Predictive Modeling
N E W S

Health-Based Consumer Analytics: Bending Trend by Design, Not by Chance

by Damon Shepherd MS, Guedem Dara MA, Caitlin Swift MA and Mary Kay Bogumill PhD

"Data Smart Solutions has related large consumer data sets using machine learning predictive modeling to current healthcare spend. With the development and implementation of this DSS Grand Model, the firm is able to predict cost/spend without the presence of health-related data on individual members. That enables customers to delineate cost much more accurately, even on members with limited or no clinical data/claims files."

Introduction

With the arrival of the Affordable Health Care Act, more individuals are seeking healthcare coverage. Generally, more business means good news for anyone marketing his or her product. In the health insurance arena, predicting the cost of each new member is critical to survival at least -- and success at best.

3M Health Information Systems Case Study: Blue Cross Blue Shield of Nebraska

Blue Cross Blue Shield of Nebraska has been providing health insurance coverage to Nebraskans since 1939. The plan serves more than 700,000 members; since 2010, BCBCNE has been engaged in innovative approaches to transforming healthcare. It started by employing risk-adjusted payment methodologies, using 3M All-Patient Refined DRGs and the 3M Clinical Risk Groups. Today, BCBSNE is also employing 3M's value-based payment models that focus on population health through care management strategies.

Less Time With Data, More Time With Members

For a number of years, BCBSNE lacked comprehensive and actionable data analytics to strengthen its care management program and impact healthcare value. To identify at-risk members, BCBSNE's care management nurses and analytics team would manually examine claims data for hospital costs, utilization trends and catastrophic events – a resource- and time-intensive process. Despite that effort, the plan still wasn't confident it had a comprehensive patient list that captured those members most at risk. On top of that, the data didn't tell the plan which individuals were the highest-cost -- a key factor in BCBSNE's value-based care program.

Having already worked with 3M Health Information Systems to change its inpatient payment system and develop value-based care contracts, BCBSNE turned to 3M's predictive analytics to improve its care management capabilities. BCBSNE set a goal of targeting those members who were costing the most and selected the 3M Persistent High-Need Individuals Predictive Model -- a tool that delivers analytics for identifying persistent super-utilizers so health plans and their providers can assign resources for the greatest impact on outcomes and costs.

3M Health Information Systems Case Study…*continued from page 1*

BCBSNE was able to quickly provide its care management nurses with a daily list of at-risk members, allowing the nurses to reach out to more members and offer them more meaningful services. "Instead of spending months and months trying to figure out the right people to reach," says Susan Beaton, senior director, Nurse Care Management and Clinical Policy, for BCBSNE, "we now have a tool that does that for us."

> *"We weren't always reaching the right members. In the past, we identified at-risk members by looking for those who had come from the hospital after an acute illness or catastrophic event. But when 3M showed us our list of persistent high-need members, we realized, 'This is a completely different population than we're used to serving.'"*
> Susan Beaton, Blue Cross Blue Shield of Nebraska

Uncovering Hidden High Costs

Traditionally, the trigger BCBSNE used to identify at-risk members had been a catastrophic event that resulted in a hospital stay. But when the medical and analytics teams started to dig into the analytics 3M provided, the plan found that its at-risk members were a completely different population than it expected. Instead of being members who experienced an acute crisis or a hospital stay, they were members who, over a period of time, had accrued high costs due to the amount and type of services they used within the provider community.

"We found that the members now identified as high-cost would have never hit one of our triggers before," says Beaton. "We never would have seen them. This was a completely different population that was actually hidden from us that we never would have identified without the 3M tool."

Changing Processes

Armed with new insights, Beaton's clinical team discovered that BCBSNE's at-risk members required a different kind of outreach than they were used to providing. Because those members didn't suffer an acute crisis, and instead held jobs and went to work every day, BCBSNE learned they had to reach out to them using new technologies, such as email and mobile, and new engagement techniques, including motivational interviewing. "We discovered they really wanted to talk with us, really wanted to engage and learn about their benefits and how to improve their health," says Beaton.

Initially, BCBSNE dedicated two care management nurses to conducting the outreach on the at-risk members list. However, the plan soon recognized this was an opportunity for all of the nurses to learn the techniques for engaging this newly identified population. BCBSNE is expanding the new approach to six nurses as well as a population health nurse. "Because we didn't have to spend months going through lists on our own," Beaton comments, "we were able to reassign those nurses without any additional staff to reach out to the at-risk, high-cost members."

> *"If I had to cut the 3M tool from my budget, I would not be able to effectively serve the members in our population and assist them in getting good, quality care. I would lose the ability to identify those who need the care the most. I would have to go back to my very old-fashioned way of trying to analyze data and never be able to stay on top of their actual healthcare needs."*
> Susan Beaton, Blue Cross Blue Shield of Nebraska

Impacting Outcomes

BCBSNE has felt the impact predictive analytics can have on improving health outcomes for members. When one woman with several conditions appeared on the list of persistent high-need individuals, Beaton's team expected her multiple sclerosis to be driving her high costs. But when they examined the data, they found the real driver was actually her mental health condition. Once nurses discovered she had six readmissions in a short period and lacked a regular psychiatrist, they quickly reached out and arranged the care she needed. "It's been five months now," Beaton notes, "and she has not had one readmission."

Visit www.3Mhis.com.

Analytics Experts Examine 2015, 2016

*W*hat will 2015 be remembered for in predictive analytics? How about 2016? What will it bring? Here's a look at two recent looks, one back and one forward.

➢ **Expert Lists Top Three 2015 Trends**

In a post on the Government Health IT website, Kathy Mosbaugh, a Vice President at LexisNexis Risk Solutions, looked back at 2015 and found that the top-of-mind issues were managing the millions of new patients in the healthcare system and understanding how elimination of pre-existing conditions would impact the market. Here are excerpts from her post. Access the complete article at http://www.govhealthit.com/news/top-3-big-data-and-analytics-trends-2015.

Trend 1: Payer and provider collaboration. "Payers and providers recognized that to be successful, they needed to engage in innovative approaches to collaboration through analytics. Using a variety of methods and data sources, they leveraged predictive analytics to reveal future risk for early intervention. Once individuals at high risk were identified, care teams developed individual plans. Looking ahead, payers and providers will need predictive analytics to reveal patient-specific underlying drivers of risks and which interventions will be most successful to improve patient care and reduce healthcare costs."

Trend 2: Physicians and value-based payment. "Data analytics were key to measuring the quality of care delivered. Payers and providers at risk for managing the health of patient populations piloted different approaches for measuring and communicating the quality of care delivered by physicians. Providers should be measured on several dimensions, including cost-effectiveness, accounting for severity of illness and the complexity of conditions they manage. Data analytics can enable healthcare organizations to measure cost efficiency in relation to severity."

Trend 3: Risk adjustment. "Risk adjustment was the answer to enabling payers to take on at-risk patients while meeting their costs. Standard risk adjustment models, which are used for payer and provider reimbursement purposes, seek to calculate the average cost of a patient population based primarily on historical claims data and limited demographics. These models are not designed to account for a wide range of specific drivers of future risks, making them insufficient, on their own, to provide reliable and accurate intelligence for population management decisions. Instead, healthcare organizations began to realize that combining risk adjustment models with more advanced clinical analytics for care management would yield better performance results."

➢ **SCIO Health Analytics Releases Predictions for 2016**

SCIO Health Analytics has released its predictions around where healthcare analytics are headed in 2016:

- There will be greater focus on educating health consumers and integrating them as key stakeholders in improving their own health.

- There will be a demand for more precision in the analytics that are generated. Analytics tools will be used to hold providers accountable for being prescriptive in the way they approach challenges. Greater precision will help providers do a better job of determining impactability and intervenability so they can apply the appropriate resources and close the loop.

- More time will be spent on reimbursement strategies, looking upstream to determine what can be done in advance of the claim to inform the process and drive efficiency. It will help the industry understand who is delivering services at a higher level of quality, increasing the level of "gold carding" (reduction of oversight or review of processes) for providers who are meeting quality, utilization and efficiency goals, thereby reducing the administrative burden.

- The need for data and transparency across domains will increase. For example, pharmaceutical companies want to understand medical claims data better to contribute more effectively to the care process and become a true partner rather than just a cost in the stream. These organizations have expertise and resources to help support PHM and disease management strategies. Expect to see more involvement and engagement from them going forward.

Adds Rose Higgins, President, North America, at SCIO Health Analytics: "Analytics hold the keys to solve many of the challenges facing us in the coming years, especially around the skyrocketing costs of healthcare and the desire to keep populations healthier. Once we understand what is occurring, we can then drive change, leading to measureable results. SCIO is clearly well-positioned to make a significant contribution to care quality and reimbursement optimization in the years to come." Visit www.sciohealthanalytics.com.

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Health-Based Consumer Analytics…*continued from page 1*

Many of the new members are predicted to arrive to insurance companies with little to none of the usual claims information -- such as Rx, medical or health screening data -- from which predictions historically are made. Additionally, there is the expectation that many new members may be more ill than average. This new landscape of healthcare coverage dramatically increases the need for predictive tools to identify near-term cost exposure.

Data Smart Solutions has long been able to provide algorithms to prioritize case management/risk management efforts. It now has developed both the machine learning modeling capability and the implementation of the modeling to predict near-term cost in the absence of direct medical information. That enables customers to predict near-term cost on members with little to no health claims data. While DSS has strong predictive capability to apply to case management and risk management, it now has the ability to apply consumer model data, without healthcare data, to predict concurrent risk, which is highly correlated with cost. That enables the customer to identify cost upfront.

This paper describes DSS' unique way of using consumer data to compute concurrent risk correlated to healthcare cost and presents the results and their practical significance in the field. DSS has also found strong correlations from consumer data to prospective risk scores/costs. Future publications will describe those efforts.

"Secondary uses of health data can enhance individuals' healthcare experiences, expand knowledge about diseases and treatments, strengthen understanding of healthcare systems' effectiveness and efficiency, support public health and security goals and aid businesses in meeting customers' needs." Safran et al. (2007).

DSS, following safe harbor regulations and in coordination with John Hopkins' internal ethics committee, combined 5.5 million individual data files containing various variables (cost, claims, wellness, risk factors, demographics, census data) with consumer file data from knowledge-based marketing solutions (842 consumer attributes). The data sets were cross-referenced and it was found that 75,978 cases in the data represented the same individual. The cross-referencing of those very robust databases at the individual level resulted in an extremely large sample (75,978), which adds statistical power to the study's outcome. According to Smith (2011), as cited in Pasek et al. (2014) p 23, "the use of consumer file data for sample targeting and as a survey corrective is growing."

Thus, using a large dataset to conduct analysis can lead to better and adequate results. As a result, those data can be successfully translated into healthier employees and offer hospitals, providers and carriers the opportunity to efficiently lower their healthcare costs with confidence. Correspondingly, Aminzadeh (2015) noted that "with bigger data pools, plans can make recommendations to promote behavior change by targeting members that are at higher risk to exhibit undesirable behavior and craft language that specifically addresses their barriers and motivations."

Data Segmentation

The full file consisted of more than 75,000 cases and 1,053 attributes. These cases were divided 80/20 into the development cases to be modeled and the test cases to test the identified model on.

Figure 1
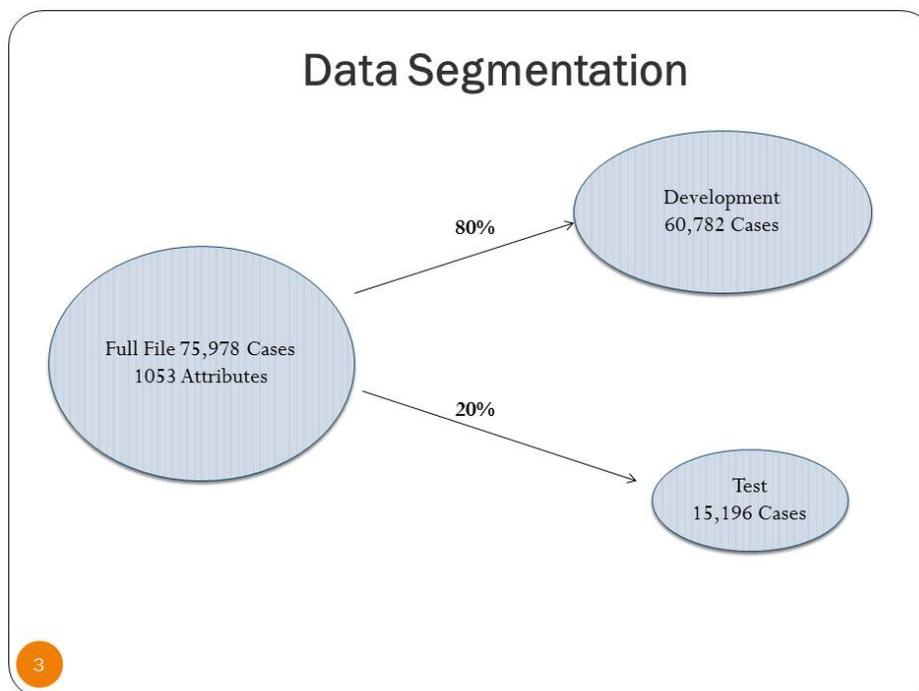
Health-Based Consumer Analytics…*continued from page 4*

The test cases allow testing the performance of the predictive results (see Figure 3) DSS computed.

Methodology and Data Analysis

Machine learning techniques were applied to consumer fields using packages of R software modeling to health attributes from Johns Hopkins Adjusted Clinical Groups System. DSS used bootstrapping method, which consisted of 5,000 samplings with replacement over 60,782 cases in order to conduct analysis of the consumer data (see Figure 2).

This method allows estimating with accuracy the development sample estimates. The computation allows identification of the different individual concurrent risk levels (see Figure 3). The purpose was to look at the attributes from the consumer file and ask the question: Is there a pattern in the consumer data file attributes that compare or map to the DSS attribute of concurrent risk?

Each sample S–i, with I = 1 – 5,000, leads to M-i models. All M-i models put together generate a Grand Model.

The study found a set of attributes that associate with concurrent risk variances, entitled the Grand Model.

Figure 2: Analysis of the Development Cases Using Bootstrapping Method
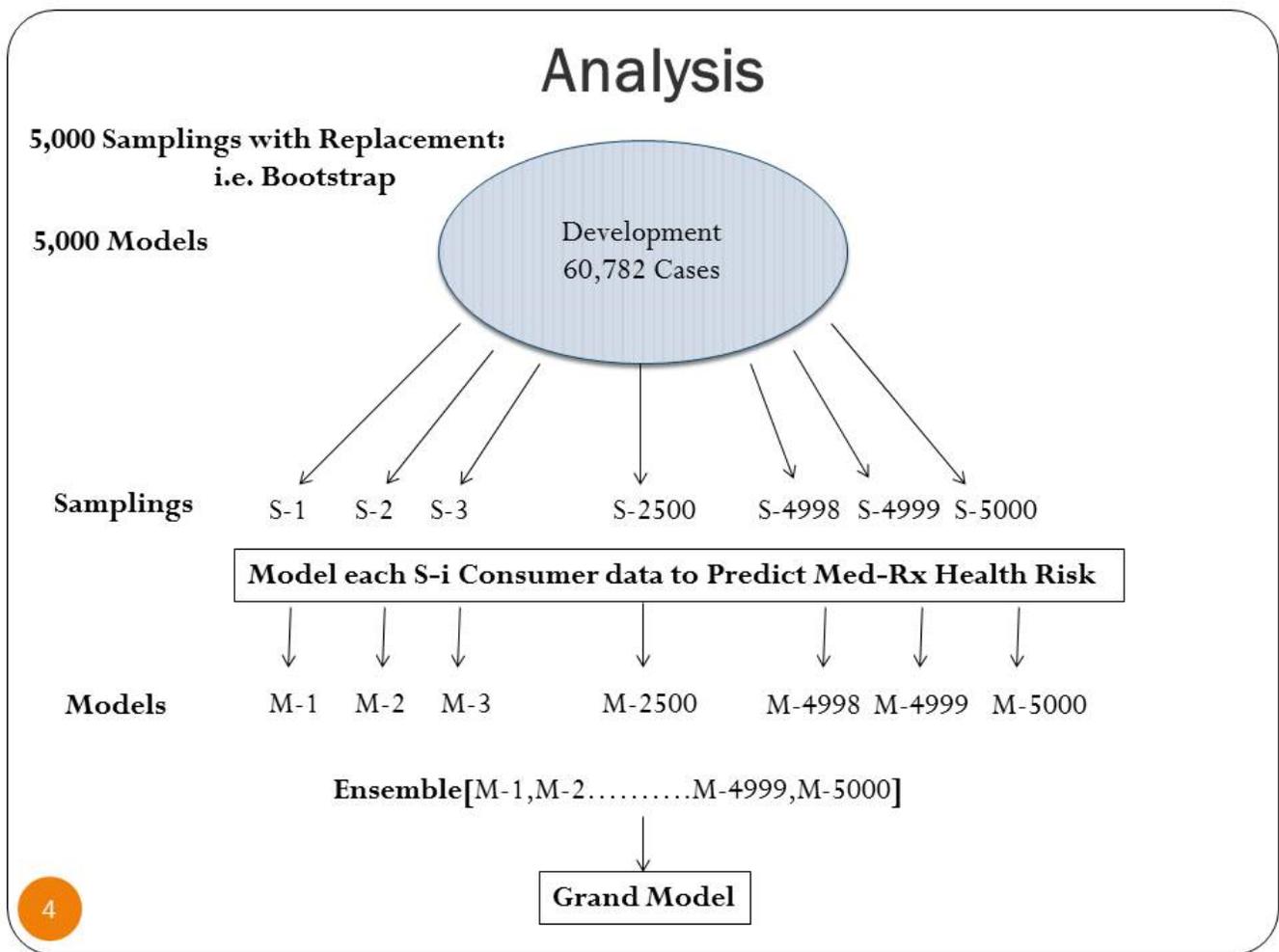
Testing the Grand Model Logic

The Grand Model computed in the section above is applied to the test sample (15,196 cases). In Figure 3, consumers are grouped by the percentage of their consumer indexed risk. Results show that the highest-ranked grouping of the consumers were more likely to spend more than $12,000 on healthcare-related items in 2014, while the low-ranked consumers were more likely to spend approximately $4,000.

Health-Based Consumer Analytics*…continued from page 5*

Testing Grand Model Logic

Test 15,196 Cases → Grand Model → Test 15,196 Cases with Prediction
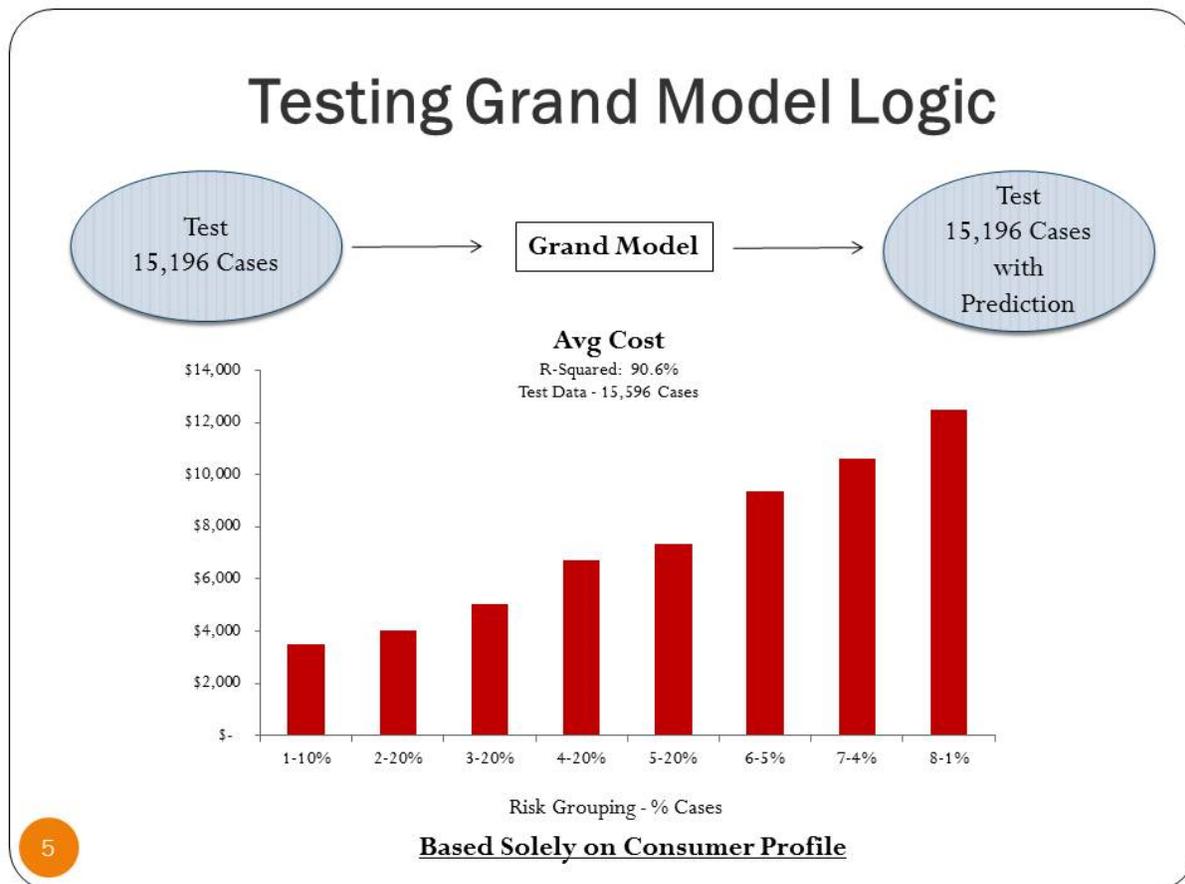
Avg Cost
R-Squared: 90.6%
Test Data - 15,596 Cases

Risk Grouping - % Cases

Based Solely on Consumer Profile

The findings were then applied to the test cases for replication. The findings were replicated at an R^2 level of 90.6%. This is a significantly strong prediction of the concurrent risk using consumer profile alone.

Interpretation of Findings

The utility and practicality of the study are clear and strong. DSS is able to provide the predictive capacity to identify concurrent risk of new or existing members from limited to no medical data with the use of consumer data. Plus the Grand Model risk indexing far outpaced standard age/sex models.

DSS is not only developing predictive models, but it also a seasoned veteran at implementing resulting complex scoring systems, facilitating health plans with real-time and complete risk identification. The statistical power behind the process is extremely strong, so that confidence in planning and premium setting can be very high. The models are also used in DSS high-performance network programs, allowing integrated clinical teams to safely move away from fee-for-service environments and allowing cost/risk to become quickly aligned between the payer and the provider. This can vastly improve plans and business viability.

Conclusion

Medical and prescription claims alone present limitations to making adequate concurrent risk prediction. However, DSS leads in the effort to provide high-functioning predictive models capturing concurrent health cost risk based solely on consumer data. The predictions in turn offer the opportunity to employers and healthcare providers to efficiently reduce healthcare cost through early detection before they become a problem.

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Thought Leaders' Corner

Each month, *Predictive Modeling News* asks a panel of industry experts to discuss a topic suggested by a subscriber. To suggest a topic, send it to us at info@predictivemodeling.com. Here's this month's question:

Q   **"How big a role in healthcare predictive analytics functions are special smartphone- and tablet-based apps playing in 2016?"**

"Smartphone- and tablet-based apps could have significant contribution both in terms of collecting data necessary for predictive analytics as well as could enable near-real-time personalized intervention and better engagement of members/patients/clinicians/care management staff. Predictive analytics efforts have traditionally relied on administrative claims data and have made progress through years by bringing in clinical data, lifestyle data, etc., but smartphone/tablet-based apps could bring to the table exciting data source to enhance predictive analytics efforts. Also, predictive analytics efforts have faced challenges around embedding insights into workflow/operations and adoption has been a missing link for many initiatives, thus diminishing the value of predictive analytics. Smartphone/tablet-based apps could open up a new frontier for member/patient/clinician/care management staff engagement."

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Industry News

MEDALOGIX

Medalogix Announces New Home Health Analytics Technology

Medalogix, a Nashville-based healthcare technology company, reports the release of Nurture, its third analytics-based solution for home health agencies. Nurture uses predictive analytics, workflows and business intelligence tools to help identify patients who may benefit from home care in the future, a statement says, and then follow through with appropriate actions to resume care. The software recently wrapped up the beta testing stage with Alternate Solutions Health Network.

"We've seen great success with Medalogix's readmission reduction analytics-based solution, Medalogix Touch," comments Doug Glassmeyer, Alternate Solutions' Vice President of Partnership Development. "We're excited to be one of two home health agencies to beta the new product to streamline our discharged patient calling programs."

Nurture analyzes EMR data to rank recently discharged patients by their potential for needing additional care. Those patients are categorized by how many days they've been off census. Their probability of needing additional care is displayed in a user-friendly ranking so clinicians can quickly understand which former patients to call first.

"We used to export a recently discharged list from our EMR, track it in a spreadsheet or within a CRM and then manually call hundreds of discharged patients each month," Glassmeyer says.

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Medalogix Announces*…continued*

"Nurture seamlessly integrates with our EMR and helps us call the appropriate patients first, which saves time and helps us reach the patients who truly need us first."

After reviewing those patients from within the Nurture platform, discharged patient callers can follow through with those patients who are likely to need additional care within the Nurture application.

Callers will be prompted with the agency's pre-defined set of questions. From there, the caller can catalog patients' responses and any notes or recordings from the calls directly from the Nurture call screen. All that information is then logged in the patients' activity history so callers can monitor trends and ensure alignment from one discharged caller to the next. If during a call the caller finds there is a medical need warranting a visit from a nurse, the caller can press Nurture's "Refer to HHA" button.

The company says it is actively working its beta clients to identify the best information to include in a document the caller can copy and paste directly into the referral component of his or her EMR, which jumpstarts the referral process.

Nurture will also deliver dashboards that enable both clinical managers and senior executives to view key utilization, performance and outcome measurements, such as call volume by user and number of calls that resulted in a referral.

Industry News

Medalogix Announces...*continued from page 7*

Upcoming releases of Nurture will include those visual progress metrics, allowing providers to pinpoint operational improvement opportunities and further improve care.

"We're thrilled an industry powerhouse like Alternate Solutions is the first to use Medalogix Nurture," comments Dan Hogan, CEO at Medalogix. "Alternate Solutions has a track record of successfully embracing technology to streamline its processes and improve patient care. Its use of Nurture provides the best feedback to further enhance our solutions for the benefit of our home health clients and their patients."

Nurture seamlessly integrates with Medalogix's other analytics-based population health management solutions to ensure continuity throughout patients' varying phases of care. For example, any patient who was identified in Medalogix's end-of-episode planning tool will appear for monitoring in Nurture.

"Overall, Nurture helps us increase the efficiency of our discharged patient planning or aftercare programs by incorporating analytics and streamlining our processes," Glassmeyer explains. "We're big proponents of combining people, process and technology to deliver the best in patient care. Medalogix helps us do just that."

Alternate Solutions has strategic partnerships with healthcare systems in Ohio, Illinois, Wisconsin and West Virginia, and is in conversation with several groups throughout the country to form more. Medalogix also offers Touch, which automates a home health clinical team's touchpoints, and Bridge, which helps identify and inform patients who would benefit from hospice care. Visit Medalogix at http://medalogix.com/.

SCIO Health Analytics Acquires Clear Vision Information Systems

SCIO Health Analytics reports it has acquired Clear Vision Information Systems of Westlake Village, CA, creators of an analytics solution and services suite that provides risk adjustment and quality metric strategies for health plans and providers. Financial terms of the agreement, which will see Clear Vision become wholly owned by SCIO Health Analytics, were not disclosed.

"Healthcare organizations are facing a myriad of challenges with unprecedented change, much of it the result of the industry's move away from fee-for-service reimbursement and toward value-based care models," says Siva Namasivayam, Chief Executive Officer at SCIO Health Analytics. "By combining Clear Vision's robust risk adjustment and quality metric analytics, as well as its outreach services, with SCIO's predictive and prescriptive analytics solutions and services focused on reimbursement and care optimization, we can help our clients manage this transition more effectively while maximizing care quality, network performance and revenue."

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SCIO Health Analytics Acquires ...*continued*

The US Department of Health and Human Services has set a goal of tying 30% of payments to value-based mechanisms such as Accountable Care Organizations by the end of 2016, and 50% by the end of 2018.

The acquisition of Clear Vision "provides SCIO Health Analytics with innovation to drive new business growth that addresses the pressing market need while extending its current analytics solution and services," a statement says.

SCIO Health Analytics' stated mission is to drive positive change in healthcare by delivering actionable insights to solve complicated problems simply and efficiently, it adds, embodied by the statement, "Once we understand, change results." Clear Vision "naturally fits into this mission by providing data transparency and actionable information to manage the risk of patient populations while optimizing reimbursement revenue," the statement continues. "It does this by offering data analytics and services in the form of SaaS around:

- risk adjustment analytics;
- quality measure reporting for HEDIS and Stars for Medicare Advantage, Medicaid, commercial and Exchange plans;
- inpatient data pursuit services for Medicare Advantage, Medicaid and Exchange plans;
- physician office prospective care gap closure; and
- data correction software."

"SCIO's approach to analytics is focused on helping healthcare organizations take actions that will make a difference in their quality of care as well as their bottom lines," notes Tom Peterson, Founder of and Chief Executive Officer and President at Clear Vision. "The two sets of technologies dovetail nicely to deliver a well-rounded picture of the changes organizations need to make to achieve their goals. We are delighted that the Clear Vision team will be able to continue to help healthcare organizations drive improvements as part of this dynamic, forward-thinking company."

Markets served by Clear Vision include government and commercial health plans/payers, providers and medical groups and ACOs.

"Clear Vision is highly respected for its innovative data analytics and ability to help both payers and providers manage risk and ensure quality more effectively," says Rose Higgins, President, North America, at SCIO Health Analytics. "We are excited at the prospect of adding these capabilities to the SCIO Health Analytics portfolio. Together, the synergies between SCIO and Clear Vision are powerful, delivering comprehensive healthcare analytics and reimbursement optimization strategies to our collective clients that will help them compete more effectively and ultimately succeed in the new world of value-based care."

Effective immediately, Clear Vision solutions and services are available through SCIO Health Analytics. Visit www.cvinfosys.com and www.sciohealthanalytics.com.

Industry News

Hindsait Selected by Magellan Health to Help Further Enhance Clinical Review Process

Hindsait Inc. reports it has been selected by Magellan Health Inc. (NASDAQ:MGLN) to provide technology to further improve Magellan's utilization management system to help increase clinical quality and outcomes. Magellan Health selected Hindsait's artificial intelligence and predictive analytics technology to enhance its ability to identify potentially unnecessary health services during the review process, a statement points out. The technology also improves consistency and productivity for Magellan's care reviewers.

Pinaki Dasgupta, Hindsait's CEO, notes that "the healthcare industry is starting to recognize the tremendous value that artificial intelligence predictive analytics technology can provide to leverage data in pursuit of better, more efficient care. We are excited to be working with Magellan Health to lead the way in this area."

Says Laurel Douty, Chief Operations Officer at Magellan Healthcare: "Magellan Health's value for our clients is grounded in a unique high-touch and high-tech approach. We worked with Hindsait for more than a year to fine-tune the particular application of predictive analytics that would enhance our efficiency without compromising quality. We are continually finding innovative ways to deliver better care at lower costs, and look forward to working with Hindsait and others in this developing area."

Hindsait turns artificial intelligence, predictive analytics and "Big Data" into healthcare business solutions, the statement continues. Hindsait's platform starts with its ability to ingest and translate physicians' "free text" in patient charts within a context of clinical guidelines and regulatory requirements. Those inputs drive machine learning and predictive analytics in Hindsait's Software-as-a-Service platform that evaluate, score and flag patient charts for specific actions.

With Hindsait's help, physicians and administrators at hospitals, health insurance plans and other healthcare payers and businesses can now "prevent more unnecessary services, correct missed preventive care opportunities, speed up provider quality reporting (HEDIS and STAR ratings) and much more," the statement adds. Visit www.hindsait.com and www.MagellanHealth.com.

SAS Envisions Healthcare System That Keeps People Healthy

"The US healthcare system is broken and undergoing exponential change, with a significant focus on data and technologies that can improve the patient experience and, ultimately, health," says a statement from SAS.

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SAS Envisions Healthcare System …*continued*

"*The Patient Revolution: How Big Data, Analytics Will Transform Health Care for Consumers*," a new book from healthcare innovation expert and SAS consultant Krisa Tailor, "offers a vision of a more personalized and pre-emptive approach that seamlessly integrates health into our daily lives," the statement adds.

Healthcare must become part of the experience economy, according to Tailor. In that context, just as consumers are defining where and how they want to shop, patients will become informed consumers and active participants in their own care, the book argues. That newly designed healthcare system – driven by data and analytics – emphasizes wellness, not just illness, it says. The care it delivers is unique for each person; no two people receive identical treatment plans.

"Tailor astutely points out that 80% of health is impacted by factors outside of the healthcare system," comments Linda Butler MD, Vice President of Medical Affairs, Chief Medical Officer and Chief Medical Information Officer for UNC REX Healthcare. "Not only that, but Amazon knows more about our patients than we do. The prescriptive analytics she describes will allow healthcare providers to use 'Big Data' to optimize interventions at the level of the individual patient. That lets them improve quality, coordinate care and contain costs. Advanced analytics will lead to personalized care and, ultimately, empowered patients."

The book covers a number of technologies shaping the future of healthcare:

- Personal health clouds that push and pull data to and from everyday devices. Part of the Internet of Things, they connect relevant health-related information to help consumers make better, more customized healthcare decisions.
- Big Data and machine learning technologies enable providers to automatically predict and prescribe. Whether it's personalizing diagnostics or a course of care, machine learning is gaining momentum for harnessing the explosion of health data.
- Data analytics uncover opportunities to support healthy behaviors. Population health analytics help health plans and providers engage and support individuals outside the clinic. And analytics tools that guide behavior, rather than simply track it, give individuals the specifics they need to create and maintain healthy behaviors.

HIMSS Analytics Launches Logic

HIMSS Analytics, a global healthcare advisor providing guidance and market intelligence solutions, reports the launch of Logic, which it calls "the most comprehensive and intuitive global healthcare IT market intelligence tool."

Industry News

HIMSS Analytics Launches Logic*…contined from page 9*

Collaboratively built with hospitals and health systems, Logic "allows healthcare providers, healthcare IT companies, governmental and education organizations and investors to gain crucial insights for guiding healthcare IT strategies," a statement says. "As a healthcare research and advisory firm, the industry depends on HIMSS Analytics' solutions to improve decision making regarding its IT strategic roadmap and market strategy," the statement adds.

Healthcare leaders and stakeholders will benefit from Logic's ability to provide insight into predictive modeling, benchmarks and value optimization of health IT, it says, including ranking and adoption of the HIMSS Analytics Electronic Medical Record Adoption Model. Logic builds off the current HIMSS Analytics Database, which stores key data insights from provider institutions across the country. New features include more visualizations and customizable dashboards that generate actionable market intelligence on demand, the statement notes. Users can quickly understand the healthcare landscape from various avenues -- from healthcare IT trends such as usage, first-time purchases, upgrades or replacements, to who the key healthcare decisions makers are at an organization and their new areas of focus.

"Our customers have come to rely on us for the most cutting-edge, reliable insights and data," says Blain Newton, Chief Operating Officer at HIMSS Analytics. "Now, with Logic, the industry can access actionable data faster than any other resource in the market. Logic is also unique in that it offers benefits for organizations both large and small -- tech giants and emerging companies alike can leverage Logic to improve their understanding of the marketplace."

With Logic, global healthcare leaders, stakeholders and influencers can benefit from the following features, the statement says:

- New Data Insights That Define the Market. Deep dives into financials, clinician and patient volumes, a healthcare organization's footprint, size, primary services offered, mergers, acquisitions or construction and participation in Accountable Care Organizations and Health Information Exchanges.
- Smarter Performance. New supporting technology powers the market's fastest generation of reports and insights with advanced filter settings that can identify facilities by their EMRAM score.
- Personalized, Flexible and Scalable. Interactive and intuitive reports and dashboards can be tailored for sales, product teams and marketing. Mobile access on any device empowers on-the-go insights.

"For providers, the road to value is an important but challenging journey," comments Adrienne Edens, Sutter Health Valley Area CIO and HIMSS Board Member. "Having the market insights into what technologies providers are leveraging -- insights that HIMSS Analytics has long provided the industry -- is an important resource for all hospitals and health systems. Logic will also ensure that providers are being approached with the services and technologies that they actually need to improve care."

Visit www.himssanalytics.org/logic.

Survey: Most Healthcare Organizations Unprepared for Precision Medicine

When President Obama announced a $215 million precision medicine initiative in his State of the Union address one year ago, many observers predicted that healthcare would quickly jump on the bandwagon, according to a statement from Health Catalyst.

Unlike a one-size-fits-all approach to medicine, precision medicine -- often called "personalized medicine" -- leverages advances in genomics and analysis of large data sets to personalize care and greatly accelerate medical research and drug discoveries, it says. But according to a new survey of healthcare executives in hospitals nationwide, few organizations are moving to adopt precision medicine. The exception seems to be academic medical centers, which have historically led the adoption of new technologies in healthcare.

59% of respondents to a survey by Health Catalyst said precision medicine will not play a significant role in their organizations in the next five years. Among respondents from non-academic hospitals and health systems, the number rises to 68% who say precision medicine will play an average, small or non-existent role in their organizations between now and 2020.

The online survey also revealed that few organizations are building genomics capabilities into their electronic health record systems. 63% of respondents overall said their organizations had no plans to integrate genomic data into their EHRs.

Proponents of precision medicine envision healthcare organizations collecting and sequencing patients' genomic data and using EHRs to generate analytical reports that physicians could use to take note of genes related to a multitude of hereditary diseases.

The survey's EHR finding is striking considering that 50% of the survey respondents believe that DNA sequencing -- the source of genomic data -- could have a positive impact on their organizations' patient treatment strategies. Recent advances in DNA sequencing technology have made the procedure, which cost up to $50,000 just a few years ago, relatively affordable at about $1,300, leading to broader use and important disease discoveries.

The disconnect between the recognition that genomics holds great promise and yet the lack of preparation for precision medicine may reflect the fact that technology adoption is often driven by research efforts at major academic medical centers, with others following in their footsteps, comments David Crockett PhD, Senior Director of Research and Predictive Analytics at Health Catalyst.

Survey results for respondents from academic medical centers were nearly the mirror opposite of those from smaller non-academic organizations.

Industry News

Survey: Most Healthcare Organizations Unprepared*…continued from page 10*

71% of the academic respondents said precision medicine will play a significant role in their organizations in the next five years, and 64% said they plan to integrate genomic data into their EHRs.

"This survey shows that leaders in academic medicine are already moving to adopt precision medicine, but the rest of healthcare has a lot of catching up to do," Crockett comments. "We live in a remarkable era of information, when all that is known about a person -- from family history and genetics to location history and environment -- can be balanced against all that is known in the medical domain. This big picture view of medical decision making can allow providers to focus both prevention and intervention on appropriate individuals, while avoiding unnecessary costs and unwanted side effects for those patients who wouldn't benefit." Visit https://www.healthcatalyst.com.

Catching Up With *…continued from page 12*

PMN: What path did you take to your present position, starting right out of college? Was it the career path you envisioned when you started?

SH: I went to the University of North Carolina at Chapel Hill, and waited until the last semester of my senior year to take that one statistics class you're required to take to graduate. Everyone told me how hard it was, and I assumed it would be the end of me, so I put it off as long as possible. Now, this part sounds like a Cinderella story. It was the third or fourth class of the semester. I remember the room and the seat I was sitting in. The professor was explaining how to use multivariate regression to predict the weather. It popped into my head that I was not too interested in predicting the weather, but that this was the way you could predict business performance and medical treatment outcomes -- and that's what I wanted to do. That's how I started.

I had a project to do for that class that was a large part of my entire grade for that course. So I decided to write a program to predict diseases. One day, while I was at my work study job in the UNC Psychometrics Lab -- I worked my way through college and this was my job then -- I was using the lab's computer to work on this project instead of doing my job. It was about midnight, and no one was around. Well, the professor I worked for walked in and saw me working on my project instead of his work. He asked me what I was doing, then said he wanted to see me in his office the next day. I was terrified. I thought he was going to fire me. As it turns out, he really just wanted to know more about my project! I explained to him that it was based on Bayes theorem, and also explained that I had already finished his work before doing my own work and I apologized for using the equipment. He did not fire me, for which I was very thankful. I thought the whole thing had blown over.

A few days later he asked me if he could use my idea to write a proposal for some grant money to see if Bayes theorem could predict diseases as well as or better than physicians could. I was just relieved to not be losing my work study job, and told him it was fine. So we wrote the proposal, got the award some months later and even held up starting the project until I graduated in a few more months. That was my first job out of college -- doing diagnoses simulations with practicing physicians across the state and analyzing the data to see if physicians were intuitively or otherwise diagnosing in any way similar to Bayes theorem. While I was at that job, I applied to and was accepted into grad school, then went to grad school part-time while working full-time. I eventually got my graduate degree as well.

That was more than 30 years ago. All of these years since then I've wanted real clinical data instead of simulated data to see if I could predict disease as well as or better than physicians can. That finally happened a few months ago. A hospital called. It was frustrated that it could not move the dial on improving the diagnosis of sepsis early enough to treat it for best outcomes. After multiple process improvement and lean operations initiatives to improve adherence to medical protocols, executives and physicians there began to question if the protocols themselves were less than optimal. The protocol was developed by a panel of experts, not from analyzing data. They had heard about predictive analytics, and were innovative and intellectually curious enough to pursue an alternative approach to the problem. For me, it all started that day, sitting in that classroom, when it popped into my head that this was a way to improve medical diagnoses. Here I am more than 30 years later. I've finally got my hands on actual patient data and the results are quite remarkable.

PMN: What occupies a typical day or week for you? What functions, activities and workload are you typically engaged in?

SH: I yo-yo back and forth. Some of it is detailed, gut-wrenching, meat grinder work, meaning the data management part. Some clients want me to start an analytics division for them, and I can be a one-person analytics shop. I can do the data management to build the analytic warehouse, then do the descriptive analytics as well as the predictive stuff. A typical week is a mix of that low-level detailed work and high-end strategic work. I just got off the phone an hour ago with an executive at a *Fortune* 500 company, for instance. I've mentored his team for its first PA project to see if there is substance to PA, to see if he could really get those high ROI returns. Sometimes I have to go for a run to clear my head between the tactical "How do you write the code to merge these datasets?" and "How do I architect this database?" and the high-end strategic questions about PA organizational issues, the "Here's the tradeoff between people and productivity, here are the risks, here are the potential payoffs" sort of strategic decision making.

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Catching Up With … Sandra Hendren MS

Senior Consultant
The Modeling Agency
Pittsburgh

Trained as a statistician, Hendren began her career in academia, but says she rapidly became frustrated at the lack of insight, innovation and application of basic statistical principles to important real-word problems. So decades ago she left academia to take her expertise to the streets, developing breakthrough analytic technologies and game-changing statistical models to drive business excellence.

Sandra Hendren MS

- BA in Psychology from the University of North Carolina at Chapel Hill.
- MS in Psychometrics (a statistical computing degree) from the University of North Carolina at Chapel Hill.
- More than 30 years' experience in analytics, data mining, analytic software development and "Big Data."
- Most recently, Hendren was Chief Data Scientist and Analytics Strategist for UnitedHealth Group, the 12th-largest company in the nation.
- Previous positions include Founder of and Managing Director at PerformaMetrics, a boutique firm that developed analytics-driven approaches to complex business problems.
- Also served as Managing Director of Hammer and Company, the business research and education firm of Michael Hammer, author of the international best-selling book *Reengineering the Corporation*.
- Also served as Vice President of Analytic Systems for Decision Support Technology and Director of Analytic Software Development and Services for Health Data Institute.
- Hendren has also held multiple adjunct faculty positions, most recently as Senior Lecturer of Strategic Management at Harvard University.

Predictive Modeling News: Characterize the amount of innovation in the predictive analytics space, especially in the area of risk adjustment models. Is there still innovation taking place, or are experts fine-tuning existing tactics and technologies?

Sandra Hendren MS: Innovation in the application of predictive analytics continues to accelerate. That's the purpose of it. One example of innovation I just developed is an algorithm to predict sepsis, a toxic response to infection. There are about 250,000 hospital inpatient deaths and more than $15 billion in extra healthcare costs each year directly attributable to sepsis. And patients who don't die from it often suffer irreparable organ damage. In this project, I found that we can predict sepsis twice as accurately and far more rapidly than the best practice medical protocol, so it can be diagnosed in time for faster treatment and better outcomes. Innovations such as that are countless in the application of PA. Police departments are predicting where crimes are most likely to occur. Departments of Social Services are predicting which foster homes need to be more closely monitored for child safety. Manufacturing companies are predicting which equipment is most likely to fail and when, preventing unplanned stoppages. These are all PA innovations that translate to money saved, lives saved and safer places for us all to live.

PMN: What will predictive modeling look like in the future? What kinds of functionality will analytics bring to the table tomorrow that clever minds are only beginning to think about today?

SH: There will be more end-user tools to do PA, the so-called "democratization of PA," or the rise of a term I recently heard, "the citizen data scientist." These will become more prolific -- and will likely generate some questionable results. I fear a similar path for PA as for reengineering, which was all the business craze back in the 90s. I was lucky enough to work for Michael Hammer then, the originator of reengineering. So I learned how to do reengineering correctly. And when done correctly, it can produce extraordinary business payback and strategic advantage. But as it became more popular, it became more diluted due to imitators – many who said they were reengineering when all they actually were doing was cost-cutting.

They failed to adhere to the original principles and discipline necessary to do reengineering correctly because to do so was hard; it took skilled people doing hard work to reengineer correctly and reap its benefits. I fear that PA is going the same way as reengineering. Any time there's a lot of buzz, companies and people and makers of new toolsets want to get on the bandwagon and grab a piece of that pie. In that process, the original intent, the original transformational concepts, the hard work behind the scenes, the training and the discipline to do something well, be it reengineering or PA, is increasingly lost. Reengineering became mainstream, and I see predictive analytics going the same route. Both reengineering then and PA in the future will be executed with highly varying degrees of success, because of highly varying degrees of capability.