCMH) and Accountable Care Organizations (ACOs) are being touted as key solutions for the future, HCOs are looking for ways to limit their financial risk and provide care in a smarter, more efficient and more cost-effective fashion. As such, both payer and provider respondents in this research suggested that they look at data that had the potential to allow them to improve the financial bottom line at their organizations.

The provider respondents in this study are achieving this by tracking and analyzing data in areas such as cardiology and the OR that have high cost implications. At payer organizations, this may mean evaluating fraud and waste within their membership. Respondents for both types of organizations are also using clinical analytics to be able to identify areas in which there are high variances in cost so that they can make modifications in service delivery to reduce overall costs.

### **Current Use of Clinical Analytics**

Most of the respondents participating in the June 2010 research reported that they are collecting and/or leveraging clinical and/or claims data to enhance patient care cost, safety and efficiency. The respondents from the current research cited similar approaches. To ensure that

they are able to understand trends emerging within their patient population, respondents from the HCOs represented in this study reported analyzing data from wide variety of departments within their organizations. Some of the data sources identified by the respondents from provider organizations included OR, other procedural suites and the emergency department (ED). They also noted that medication, laboratory, billing and claims data were also analyzed. A number of respondents are also looking at data captured in ambulatory environments. The payer respondents in this research are also analyzing data from a wide variety of sources, including laboratory data, pharmacy data and claims (i.e. UB92) data.

The list of questions that organizations are trying to address with their data is as broad as the sources of data itself and respondents from both groups are trying to translate data into actionable information on a number of levels.

First, HCOs are looking at data at an individual level. In some cases, this is the patient. In other cases this may entail analyzing data for a single physician to evaluate overall performance. SCIP and physician quality reporting initiative (PQRI) measures were frequently identified as sources that HCOs used to evaluate the performance of their physicians.

Respondents also indicated that they wanted to be able to look at information across a larger patient population, thus enabling them to analyze trends that exist across the entire population. This will enable organizations to identify both areas where they could modify workflows and procedures to enhance patient care, as well as identify opportunities to reduce costs. For providers, this might translate into looking at data across a population of diabetics to identify that patients are maintaining appropriate hemoglobin A-1C levels. Payer respondents also reported looking at and analyzing data across all of their insured patients. Questions addressed using population data included identifying causes that put patients at risk for readmission.

Preventative care was another theme that emerged in this year's study. While the dialogue among respondents at provider organizations seemed to be focused on reducing the cost of providing care, they are also using clinical analytics to look at a patient population to ensure that patients were getting immunizations and taking other precautionary measures. Such measures ultimately reduce the need for medical intervention and higher cost services, primarily because routine screenings and other preventative well care services are much less expensive than providing care once a patient is sick. Respondents from payer organizations also cited efforts to use clinical analytics to formulate wellness programs that will ultimately reduce the number of encounters that a member requires with the healthcare provider community.

Additionally, the analysis conducted by respondents from payer organizations in a number of cases was directly tied to evaluating the cost of care. These respondents reported conducting analysis using existing data in a wide variety of areas, including underwriting policies, identifying instances of fraud and abuse and predictive modeling, all of which have a direct impact on the financial health of an insurance company.

## **Data Sharing**

In addition to patient data that is captured at the HCO that is providing care, respondents reported sharing data with other organizations such as Midas, United Hospital Consortium (UHC), Premier and Health Plan Employer Data and Information Set (HEDIS). In conjunction with their own data, these external data sources allow HCOs to create a series of benchmarking

reports that help them identify and analyze variances on their performance compared to other organizations of similar size and composition on key metrics such as length of stay, case costs and outcomes measures. Respondents from payer organizations are also relying on external metrics such as HEDIS and CAHPS (Consumer Assessment of Healthplan Providers and Systems) to direct their analysis.

Respondents from both provider and payer organizations reported that they are sharing data with other organizations through a variety of data sharing arrangements, including health information exchanges (HIEs). For instance, respondents in New Jersey, New York, Indiana, Tennessee, Pennsylvania and Nebraska reported that they are participating in HIEs that exist in their states/regions. Other respondents reported that they are not presently sharing information with an HIE, primarily because the state does not offer this ability at this time, while others reported that they are currently exploring sharing information with HIEs in their geographies.

Because they bring together data from multiple HCOs at which a patient may have seen a care provider, data sharing arrangements afford HCOs a more complete picture of a patient's medical history. This ultimately enables for more robust clinical analytics, because it reduces gaps in a patient's healthcare record. Both payer and provider respondents reported sharing information on a provider-to-provider basis, where a wide variety of information is made available, such as lab data, histories and physicals and advance directives. Data sharing is also being promoted from settings such as between pharmacies and provider organizations, so that physicians and other caregivers have an accurate view of the patient's active and past medications, regardless of who the ordering physician was. Data sharing also exists between provider organizations and the payers that serve their patients.

One area of data sharing that does not seem to be in place is sharing between payers. None of the payers represented in this research reported that they shared data with other payer organizations. HIPAA restrictions were cited as some of the key barriers to sharing information between payers.

## Reporting

As was reported in the previous research, data warehouse use among healthcare provider organizations is still not widespread in the United States. Despite the fact that there has been a growth of five percent among hospitals in the past two years, according to data from the HIMSS Analytics™ Database<sup>5</sup>, only 30 percent of U.S. hospitals presently use a clinical data warehouse/mining solution. Usage is more widespread among larger hospitals. More specifically, nearly half of hospitals with more than 500 beds use this technology, as compared to only 20 percent of hospitals with 100 beds or fewer<sup>6</sup>. Similarly, among the respondents in this focus group, not all respondents at the provider organizations represented in this sample have put a formal data warehouse into place at their organizations. Use of data warehouses was more widespread among the respondents from payer organizations in this sample; all of the respondents from payer organizations reported housing data in a data warehouse.

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<sup>5</sup> HIMSS Analytics™ Database ([www.himssanalytics.org](http://www.himssanalytics.org)) January 2011

<sup>6</sup> HIMSS Analytics™ Database ([www.himssanalytics.org](http://www.himssanalytics.org)) January 2011

Just because data is housed in a data warehouse doesn't mean that access to information is easy or timely. Clinical analytics continues to be used primarily for retrospective analyses, rather than real-time clinical decision support. The 2010 study found that there is very little use of clinical data to drive a clinician's decision in real time as care is being delivered (e.g. evidence based medicine protocols). This does not appear to have changed substantially, as retrospective reporting continues to dominate the way in which the information generated by clinical analytics is presented.

Most organizations do not permit clinicians to directly run queries to produce information directly from the data warehouse, and while there are instances in which data housed in an electronic environment can be reported using screens and dashboards that are available in the EMR environment, there are also numerous instances in which a caregiver must request this information. To facilitate these requests, some organizations have set up specific departments whose employees have responsibility for creating reports from the data warehouse and other data sources.

Use of data at payer organizations is also primarily retrospective. According to the respondents in this study, much of their data analysis is conducted after the fact to establish protocols about future patterns of care and wellness programs. And, as with their counterparts at HCOs, many payers have also established departments to handle specific types of requests for data review.

### **Challenges to Clinical Analytics**

Clinical analytics gives users the tools to turn data into information. Data can be defined as "factual information (as measurements or statistics) used as a basis for reasoning, discussion, or calculation".<sup>7</sup> Information is defined as "the communication or reception of knowledge or intelligence".<sup>8</sup> But translating data into information is not without challenges.

As noted by the respondents in the 2010 research, challenges can exist with the data itself. Getting data into the system from which the analytics is conducted is a challenge. This problem exists both in the instance that data is collected in paper format, as well as when data comes in from another source (such as prescription fill data that comes from a commercial pharmacy). Thus, organizations have to identify means for getting data into their electronic system for analysis. The solution to this challenge is often creating a plan for manually entering this data, which can be expensive, time consuming and error-prone. Concerns were also raised around the quality of the data that exists in the system: the classic "garbage in/garbage out" characterization.

Even when data is captured electronically at the HCO, there can still be issues with regard to extracting data from the source systems and transforming it into a useable format in the data warehouse. Several respondents noted that it can be complicated to map the data in the database to the appropriate field in the report, so that the analysis makes sense. This can be particularly challenging when the information is not captured at the source as discrete data elements, and may have to be manually abstracted or converted through an intermediate process.

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<sup>7</sup> Merriam-Webster <http://www.merriam-webster.com/dictionary/data> Accessed January 2011

<sup>8</sup> Merriam-Webster <http://www.merriam-webster.com/dictionary/information?show=0&t=1296067885> Accessed January 2011

Finally, there is also concern that some data elements required for data analysis might be missing, resulting in an incomplete record, thus producing an analysis which may be incomplete or even incorrect. Respondents from both the payer and provider perspective noted that in order to have a complete picture of a patient's clinical health, it is necessary to have a complete data set. This is not always possible, particularly if a patient has seen a physician or other care provider at a location that has no means for sharing information with the other sites where the patient is seen. This can also be a problem in a single HCO if the data needed for analysis is housed in multiple databases and the HCO has not devised a means to connect the data elements into elements through a single reporting tool.

In addition to the challenges surrounding the availability of the data and turning that data into information, several respondents also noted that it can be challenging to integrate the information generated from the analytics into the clinical workflow. This is particularly true in provider organizations, where physicians might find it simpler to enter data into a form using free form text instead of capturing the information in the discrete fields provided by the EMR.

Organizations are also concerned about the impact that federal regulations and other drivers will have on clinical analytics. In an environment in which it takes a great deal of time and energy to produce reports that are useful for managing quality of care and reducing costs, there is concern that evolving meaningful use requirements and other reporting measures will nullify the processes that are presently in place.

### **Future of Clinical Analytics**

It has already been noted that many analyses are conducted only through retrospective reporting. Several respondents noted that the goal at their organization is to move, wherever possible, to real-time tracking. This will afford healthcare professionals the ability for more timely intervention in the patient care process.

Respondents also believe that quantity and the quality of source data available to them for analysis will increase in the future. This additional data will come from many sources. First, as new clinical IT applications are brought online, more information from within the patient's own facility will be captured and made available for analysis. Furthermore, as means of data sharing between organizations, through entities such as HIEs, continue to develop and mature, HCOs will have access to more complete data on individual patients. And, as additional types of facilities join HIEs, it can be expected that there will be an increase not only in the data from direct care sites such as the hospital or physician office, but other sources, such as reference laboratories and commercial pharmacies. This type of information will produce a more complete picture of a patient's medical condition and the care they are receiving.

Several respondents noted that they anticipate that data will come from new sources in the future. Right now, much of the data that is analyzed comes from healthcare professionals. In the future, respondents anticipate that data input into systems directly by patients themselves. One respondent noted that his organization uses a patient portal to capture this information. Another future source of data that was identified was genetics data, with an expectation that it will impact the clinical care that a patient is receiving.

## Conclusion

Respondents confirmed that meaningful use is a key driver that will impact not only in their current environment, but as they look toward the future as well. The five health outcomes policy priorities included in meaningful use were all articulated, at least on some level, by the all of the participants in this study. These are:

- Improve quality, safety, efficiency and reduce health disparities
- Engage patients and families
- Improve care coordination
- Improve population and public health
- Ensure adequate privacy and security protections for personal health information<sup>9</sup>.

What is not directly noted on this list, but is implied, is cost, which was a key driver cited by respondents from both provider and payer organizations. For instance, by improving care coordination, through HIEs and other means of data sharing, providers will be privy to more complete patient information from multiple care delivery sites, commercial facilities and payers. This will enable healthcare providers to provide a higher level of quality care, while limiting redundancies in care, such as extra tests that were previously conducted simply because the provider did not have access to that data. It will also allow payers access to information that will help them establish preventative and wellness guidelines and identify areas in which fraud, waste and abuse can be targeted and eliminated, both activities that can ultimately reduce the costs of healthcare.

There are other ways in which the access to a complete spectrum of clinical information by both providers and payers will help to reduce healthcare costs. For instance, access to data that allows for the creation of integrated wellness programs may reduce hospital admissions by allowing patients to receive preventative care – care which is less expensive than the treatment and interventions that would be required if the progression of the patient’s condition were to require a hospital admission. In addition, improved care coordination on the provider side will help achieve payers’ desires to lower clinical costs.

Stage One of meaningful use focuses on a series of performance metrics that revolve around data capture and data sharing. As already stated, between 2011 and 2013, HCOs will have to meet a series of core and menu requirements to be eligible for incentive payments. The HCOs in this sample seem well poised to be able to begin to meet these requirements, as many were already capturing information electronically, performing clinical analytics and sharing the results of this information within their organizations. Both payer and provider organizations also participated in HIEs and other data sharing arrangements that allowed them to conduct clinical analytics on a dataset that includes patient information from multiple care site environments, claims data and data from commercial laboratories and pharmacies.

There are challenges ahead, however. For instance, not all of the organizations in this sample used a data warehouse to consolidate the information into a single data portal to enhance clinical analysis. They are also grappling with data that is paper-based and must be manually entered into their electronic environments. Finally, most of the reporting that is permitted in

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<sup>9</sup> HHS Meaningful Use Matrix  
[healthit.hhs.gov/.../gateway/PTARGS\\_o\\_11113\\_872719\\_o\\_o\\_18/Meaningful%20Use%20Matrix.pdf](http://healthit.hhs.gov/.../gateway/PTARGS_o_11113_872719_o_o_18/Meaningful%20Use%20Matrix.pdf) Accessed February 2011

the current environment affords information that can be looked at only in retrospective fashion. They will also have future considerations to address, such as an increased volume of data.

However, even as HCOs gear up to meet Stage One of meaningful use, they must plan ahead and begin thinking about Stages Two and Three. For Stage Two, HCOs can start receiving incentive dollars between 2013 and 2015, with Stage Three dollars available to qualifying organizations in 2015 and beyond. Each subsequent stage will require HCOs to not only meet new and more sophisticated performance criteria, but also demonstrate continued compliance with the performance criteria achieved in previous stages. In Stage Two, the focus will begin to shift to advanced clinical processes and in Stage Three, the focus will be to build on the previous stages to achieve improved outcomes. Analytics will play a key role in monitoring and measuring the improved outcomes that providers must demonstrate. The challenges will be great, but the potential rewards greater still.