Reducing hospital readmissions for congestive heart failure

Generate new clinical and operational insights by analyzing untapped, previously inaccessible data

Healthcare organizations are under tremendous pressure to increase the quality of care they provide, improve clinical outcomes and control their costs. Reducing hospital readmissions for patients with chronic conditions such as congestive heart failure (CHF)—the most common cause for hospitalizations and readmissions in the Medicare program—can play an important role in helping them achieve those goals.¹

For some organizations, patients with chronic conditions represent a large percentage of emergency-room admissions and require substantial hospital resources. In 2010, the direct medical costs for treating CHF alone came to approximately USD24.7 billion.² In addition, a full 24.5 percent of CHF patients in the US are readmitted to the hospital within 30 days of their initial admission.³ Because a large portion of direct medical costs results from hospital readmissions, working to avoid excessive and rapid readmissions for patients with CHF not only helps improve their quality of life, but also helps healthcare organizations cut costs and free up hospital resources for others who need care.

Reducing readmissions can also help organizations avoid fines and reimbursement penalties. New US government regulations aimed at improving hospital performance will hold facilities accountable for the care delivered during a patient’s first hospital admission by reducing Medicare payments for avoidable readmissions—and it is likely that other payers will follow suit. Hospitals must reduce readmissions to maximize reimbursement.

Employing new analytics tools for reducing CHF readmissions

To reduce CHF readmissions, healthcare organizations need ways to accurately identify predictors of readmissions so they can implement targeted preventive actions.

Identifying readmission factors requires a new approach that takes advantage of previously untapped and inaccessible information residing across the enterprise. By employing technical capabilities such as content and predictive analytics, organizations can find and extract vital information hidden in existing text-based information, which in the past
was nearly impossible to correlate with other forms of patient data. Organizations can then generate new insights to support more accurate and informed clinical and operational decision making.

**Content analytics**

Content analytics technologies are essential for helping healthcare organizations discover factors that might lead to hospital readmissions hiding within large volumes of structured and unstructured information. Traditionally, healthcare organizations have focused on analyzing structured data sources such as electronic medical records (EMRs) and billing systems. Incorporating analysis of unstructured content—ranging from doctors’ dictated history and physical notes to echocardiogram results—could hold valuable information as well. In some organizations, more than 80 percent of usable information is in unstructured forms.

Extracting information from unstructured sources is not easy. It requires advanced natural-language processing technologies that can accurately understand text-based information and effectively extract the data for analysis while keeping the extracted information in context.

**Predictive analytics**

Predictive analytics technologies enable organizations to cleanse data, run statistical models, generate scores and determine the probability for each of the factors in predicting hospital readmissions. By combining structured and transformed unstructured data, organizations can create a single view of all data and then use additional tools to find trends and discrepancies.

**Visualization and interaction**

Organizations can put the results to work by implementing dashboards with visualization, monitoring and reporting tools that can help deliver insights to executives and clinicians. Clinicians can use a dashboard to quickly identify patients at high risk for readmission and then target preventive care at this focused patient population. Executives and financial managers can use this new quantitative information as the basis for making informed, data-driven decisions. With a flexible means of visualization, a full range of users—with different needs and technical skill levels—can interact with information and benefit from new insights.

Enhancing quality, improving outcomes and reducing costs

IBM® Content and Predictive Analytics for Healthcare can help organizations reduce readmissions for CHF and other diseases—enabling them to boost the quality of care, improve clinical outcomes and control costs. The solution combines multiple analytics capabilities that extract, analyze and visualize previously inaccessible data, which in turn generates key clinical and operational insights.

Pinpointing the factors that predict hospital readmissions enables organizations to identify high-risk patients and provide personalized care, from medical treatments to social services, to improve the quality of care and reduce the probability of readmissions. Over the long term, organizations can use these insights to optimize treatment plans and fine-tune clinical protocols.

With the information gained from the solution, organizations can reduce costs and potentially increase revenues. By employing high-cost preventive measures with the highest-risk patients, organizations increase the value of these expensive interventions and avoid waste. In addition, they can more easily avoid reimbursement penalties triggered by excessive, rapid readmissions and minimize the potential resource strain caused by rising inpatient populations.

Controlling readmissions also helps accountable care organizations (ACOs) to increase revenues. In the Pioneer ACO Model created by the Centers for Medicare & Medicaid Services (CMS) Innovation Center, ACOs are rewarded for improving the health of Medicare patients and lowering their healthcare costs.

In the future, these organizations can apply content and predictive analytics to other chronic and poly-chronic conditions and expand the capabilities of the solution to explore new treatment ideas. IBM Content and Predictive Analytics for Healthcare leverages the same natural-language processing technology used in IBM Watson™ to evaluate hypotheses, learn and confidently respond to complex questions posed in natural language. Integrating the healthcare solution with IBM Watson may enable organizations to further transform care delivery and enhance efficiencies.
Uncovering hidden insights in unstructured data

One Texas health system took important steps toward reducing CHF readmissions by initiating an IBM Content and Predictive Analytics solution pilot. While this health system’s readmission rates were already lower than the national average, executives wanted to reduce readmissions further to improve the quality of care, better focus resources on high-risk patients and reduce patients’ length of stay.

Confident that analytics could drive radical change, executives created a new analytics department within the health system and engaged IBM Services to lead the solution pilot. The goal: identify key risk factors that predict CHF readmissions so the health system could apply targeted interventions.

By polling cardiologists across the organization, the team from IBM and the health system identified more than 100 possible factors that might lead to CHF readmissions. The team then applied IBM content analytics technologies to 36 months of data in unstructured formats, comprising more than 5,000 inpatient encounters.

Advanced IBM natural-language processing technologies helped the team accurately understand text-based information extracted from unstructured data formats. As a result, the hospital unlocked the value of previously inaccessible clinical information—such as smoking status, alcohol abuse and drug abuse history—from patient history, physical, consultation and discharge notes. This data would have been too arduous and time-intensive to search, extract and analyze without the IBM solution.

IBM predictive analytics technologies helped identify the leading readmission indicators. Patients who paid through Medicaid, resided in assisted-living facilities or did not have emotional support were among those most likely to be readmitted for CHF. Surprisingly, some of the common characteristics of CHF patients that were often considered to be readmission factors (such as smoking) were not significant predictors of CHF readmissions.

From this pilot, the health system learned that some of the most complete information about indicators had previously been locked in unstructured information; the data derived from the unstructured information was more complete and more accurate than these same attributes in the structured data. For example, information about a patient’s living arrangements (which was determined to be a significant predictor of readmission) was found in less than 1 percent of structured data but in 73 percent of unstructured data. Analyzing the structured data alone might not have confirmed that this factor was a significant predictor of readmissions.

“IBM Content and Predictive Analytics for Healthcare uses the same type of natural language processing as IBM Watson, enabling us to leverage our unstructured information in new ways not possible before. With this solution, we can access an integrated view of relevant clinical and operational information to drive more-informed decision making and optimize patient and operational outcomes. For example, by predicting readmission candidates, we can reduce costly and preventable readmissions, decrease mortality rates and ultimately improve the quality of life for our patients.”

—President/Chief Executive Officer, Texas health system
Moving forward with data-driven decision making

Whether healthcare organizations want to reduce readmission rates for chronic illnesses such as CHF, optimize treatment plans, enhance medical research, increase accountability or cut costs, data-driven decision making will play a vital role in achieving their goals. IBM Content and Predictive Analytics for Healthcare enables organizations to tap into vast volumes of structured and unstructured information, and deliver new, actionable insights that enhance the quality of clinical care and help improve operational efficiencies.

Building the foundation for care coordination

Extracting clinical and operational insights from a combination of structured and unstructured data is just the first step toward coordinated care. With these insights, healthcare stakeholders can visualize and analyze population-specific risk factors associated with specific groups of high-risk patients. They may use the insights to guide identification of similar patient cohorts and to inform intuitive workflow automation at the point of care. Once this foundation is in place, care delivery that supports personalized, patient-centric coordinated care across multiple facilities and care teams becomes possible. Manual, inefficient and error-prone processes and tools are replaced by technology and automation, freeing up scarce clinical resources for care delivery and prevention of costly—and avoidable—readmissions and downstream care.

For more information

For more information on how IBM Content and Predictive Analytics for Healthcare can help your organization improve clinical outcomes and reduce costs, please visit: ibm.com/software/ecm/content-analytics/predictive/healthcare.html

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3 “Heart Disease and Stroke Statistics—2012 Update: A Report From the American Heart Association,” Circulation (2012); http://circ.ahajournals.org/content/125/1/e2.full.pdf+html