

# Predictive Modeling NEWS

## Applying PM to Transform Access to Healthcare in Communities

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The number of uninsured in America increased by more than 13% nationally between 1996 and 2005. Uncompensated care costs increased 28% over the past decade. A recent study showed that uninsured patients will receive more than \$56 billion in uncompensated care in 2008.<sup>2</sup> In 2004, 44 million uninsured Americans (including those without coverage for all or part of the year) had total medical care expenditures of about \$125 billion.<sup>3</sup> Safety net providers, usually a group of amorphous hospitals, community health centers and volunteer clinics, share most of the responsibility of society to provide care to those uninsured and indigent patients.<sup>4</sup> Most safety net providers report an increase in uncompensated care due to population growth, local economic downturns and increased chronic disease burdens. Financial pressures are forcing many of those safety net providers to respond by limiting their services and their exposure to indigent patients.<sup>5</sup> However, some safety net providers are attempting to address the issue through better coordination of care for low-income patients to reduce the total cost of uncompensated care to the community.

Over 10 years ago, the safety net providers in Austin came together to do something about the lack of access to healthcare for the indigent and uninsured members of their community. It was obvious that uninsured and underinsured patients can be best served through coordination and integration of their care across the community. The broad consortium of hospitals, community clinics and local public health agencies formed the Integrated Care Collaboration. The members realized, quite astutely, that to address the myriad pitfalls and gaps in the healthcare system, the most valuable resource that could be shared among them was their information. The beginnings of a health information exchange were thus established, which has since served as a master patient index or central data repository for the participating members.

According to the *Fourth Annual Survey of Health Information Exchange at the State, Regional and Community Levels*, by eHealth Initiatives, only 32 health information exchanges are fully operational in the country. Of them, only about half are incorporated into separate legal entities.<sup>6</sup> The ICC is, therefore, a unique model of care coordination through the establishment of a health information exchange that can provide insights into addressing the issues related to uncompensated care and community safety nets. It also provides a great opportunity to use predictive modeling methodologies to improve access and disease management for the indigent.

Formed in 1997, the ICC is a 501(c)(3) non-profit organization striving to improve access to healthcare for people in Central Texas. Members include non-profit hospitals; public, volunteer and private clinics; and government and academic institutions (Table 1 – see page 2). It is currently serving an area with estimated population of over 1.5 million. The member entities are all represented at the Board of Directors level and contribute to the annual expenditures of the ICC through membership fees.

### Description of ICC Database

The ICC developed the I-Care database, which is a master patient index and clinical data repository. Member entities contribute patient data for patients identified as uninsured or underinsured to I-Care on a daily to monthly basis. Patient records are then built by the ICC in HIPAA-compliant, HL7-standard record formats, which may be subsequently accessed by authorized providers. Figure 1 (see page 2) describes the information flow and the diversity of systems that contribute to the central data repository at ICC, mainly through secured file transfer.

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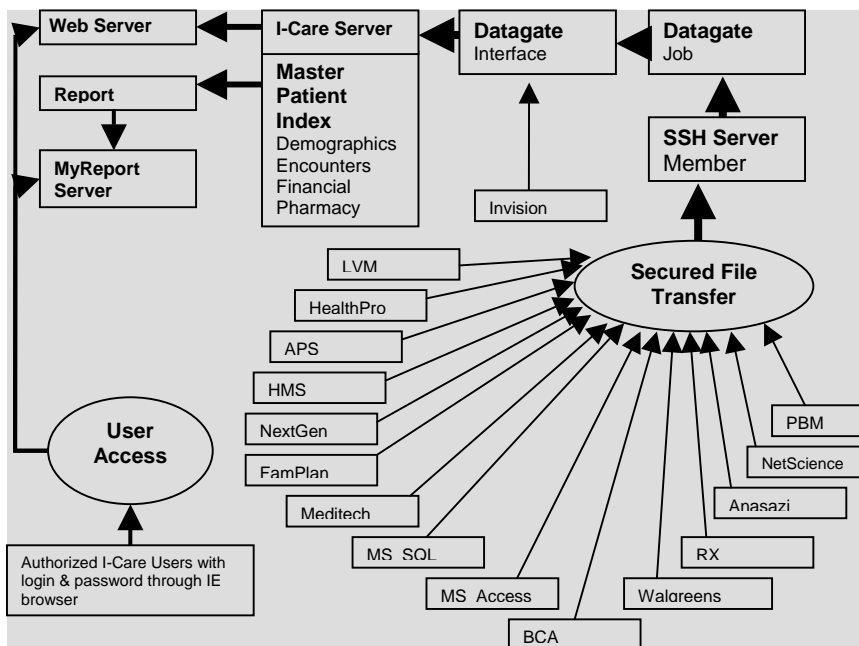
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**Applying PM to Transform Access ... continued**

**Table 1: List of Current ICC Members**

- Austin Travis County Mental Health Mental Retardation Center
- Austin Women’s Hospital
- Austin/Travis County Health and Human Services Department
- Blackstock Family Health Center
- Central Texas Medical Center
- City of Austin Community Care Services Department
- Del Valle Children’s Wellness Center, Family Wellness Center – University of Texas, School of Nursing
- El Buen Samaritano: Episcopal Mission
- Front Steps Recuperative Care
- Hays County Independent School District – Student Health Services
- John’s Community Hospital
- Lone Star Circle of Care
- National Center for Farmworker Health, Hays County
- People’s Community Clinic
- Planned Parenthood of the Texas Capital Region
- Project Access - Travis County Medical Society
- Samaritan Health Ministries
- Seton Family of Hospitals
- St. David’s HealthCare
- Travis County Healthcare District
- University of Texas Medical Branch – Austin Programs
- Volunteer Healthcare Clinic
- Williamson County and Cities Health District

**FIGURE 1: ICC Health Information Exchange**



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**Applying PM to Transform Access ... continued**

Residing on an SQL server, the information collected for most patients in the I-Care database includes: name, date of birth, sex, Social Security number, patient address, race/ethnicity, marital status, primary care provider, funding program, encounter type, location of encounter, attending doctor, admission date and time, discharge date and time, diagnosis code (ICD-9) and procedure codes (CPT-4) (Table 2). The different types of encounters sent to I-Care include hospital, outpatient, emergency department and clinic visits. Data on prescriptions dispensed is also available from some ICC Members. Patients are asked to sign an authorization for sharing data across the ICC membership. That authorization is valid for two years and is updated whenever a new authorization is provided. It allows members in the collaboration to share personally identifiable patient information across the membership in a HIPAA-compliant manner. Access to the database is strictly controlled and monitored. Users log on to the database using the Internet Explorer web browser. Users can look into a patient’s past history of utilization, diagnoses and prescriptions. The system is currently working on adding laboratory data and more prescription details from various locations.

**Table 2: I-Care database**

<b>Data Category</b>	<b>Variables</b>
Master Patient Index	Patient Name, Date of Birth, Gender, Social Security Number, Medical Record Number
Demographic data	Address, Telephone Number(s), Primary Language, Race/Ethnicity, Marital Status, Next of Kin
Clinical data	Medical Diagnoses (ICD-9), Medical Procedures (CPT-4)
Funding data	Payer or Funding Program (Medicaid, CHIP, Locally Funded Programs)
Encounter data	Encounter Type (ED, Inpatient, Clinic Visit, Etc.), Visit Date, Location, Attending Provider, Admission and Discharge Date, Time of Admission or Discharge
Pharmacy data	Prescription Start and End Date, Prescribing Provider, Amount Ordered, Number of Refills Allowed, National Drug Code (NDC) and Name of Medication, Dispense Date and Amount, Prescription Number

The I-Care database is a great data resource for its members, the community and health researchers. It currently holds data for about 700,000 patients. There are details of about 4 million patient encounters taking place in the ICC network. Data are being received from more than 70 locations in the Central Texas area. Encounter data go back to 1999, although a majority of encounter records are from 2002 onwards. More than 850,000 encounters of about 250,000 patients were reported in the I-Care database in calendar year 2007. That included more than 200,000 emergency department (ED) visits, 37,000 hospitalizations and about half a million clinic visits. Because all members have shared ownership of the database, they are keen to keep an eye on the demographic and disease trends in the community. Also, the community leadership is interested in informed policy-making based on evidence and data available in the I-Care database.

**Examples of Innovative Programs in the Community**

The I-Care database has already helped the community and its providers develop innovative interventions and initiatives to improve access for the uninsured and indigent. Here are some examples:

**ICC-Asthma Network**

The program identifies patients in the database who will benefit from an educational self-management asthma program. Patients who have had at least one hospitalization, one ED visit or four outpatient visits with a diagnosis of asthma are selected from the I-Care database. Those patients are then contacted by program staff to participate in the asthma education and training program. The patients interact with a certified respiratory therapist, who works with them to establish a medical home, guides them about medications and helps them cope with their chronic disease symptoms. Disease management software is used to capture clinical information for those patients, which is then merged with their records in the I-Care database. A recent evaluation of the program found a 40% decrease in ED visits and 95% decrease in hospitalization before and after the program in enrolled patients. The I-Care database not only helps in identifying the most appropriate patients for the program but also helps in tracking their utilization across community providers.

**High-Alert Program**

Another program that uses I-Care to identify patients is the “High-Alert” program at Seton Family of Hospitals. The I-Care database is used to identify patients who have complex needs. Besides other more specific criteria, such as having chemical dependency or behavioral issues, generally patients who have presented at an ED more than three times within a month are treated as having complex needs. After looking at the patient’s treatment history in the I-Care database, the High-Alert program coordinator and ED directors create a care plan for his or her future management.

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## Rules-Based vs. Statistical Models

Are rules-based predictive models on a par with statistical models? That question goes to the very definition of predictive modeling, and the experts *Predictive Modeling News* asked to comment had predictably diverse opinions. Here's what they had to say:

"Rules-based models imitate the human reasoning process. They were first applied in computer-aided clinic diagnostic systems, and later applied in control systems, including household electronic appliance control logics and so on. Rules-based models have the advantage of being compact and easily understood. However, they are mainly used for classification tasks (i.e., where outcomes are categorical or discrete). Although rules-based models have some predictive power, they are not on par with statistical models. Statistical models have a far richer set of algorithms and far more powerful tools at their disposal and can be applied to both classification-type tasks (categorical outcomes) and regression-type tasks (continuous outcomes). In the field of predictive modeling for healthcare, statistical models usually outperform rules-based models, as evidenced in the 2006 Society of Actuaries-sponsored study "A Comparative Analysis of Claims-Based Tools for Health Risk Assessment." Swati Abbott, MEDai Inc.

"I would suggest the core difference is one between targeted actions and outcomes. One can look at claims data to see the behaviors at play in care settings (Did this or that get ordered/charged?), but EHRs allow the opportunity to see the actual data (declining HgbA1C, weight, inhaler use) to help refine the interventions. It's one thing to know a HgbA1C is ordered, it's another to know it decreased from 10 to 7. I have always thought claims data help focus on the population needs, [while] EHRs help one pay attention to progress." Eric Anderson, Maine Medical Center

"Rules-based models are a type of predictive model, constructed from a different methodology. As with other models, they need to be validated and compared to alternative approaches." Howard Brill PhD, Monroe Plan for Medical Care

"When leveraging predictive modeling for use in care management, there are several points to consider when looking at health risk predictive models: (a) Accuracy; (b) Transparency and (c) Support for different operational needs." - Eric Chetwynd, Ingenix

"We consider rules-based predictive models to be on par with and in some cases superior to statistical models. For example, when leveraging predictive modeling for use in care management, there are several points to consider when looking at health risk predictive models: (a) Accuracy; (b) Transparency and (c) Support for different operational

needs. The 2007 Society of Actuaries study on health risk tools showed that both rules-based and statistical models deliver similar predictive accuracy when measuring health risk, as measured by a number of factors, including MAPE and R-squared. The next element to look at is the transparency of the predictive model. Statistical models tend to be "black box" methodologies, making it difficult for clinicians and others to understand what is driving the prediction. For example, the solution has identified an individual who is predicted to have a high need for medical services next year. What clinical information is driving that prediction – diabetes? asthma? orthopedics? pregnancy? Without that detail, the prediction is not clinically actionable. In addition, statistical models tend not to be as rooted in clinical knowledge (e.g. diabetes and hypertension are related conditions) and may draw connections between markers of risk that are not clinically relevant (e.g. statistical relevance between broken knees and congestive heart failure). While this may be an indication of a correlation to be studied over time, it may not be operationally useful in a clinical setting. Care management organizations need to leverage predictions that complement their clinical processes and that are compatible with their needs over time. That includes the ability to trend risk over time. Statistical models tend to "learn" from datasets each time the model is run. Because the data are always changing underneath the model, it is difficult to trend a consistent understanding of risk over time to any individual or population."

Eric Chetwynd, Ingenix

"Let's start by clarifying some concepts: all models are applied in practice through rules. Thus, however a model is developed, it is applied in a production environment via a set of rules. For example, a population is scored according to an algorithm that could include weights for the presence of conditions, age and/or geographic location. Thus a set of rules is used to score members and identify those who are high-risk. I don't think that the practical application is what is implied by the question, however. Rather, I suspect that the question is aimed at the difference between statistical modeling, and what we might refer to here as "Delphi" methods. The former models are developed by applying statistical methods (regression analysis, decision trees, neural networks) to large datasets. The latter models are constructed from first principles by knowledgeable professionals. Examples of the first type of model include the class of models known as risk adjusters. Examples of the second type of model may also be found in risk adjusters (because the clinical hierarchies on which the models were based were developed that way), but the better example is so-called "gaps in care" models. In that type of model, clinical rules are developed consistent with medical best practice (for example, beta blocker post-MI), and patients who appear not to be compliant with the rules are identified from claims data. At the end of the day, a successful model is one that produces higher predictive accuracy, whether it is rules-based, statistical or produced by one's favorite astrologer."

Ian Duncan FSA FIA FCIA MAAA, Solucia Inc.

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## Rules-Based vs. Statistical Models ... *continued*

"I work in outcomes and informatics, and often need to consider various types of predictive models in my work, though our company focuses mainly on what might be called "clinical impactability modeling" to feed clinical decision support tools and programs. A rule-based model, like a statistical (or neural net) -based model, can be useful in predicting risk for future (adverse or beneficial) health events. Widely used examples include the Ottawa Rules (for deciding whether to do an ankle or knee x-ray after an injury) or the Framingham Score (which predicts 10-year risk of heart attack from blood pressure, age, smoking status and other factors). While those rules may have been originally developed from statistical (regression) equations, they are generally used as point-scoring systems -- rules. Rules can substantially add to the utility of statistical risk models. Consider, for example, two 53-year-old males with diabetes, coronary artery disease and chronic kidney disease. The regression models will give them identical risk scores (prediction of next year's costs), but suppose patient A is taking metformin and not taking an ACE inhibitor or ARB, while patient B is taking no metformin (but is, rather, taking a sulfonyleurea) and is taking an ACE inhibitor. Patient A has much higher risk: Metformin in the presence of kidney disease can cause lactic acidosis (with a 50% mortality rate), and failure to take an ACE or ARB puts Patient A at risk for accelerated kidney disease, leading to earlier dialysis. In that illustration, clinically derived rules improve the quality of prediction (in synergy with statistical modeling), and also help with case selection in disease management programs. Resolution of those clinical issues is known to reduce risk, even if the statistical model risk score remains the same."

*Iver Juster MD, ActiveHealth Management*

"Unfortunately, both types of models fail to explain 50% or more of the observed variations between predicted and actual results." - *William Vennart MD, CareAdvantage Inc.*

"Rules-based predictive models usually allow the user to understand the clinical reasons for the prediction, whereas statistical models frequently create black box predictions that may be difficult to explain to individuals with limited statistical backgrounds. Both types of models have shown similar predictive power in testing situations. Unfortunately, both types of models fail to explain 50% or more of the observed variations between predicted and actual results."

*William Vennart MD, CareAdvantage Inc.*

"The lines blur in many ways when considering 'rule'- vs. 'statistical'-based predictive models. It may be possible to develop rule-based models without any statistical analysis, and similarly it is possible for statistical models to be devoid of any rules. However, most predictive models fall midway along a continuum. Models that rely on rules generally are developed based on extensive statistical analysis of clinical, epidemiologic and economic patterns among large populations. Most of the time those rules are then 'fit' to the client's specific population based on customized statistical analysis. Predictive models with no preconceived rules are usually based on naturally occurring patterns (i.e., found through 'data mining') within a client's data. However, in most cases, those models still rely to some extent on sets of pre-set rules or paradigms, such as diagnostic groupings or specific bundles of care encounters. Without such frameworks, those models run the risk of making little sense to the clinicians or managers who will apply their output. In sum, most rule-based models rely heavily on statistical analysis to ensure predictive accuracy, and statistical models rely on implicit (if not explicit) rules if they are to attain cogency and avoid statistical over-fitting."

*Jonathan P. Weiner DrPH, Johns Hopkins University*

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## Applying PM to Transform Access ... *continued*

The I-Care database is used to research the clinical background and utilization patterns of patients across the healthcare system. It also helps in finding a primary care physician for a patient for coordinated care. When an identified patient presents for treatment at any of Seton's EDs, a flag identifies that the patient has a care plan to guide his or her future management. Early evaluation of the program shows that 75% of "drug-seeking" patients who visit EDs to seek narcotics do not return for ED visits because attending physicians are able to see their care plans. Access to patient care plans for those complex patients has also brought about a measurable decrease in door-to-door times in their ED visits.

### **EMerge Program**

The EMerge program is an integrated behavioral health and primary care program provided by the Austin Travis County Mental Health and Mental Retardation Center in collaboration with Austin Travis County Community Health Centers. The program addresses the limited availability of safety net mental health services and the need for better coordination of services for patients with psychiatric problems that can be managed in primary care settings. Psychiatric assessment of indigent and uninsured patients is conducted at MHMR. Those in acute crisis are referred to safety net psychiatric facilities. However, those who are stable and need counseling for less-severe levels of depression, anxiety or other mental disorders are provided outpatient counseling and referred to a primary care physician in a community health clinic. In the absence of that program, many of those patients were never properly assessed for psychiatric treatment and often ended up in EDs with psychosomatic symptoms. The I-Care database provides much-needed access to information to providers at MHMR and CHCs that helps them identify safety net patients by looking up past utilization, diagnoses and medication records. The EMerge program helps reduce the burden on the limited psychiatric specialty services for the really sick patients while providing a chance for stable psychiatric patients to be included in a routine care regimen at city clinics. Better care of safety net patients, facilitated by access to their health records through the I-Care database, also lessens the burden on area EDs, lowering costs and freeing up beds for more serious patients.

### **MATCH Program**

A study at the University of Texas at Austin found that 13% of uninsured patients are readmitted within 90 days of their discharge from the hospital.<sup>7</sup> One of the key reasons for that high rate of recidivism is that most uninsured patients do not have a primary care provider and are unable to get medications and routine follow-up treatments to prevent subsequent hospitalizations. The goal of the *Medical Assistance Through Community Healthcare* (MATCH) program is to reduce the risk of admission, readmission and ED visits for uninsured patients seen at St. David's Medical Center and match them with a community clinic that can serve as their medical home. That match-making is facilitated by the MATCH staff's being able to look at any previous outpatient visits for uninsured patients in the I-Care database and referring them for follow-up to the clinics.

## Potential of PM Applications

As a rich source of information about how and for what conditions indigent and uninsured patients seek care in the community, the ICC's I-Care database provides a great opportunity to use predictive modeling tools. One purpose for which the ICC database has been used in the past, and for which more sophisticated PM applications will be extremely suitable and productive, is the identification of most-deserving or "high-risk" indigent patients.<sup>8</sup> Using information about prior utilization and disease codes, those patients who can benefit most from disease management and care coordination can be identified and approached for provision of education, self-management training, coordinated care and financial support. Those patients can also be assisted in establishment of a medical home for them, where they can get continued quality care.

"There is an increasing demand by community members to be able to use the data to identify "high risk" or "high-opportunity" patients and then accordingly make sure that the system provides them access to quality care to minimize their suffering."

The high-risk patients identified through I-Care are not necessarily the "high-cost" patients that many health plans want to look for in predictive models.<sup>9</sup> Instead, high-risk patients who may be identified through I-Care are the ones who are at higher risk of landing in an ED or in a hospital for conditions that are preventable.<sup>10</sup> Such patients are also termed "high-opportunity" patients because they have a higher likelihood of being helped by

a disease management or case management intervention.<sup>11</sup> The I-Care database can also be used to help design interventions, enroll patients in different programs and evaluate the effectiveness of interventions.

The ICC has only recently started to explore the potential of using predictive modeling tools with the rich data at its disposal. There is an increasing demand by community members to be able to use the data to identify "high risk" or "high-opportunity" patients and then accordingly make sure that the system provides them access to quality care to minimize their suffering. Better management of those indigent patients will also save costs to the healthcare system, and those savings can be reinvested to expand programs that work. A recent evaluation of the ICC-Asthma program, which provides education and care coordination to indigent patients identified through I-Care, showed a high return on investment – for every dollar spent on the program, more than five dollars were potentially saved in hospital and ED utilization.<sup>12</sup>

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## Applying PM to Transform Access ... *continued*

### Conclusion

Most experts agree on the benefits of prevention, care coordination and disease management. Those benefits can be far more dramatic for the indigent, uninsured and vulnerable subpopulations in our communities who have limited access to healthcare services. However, discovering those subpopulations accurately and implementing programs and policies that provide such services in an efficient and effective manner is a daunting task. Information technology and modern data analysis techniques have given us the capability to identify those subpopulations. The ICC is an organization that is setting an example of how to integrate care for the underserved and uninsured in our communities, using information-sharing among diverse providers in an environment of trust, protection of privacy and collaboration. Predictive modeling techniques can take the model to another level of sophistication in targeting delivery of services to those who are in greatest need and who will benefit the most. Used in that manner, predictive modeling techniques can become a transformative technology that promises to bring about a system-level change in the delivery of services to the uninsured and poor in our communities.

### Notes

- <sup>1</sup> Hadley J, Holahan J, Coughlin T, Miller D. Covering the uninsured in 2008: Current costs, sources of payment and incremental costs. *Health Affairs*. 2008;27(5):w399-w415.
- <sup>2</sup> Hadley J, Holahan J, Coughlin T, Miller D. Covering the uninsured in 2008: Current costs, sources of payment and incremental costs. *Health Affairs*. 2008;27(5):w399-w415.
- <sup>3</sup> Hadley J, Holahan J. The cost of care for the uninsured: What do we spend, who pays and what would full coverage add to medical spending? Kaiser Commission on Medicaid and the Uninsured. Available at <http://www.kff.org/uninsured/7084.cfm>
- <sup>4</sup> Lewin ME, Altman S. eds. *America's Health Care Safety Net: intact but endangered*. Institute of Medicine. Washington DC National Academy Press; 2000.
- <sup>5</sup> Cunningham PJ, Bazzoli GJ, Katz A. Caught in the competitive crossfire: Safety-Net providers balance margin and mission in a profit-driven health care market. *Health Affairs*. 2008;27(5): w374–w382
- <sup>6</sup> eHealth Initiative. Annual Survey of Health Information Exchange at the State, Regional and Community Levels. Accessed at <http://www.ehealthinitiative.org/HIESurvey/2007Survey.aspx>. August 14, 2008.
- <sup>7</sup> Warner DC, Nyer G, Kerber L. Care that pays for itself? Community initiatives to reduce the cost of uncompensated health care. LBJ School of Public Affairs, The University of Texas at Austin. Policy Research Project Report. Number 151. Accessed at [http://www.stdavidsfoundation.org/downloads/collaborations\\_lbj\\_prp.pdf](http://www.stdavidsfoundation.org/downloads/collaborations_lbj_prp.pdf). August 20, 2008.
- <sup>8</sup> New, integrated model of care targets risk rather than disease. *Disease Management Advisor*. 2007;13(4)
- <sup>9</sup> Dove HG, Duncan I, Robb A. A prediction model for targeting low-cost, high-risk members of managed care organizations. *Am J Manag Care*. 2007;9(5):381-389.
- <sup>10</sup> Duncan I. Population risk management: Identifying high-risk members to reduce costs. *Health Section News*. Society of Actuaries. Issue 46. June 2002.
- <sup>11</sup> Bernstein RH. New arrows in the quiver for targeting care management: high risk versus high opportunity case identification. *J Ambul Care Manage*. 2007;30(10):39-51.
- <sup>12</sup> Khurshid A, Conti S, Batcher C, Simmons SC, Kitchen A. Evaluation Report: ICC-Asthma Network Project. July 2008. Austin, TX: Integrated Care Collaboration.



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## Thought Leader's 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](mailto:info@predictivemodeling.com). Here's this month's question:

**Q: "Which specific predictive modeling initiatives and issues do you see employers paying the most attention to? Which important initiatives and issues should employers be paying more attention to?"**

"We see many employers looking to predictive modeling to understand the overall health of their workforces and, subsequently, structure benefits accordingly, specifically pharmacy benefits. Employers should continue to focus on how applying the information provided in those models can help them positively influence behavior and impact the overall cost and quality of healthcare to their employees."



**Swati Abbott**  
President, MEDai, Inc.  
Orlando, FL

"Actually, what excites me most is that employers are beginning to 'go to school' on predictive modeling in terms of understanding what to look for, how to judge various models and how the choice of predictive modeling tool really impacts the vendor's ability to get health and financial results. Employers should pay close attention to the parameters of 'good shopping' for predictive modeling tools and learn to ask and demand answers to the tough questions around published results, around how the model was validated, what the true engagement intervention levels are and all of the 'who, what, when, where, why and how's' of how the model is operationalized in the vendor's workflows."



**Julie Meek**  
Independent Health Management Consultant  
Indianapolis, IN

"Which specific predictive modeling initiatives and issues do you see employers paying the most attention to?"

1. Member touch – 100% of members being touched
2. Predictive modeling profiles
3. Identifying and intervening with members for wellness/prevention

Which important initiatives and issues should employers be paying more attention to?

1. Member touch by impactability – are moderate/highly impactable members being touched?
2. Member engagement
3. Personal health advocacy/integrated health management"



**Soyal Momin MS MBA**  
Manager, R&D and Consulting, BlueCross BlueShield of Tennessee  
Chattanooga, TN

"The issues that employers are looking at currently include understanding healthcare claims data and what the impact is on their bottom line and workforce. As employers understand more about the underlying causes of healthcare costs, they are looking at ways to mitigate them to increase productivity and decrease absenteeism. Employers are also looking at initiatives that leverage multiple sources of data and that can demonstrate the increased sensitivity and specificity of the model. They are interested in finding ways to integrate data such as HRA information, lab values and sophisticated demographic characteristics. The initiatives take on particular significance as they relate to improving targeted outreach and engagement, which in turn can be directly linked to positive outcomes and ROI. For example, knowing that you have diabetics in the work force is useful, but being able to understand, through predictive models, how costs, hospitalizations and ER use vary with the more- or less-compliant populations is essential to creating the necessary educational tools for those employees."



**Russell D. Robbins MD MBA**  
Principal & Senior Clinical Consultant, Mercer  
Norwalk, CT

## INDUSTRY NEWS



### Cognizant Revenue Jumps Almost 7% From 1st Quarter

Teaneck, NJ's Cognizant Technology Solutions Corp. (NASDAQ:CTSH) reports that revenue for the second quarter of 2008 increased to \$685.4 million, up 6.6% sequentially from \$643.1 million in the first quarter, and up 33% from \$516.5 million in the second quarter of 2007. "Despite continued uncertainty in the marketplace, we exceeded our quarterly revenue guidance and our sequential growth once again outpaced our peer group in the second quarter," says Francisco D'Souza, CEO and president there. "Due to the continued deterioration in the macroeconomic environment and sagging consumer and business confidence, we are adopting a more conservative stance for the remainder of the year. However, we remain optimistic about our long-term growth prospects, given that our pipeline of large deals remains healthy and our market position remains strong." Based on current visibility, he adds, the company says third-quarter revenue should be at least \$723 million, and fiscal 2008 revenue is anticipated to be at least \$2.81 billion. Visit [www.cognizant.com](http://www.cognizant.com).



### D2Hawkeye Will Support, Exhibit at DMAA Meeting

D2Hawkeye Inc., Waltham, MA, will be a sponsor of and will exhibit at the DMAA's Forum 08 – Integrated Care Summit this month in Hollywood, FL. The meeting focuses on critical topics, healthcare technology innovations, policy issues and population health improvement models that change the way healthcare is delivered to chronically ill patients worldwide. The D2Hawkeye presence features its complete line of clinical analytics, risk analyses and reporting solutions. Attendees have the opportunity to view the company's flagship product, D2Explorer, an advanced data-mining solution that provides clinically specific information at the individual and population levels. D2 will also preview the company's newest module, Stratifier and Cohort Tracker, which offers users the capability to stratify their populations into specific cohorts by using a virtually unlimited combination of clinical, financial and utilization metrics. In addition, the company will showcase its reporting tool, D2ReportManager. Visit [www.d2hawkeye.com](http://www.d2hawkeye.com).



### Pharsight Participates in Equity Conference

Pharsight Corp., Mountain View, CA, presented at the Noble Financial 4th Annual Equity Conference in Las Vegas.

### Pharsight... continued

Shawn O'Connor, chair and CEO, and Will Frederick, SVP and CFO, discussed the company's business strategy and historical performance. An archived replay of the presentation is available. Visit [www.pharsight.com](http://www.pharsight.com).



### Health Dialog to Add to Highmark Registry Reports

Health Dialog, Boston, has this to report about its client, Pittsburgh's Highmark Inc.:

"Studies show that regular monitoring of medications by physicians is an effective way to improve a patient's health. Thanks to recent advances in the SMART Registry, physicians are now getting all sorts of information about their patients that they never received before. Highmark will provide physicians with reports this fall that show how regularly their chronically ill patients fill their prescriptions.

'Improving patient adherence to medications is one of the most critical areas in improving the quality of health of our members,' says Highmark's Michael E. Madden MD, medical director of medical performance management. 'We're confident the new reports will help initiate conversations between patients and their physicians about the importance of taking medications and overcoming barriers that may prevent them from doing so.'

Through the SMART Registry, Highmark has been sharing claims data with family practice, internal medicine and general practice primary care physicians since 2003 to identify potential treatment gaps for their Highmark patients with diabetes, congestive heart failure or coronary artery disease. The report can quickly reveal which Highmark patients with diabetes need a blood test or an eye exam, for example. More than 2,700 primary care physicians now use the SMART Registry to monitor the health of more than 255,000 Highmark members. Results will be measured by tracking changes in clinical indicators and reviewing feedback from physicians.

Physicians already receive SMART Registry reports twice a year on paper or CD. The reports include spaces to indicate where particular treatments have been provided, highlighting trends among Highmark's network physicians for treating patients with specific conditions. A physician comparison report is also available, which shows a particular physician practice how it compares to its peers for ensuring patients receive certain tests and treatments. Now there will also be a report indicating whether patients are regularly taking their prescription medications." Health Dialog is a wholly owned subsidiary of UK-based Bupa. Visit [www.HealthDialog.com](http://www.HealthDialog.com) and [www.highmark.com](http://www.highmark.com).

## INDUSTRY NEWS



### MEDai to Participate in Underwriting Conference

Orlando's MEDai Inc. will participate in the upcoming audio conference "Health Plan Strategies for Using Predictive Modeling in Underwriting," sponsored by Atlantic Information Services Inc. "In the last year, there has been a heightened interest in the application of predictive analytics to healthcare underwriting," comments Swati Abbott, MEDai president. "Stakeholders are realizing that the technology can greatly improve how organizations approach group renewal, rate setting and overall benefit design." The firm also reports that one of its leading health plan clients will present at the Blue Cross and Blue Shield Association 2008 National Finance, Actuarial & Underwriting Conference, focusing on "how the health plan has integrated MEDai's Risk Navigator Clinical application into its existing underwriting processes and how it has helped the organization bridge the gap between underwriting and care management," Abbott adds. "Traditionally, Risk Navigator Clinical was used strictly for care management-related efforts. The presentation is a perfect example, however, of how an organization can leverage the vast amount of data found within MEDai's patient-centric database to bridge gaps among multiple departments. Clients are beginning to think outside the box in terms of maximizing the benefits that predictive analytics provide." Visit [www.medai.com](http://www.medai.com).



### QuadraMed Unveils New Identity Management Solution

QuadraMed Corp. reports the general availability of Smart Identity Exchange, its next-generation identity management solution designed to help hospitals and health information exchanges identify, reconcile and manage patient records, significantly reducing the potential for medical errors and the needless expense of unnecessary tests and procedures.

"Adding another powerful tool to QuadraMed's portfolio of identity management solutions, Smart I/X is both an enterprise master person index and a record locator/reconciliation solution designed specifically for organizations that require a means of more accurately identifying patients and establishing and maintaining a composite medical record across multiple data sources," a statement says. "The solution helps organizations comply with HIPAA and uses a probabilistic algorithm to analyze all records stored in an organization's MPI systems, cross-references and reconciles them, then assigns each patient a unique, enterprise identifier."

### QuadraMed .....Continued

The system "significantly improves an integrated delivery network's ability to deliver consistent and cost-effective, high-quality care by providing physicians immediate access to comprehensive patient information to help them make more informed and safe decisions at the point of care," adds Hagen. "It efficiently unifies individual patients' historical and most current information, enhances enterprise-wide care coordination and minimizes duplicate and overlapping records, all of which reduce unnecessary tests, treatments and medical errors."

The product uses probabilistic matching to identify and link patient records, which is "widely regarded by industry experts as the best-practice approach to record matching because of its accuracy rate of 90% or higher," the statement says. Organizations can utilize the algorithm's probabilistic logic combined with organization-specific rules to automatically link records to minimize manual review and reconciliation. With Smart I/X, IDNs can create a longitudinal view of clinical and financial data for sharing patient records, tracking patient populations, monitoring quality of care indicators, producing accurate billing statements and connecting to HIEs. Visit [www.quadramed.com](http://www.quadramed.com).

### Focus on drug and device discovery

Firms Use Predictive Modeling to Weigh Clinical Responses, Drug Activity

There's a lot of healthcare predictive modeling that doesn't involve pricing, product development or plan design. Here's a look at what's up in the drug and device discovery sector.

### Firm Reports Progress in Cancer-Related Research

Redwood City, CA's Genomic Health Inc. (NASDAQ:GHDX), which offers the Oncotype DX breast cancer assay, reports results of two studies, originally presented at the annual meeting of the American Society of Clinical Oncology, that it says could "lead to the development of new tests for predicting benefit from certain targeted therapies in cancer, specifically cetuximab for colon cancer and docetaxel for breast cancer. Oncotype DX predicts the likelihood of chemotherapy benefit and of disease recurrence for early-stage breast cancer patients. Says Steven Shak MD, chief medical officer of Genomic Health: "We believe this is an important step forward in demonstrating the potential of a diagnostic and therapeutic partnership in advancing the field of personalized medicine."

## INDUSTRY NEWS

### Firm Reports Progress... continued

Results from "Evaluation of tumor gene expression and K-Ras mutations in formalin-fixed, paraffin-embedded tumor tissue as predictors of response to cetuximab in metastatic colorectal cancer" suggest that quantitative expression of a number of the candidate genes used in conjunction with K-Ras mutation status increases the ability to predict which patients might benefit from treatment with ERBITUX over K-Ras status alone. "Based on those results, we believe there is a potential to develop a multi-gene test comprising K-Ras mutation status in combination with the expression levels of a small number of genes to select patients for cetuximab," comments Joffre Baker PhD, chief scientific officer of Genomic Health and lead author of the study.

Results of "Predictive utility of progesterone receptor and multigene expression in identifying benefit from adjuvant doxorubicin plus cyclophosphamide or docetaxel in intergroup trial E2197" showed that in patients with hormone receptor positive disease who had an Oncotype DX Recurrence Score result greater than 18 (i.e., who were classified as intermediate risk of recurrence or above), a number of candidate genes strongly predicted benefit from treatment with docetaxel. A genomic classifier predicting differential benefit was identified and, if validated through additional studies, might be useful in defining a differential benefit of docetaxel. Visit [www.genomichealth.com](http://www.genomichealth.com).

### Tethys Bioscience Announces Expanded Availability of Diabetes Risk Test

Tethys Bioscience Inc. reports it has expanded the availability of its PreDx Diabetes Risk Test, a predictive tool that delivers an accurate assessment of an individual's risk of developing Type 2 diabetes within the next five years. The test is performed exclusively by the Tethys Bioscience Clinical Laboratory on routinely collected blood samples. The test is designed to help physicians identify patients at highest risk of developing Type 2 diabetes so they can promote lifestyle changes or initiate treatment plans to prevent or slow progression to Type 2 diabetes.

Numerous studies have demonstrated that such interventions can reduce the incidence of new onset diabetes by 30% to 60%, the company says. Using data generated from thousands of patients who were monitored for up to 17 years, Tethys identified specific proteins and other biomarkers that are most predictive of a person's progression to Type 2 diabetes. Through comprehensive analysis of proteins and integration of multiple risk-defining biomarkers, the company developed a sophisticated test capable of stratifying at-risk individuals, it says. Using a routine blood sample, Tethys provides an individualized risk report that indicates the likelihood of diabetes onset in a patient within the next five years. Visit [www.tethysbio.com](http://www.tethysbio.com).

### Personalized Medicine: Agendia Breast Cancer Test

Agendia BV reports that data from two studies involving its MammaPrint breast cancer prognosis test show that the prognostic test for breast cancer recurrence, using a 70-gene signature, provides important information for more effective patient management. Comments Laura van 't Veer PhD, head of molecular pathology at the Netherlands Cancer Institute, Amsterdam: "Prognostic tests have ushered in a new era in personalized medicine, helping us to determine the most appropriate care based on an individual patient's risk and treatment preferences. That might mean, in some cases, avoiding harsh therapies that may otherwise not be effective." The recent findings, adds Lajos Pusztai MD PhD, associate professor of medicine at MD Anderson Cancer Center, "suggest that different predictive tests that evaluate the risk of recurrence and therapeutic response can be used conjunctively on a single tumor sample to help physicians gain a clearer picture of a patient's treatment needs. The information gained from multiple predictive tests can be used to help physicians make more personalized decisions related to patient management. It may also be useful in helping identify additional areas for research, such as determining the best course of treatment for patients who are identified as being at high risk for breast cancer recurrence and also likely to not respond to certain treatments." Visit [www.agendia.com](http://www.agendia.com).

### Aureus Pharma Releases New Pharmacology Profiling Solution and New Unified Knowledge Database

Paris-based Aureus Pharma reports the release of AurPROFILER, a new software solution that enables researchers to rapidly evaluate target, cell and drug profiles using bio-assays derived from the activity data found in Aureus Pharma's AurSCOPE Target Knowledge databases. AurPROFILER has been designed to work in conjunction with the just-released AurSCOPE Global Pharmacology Space and all of Aureus' drug target-focused knowledge databases. Compound profiling is often used by pharmaceutical researchers to evaluate the critical issues of drug target selectivity, including off-target effects, polypharmacology and cytotoxicity, the company explains in a statement. With "easily interpretable graphics," AurPROFILER provides valuable insights to help better manage those issues by rapidly providing in-silico profiles. The results "facilitate better discovery team decision making and reduce risk."

Aureus has also released three new AurSCOPE Target knowledge databases, related to the important drug targets Nuclear Receptor and Protease, as well as the centralized product AurSCOPE Global Pharmacology Space, which comprises all of the pharmaceutically important therapeutic targets, including G-Protein coupled receptors, kinases, ion channels, nuclear receptors and proteases. AurSCOPE GPS and other AurSCOPE Knowledge databases streamline discovery efforts with thorough assessment of selectivity and off-target effects at the earliest stages of the drug discovery pipeline. Visit [www.aureus-pharma.com](http://www.aureus-pharma.com).

## Survey: Predictive Modeling Activity Compared to Last Year

Periodically, *Predictive Modeling News* provides exclusive results from a survey of health plan and health care professionals conducted by MCOL on various issues that relate to predictive modeling. Survey participants typically have a more active interest in predictive modeling issues.

This month, we addressed 2008 predictive modeling activity and initiatives compared to 2007. We asked participants to respond to three items:

1. Please categorize your organization.
2. During 2008, how has your organization's involvement with Predictive Modeling changed from 2007?
3. Regarding your general observations of other health care organizations relevant to you, and their involvement with Predictive Modeling in 2008 compared to 2007, have predictive modeling initiatives increased, decreased or remained similar.

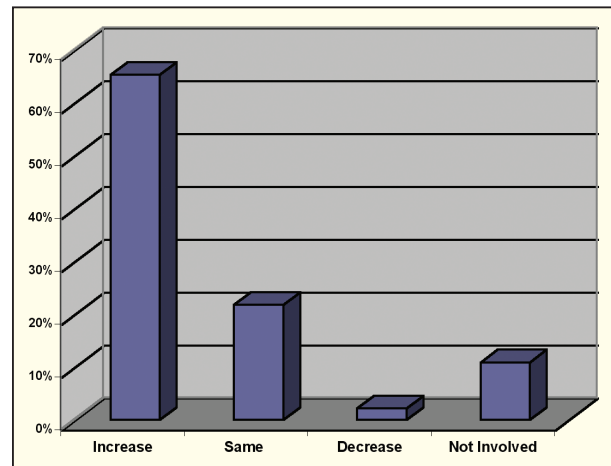
Here's what we found:

- Overall, 19.6% felt their own organization's Predictive Modeling activities and initiatives had significantly increased from 2007 to 2008, and 45.7% experienced some increase, totaling 65.2% or respondents experiencing some level of increase.
- This compared quite similarly to observations of other relevant health care organizations, as 63.1% of respondents felt those organizations had increased their initiatives during last year.
- Respondent's view of their own organization's PM level of activities from 2007 to 2008 is very comparable to their view of other organizations relevant to them. Not only were the total "Increase" responses within two percentage points, but the "Same/Similar" and "Decrease" responses were identical.
- Providers were less involved in PM (25% compared to 11% overall) and less sure about other organizations' involvement (25% not sure, compared to 13% overall.)
- Vendors were more likely to view PM involvement for their own organization as the same compared to last year (39% versus 21% overall.)
- General category of respondents (N = 46):
 

Payer	45.6%
Provider	26.1%
Vendor/Other	28.3%

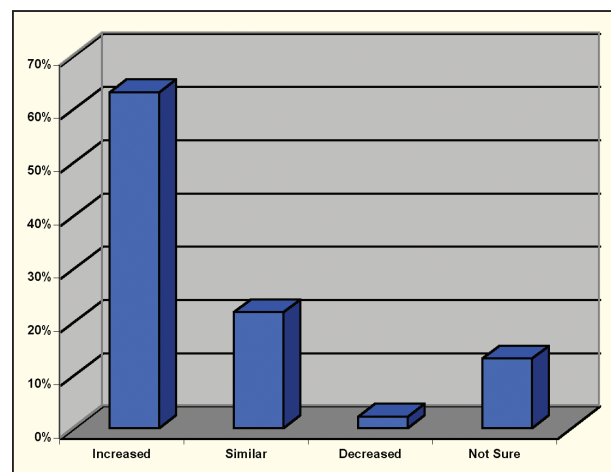
See subscriber web site for additional details -

### Your Organization's PM Involvement 2008/2007:



Response	Percent
Significant increase in activity and initiatives	19.57%
Some increase in activity and initiatives	45.65%
About the same level in as 2007	21.74%
Decrease in activity and initiatives	2.17%
We are not involved in Predictive Modeling	10.87%
Total	100.00%

### Other Organization's PM Involvement 2008/2007:



Response	Percent
Initiatives have increased during past year	63.05%
Initiatives are similar to last year	21.74%
Initiatives have decreased during past year	2.17%
Don't know / Not sure	13.04%
Total	100.00%