



Analytical integration in healthcare

Healthcare organizations need to finish implementing basic transaction data systems.



BY THOMAS H. DAVENPORT

HHealthcare analytics is poised to take off. The heavy government subsidies for electronic health records, the enormous need for healthcare cost control and the rise of analytics in other industries all suggest that healthcare has an analytical future. Consistent with this prediction, many organizations in the provider, payer and life sciences communities have embarked upon analytical initiatives.

However, almost all of these initiatives lack one attribute that will be necessary for the effective use of analytics in healthcare – the internal and external integration of healthcare analytics. Both within and across organizations, the healthcare analytics of the future need to cross boundaries. While many organizations have analytical silos – disconnected analytical groups that don't share data, technology or expertise – they are particularly

common within the healthcare industry. And there is virtually no analytical integration across the payer/provider/life sciences continuum.

This situation must change if societies are going to deliver effective and cost-efficient healthcare. There are trends in motion – not only the widespread adoption of electronic medical record systems, but also the “meaningful use” requirements for these systems for reimbursement,

and the shift to “accountable care organizations” – that will require greater levels of analytical integration within and across organizations. For the most part, however, the trends have yet to yield dramatic change in analytical integration.

I'll begin this article by describing what a high level of analytical integration in the industry would look like – “analytical integration nirvana” – in order to provide a sense of potential benefits and



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comparison with current practice. I'll then describe the existing situation within each of the healthcare industry sectors and provide a few examples of where greater integration is beginning to occur.

NIRVANA FOR ANALYTICAL INTEGRATION IN HEALTHCARE

We don't have anything resembling nirvana for analytical integration in healthcare, but it's useful to think of what it might look like. Within provider organizations, for example, integrated analytical decisions about patient care would address clinical, financial and quality concerns – all at the same time. Care providers would be able to employ clinical decision support tools to administer the most effective treatment protocols, but they would also understand the financial implications of different treatment approaches. On admission, hospitals would understand how likely they were to improve the patient's condition, and how likely the patient was to be able to pay for the treatment. On discharge, hospitals would know the likelihood of readmission, and the best combination of home healthcare and other interventions to prevent readmission. They would share a patient's data and analytics – using proper privacy protection, of course – with other institutions and individuals that provide care for the patient.

In terms of planning for new services and facilities, providers would have accurate statistical forecasts of patient demand for existing and planned offerings. They would market those offerings to patients most likely to require them. They would understand the implications of new and enhanced service offerings – and the quality with which they are delivered – for the institution's financial and operational performance.

Payer organizations would take the lead in analytically focused disease management. They would use data about their customers and claims in order to understand what genetic, physiological and behavioral attributes are associated with particular diseases. After informing their customers or members of any diseases they would be likely to contract (assuming they opt into receiving this information), they would also have analytics on which intervention strategies are most likely to yield the desirable behavior change necessary to avert the disease. They would supply these analytics, again with the appropriate levels of privacy, to anyone who cares for the patient.

Payers would also use analytics to identify employers and providers they want to work with, and who would be likely to employ their services. Payers in the United States would also have considerable information on consumers (which will become primary health insurance purchasers under

U.S. healthcare reform), and would be able to do predictive modeling of which consumers would be most likely to purchase certain types of insurance.

Life sciences firms – including pharmaceutical and medical device organizations – would offer predictive models of responses to drugs and devices. With the advent of personalized genetic medicine, they would be able to help care providers understand whether particular treatments would be likely to work on particular individuals. This would also allow an intelligent decision on whether certain medical interventions would be worth the cost. In addition, life sciences firms would have much more effective models of the business value of relationships with physicians (both individually and as members of social and business networks) and provider organizations, and target marketing and sales resources to the most likely adopters of particular drug and device interventions. Some of the predictive models would take into account the analytical results from clinical trials and large-scale population studies.

In addition to these integrated analytics initiatives within organizations, nirvana would also feature a variety of integration activities for analytics across subsectors of healthcare. In this ideal environment, providers, payers, life sciences firms, pharmacy benefit managers, patient registries and



other organizations would share data and analytics with other organizations within their sector and outside of it. Payers, for example, could share analytics about “at risk” status of their customers with the providers who would treat them for it. All parties would share data and analysis on post-market surveillance of drugs and medical devices.

ANALYTICAL REALITY IN HEALTHCARE PROVIDERS

Nirvana is an appealing picture, but the real world obviously falls short of it. In this section I’ll describe the actual behaviors of organizations with regard to integrating analytics and some of the reasons why integration isn’t more advanced. In provider organizations, for example, most hospitals and physician groups are still in the midst of implementing electronic medical record systems and clinical data repositories. Analytics are increasingly being generated on clinical, financial and operational metrics, but they are primarily descriptive rather than predictive. From the standpoint of integration, the analytics are largely created and used within silos. The groups that work with clinical and financial/operational analytics often do not work together or even know each other.

There are exceptions, of course. “Accountable care organizations” such as Kaiser Permanente, the Mayo and Cleveland Clinics and Intermountain Healthcare have somewhat centralized analytics or business intelligence groups. Their clinical, financial and operational analytics, while still largely descriptive, are likely to be integrated in scorecards and for the benefit of individual patients. Several of these organizations recently entered into an agreement to exchange patient care data among themselves [1]. Called the Care Connectivity Consortium, the agreement is unusual in that it is not geographically focused like most other healthcare data exchanges. However, the focus is on basic data exchange rather than analytical integration.

More traditional academic and community medical centers are also beginning to lay the foundation for integrated analytics. Brigham & Women’s Hospital in Boston, HealthEast in St. Paul and UPMC in Pittsburgh are examples of organizations that have created central functions that address analytics across clinical, financial and operational domains. The Veterans Health Administration, a leader in healthcare analytics for many years, has also recently created an integrated organization for business

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intelligence and analytics. These organizational moves are steps toward analytical integration in daily medical practice, though even these leading organizations still have a long integration journey ahead of them.

Finally, many provider organizations are exploring participation in health information exchanges. At one point some of these were regionally focused, but since the focus of U.S. healthcare reform funding is state-level exchanges, that is the primary focus today [2]. A set of functioning exchanges would be a step forward for analytical integration, but their primary focus at present is on exchanging transaction data and perhaps some simple reports. Any sophisticated descriptive analytics and certainly predictive analytics through exchanges will have to wait until the basic exchange infrastructure is built out and functioning.

ANALYTICAL INTEGRATION IN PAYER ORGANIZATIONS

Payer organizations – primarily healthcare insurance firms – have a substantial opportunity to analyze the large claims databases they have compiled. However, they have faced two major issues in this regard. First, their culture is typically one with a strong transaction-processing orientation, and most struggle with addressing claims and other data with an analytical focus. Secondly, while health

insurers are increasingly consolidating, many still lack the national scale to compile sufficient data for analysis.

Some large payers are addressing the transactional culture problem by creating separate organizations for analytics. These groups are becoming a force for analytical integration within the industry and certainly within their own companies. United Healthcare, for example, focuses most of its analytical activity within its subsidiary Ingenix, which also provides data and analytics to other payers and to providers. Aetna has a business unit called Aetna Integrated Informatics, which provides, among other analytics, information for physicians on the progress and risk level of its members who are enrolled in disease management programs. Humana has also formed a new analytics group with a particular emphasis on consumers; it collaborates with a “Business Intelligence and Informatics Competency Center” that is primarily focused on financial and claims analytics.

A number of Blue Cross payers have banded together to solve the data scale issue; they have created the Blue Health Intelligence (BHI) organization, which is part of the national Blue Cross/Blue Shield Association. BHI has compiled seven years of claims data on more than 110 million members, which gives it considerable ability to analyze data for disease management and

cost-effective treatment purposes. Thus far the results have been restricted to its Blue Cross payer sponsors, but BHI has announced its intention to spin out from the national association, which would give it the ability to serve other payer and provider organizations [3].

Payers have not historically shared much data with healthcare providers, and vice versa. Providers feared that payers would use the information to take advantage of them in rate increases and to send patients to the lowest-cost providers [4]. Payers may have been reluctant to reveal information to providers about their costs and profit margins.

One counterexample, however, is the POET (Partnership in Operational Excellence and Transparency) program between Blue Shield of California and about 100 provider organizations. The program provides detailed information on claims submitted by providers on Blue Shield members. Again, the focus is primarily on descriptive analytics, but it has reduced the cycle time for claims payment by about 20 percent and led to a reduction in claims appeals and disputes [5].

Aetna also has a program to share data and collaborate with providers. The sharing takes place in the context of jointly marketed health plans that blur the traditional payer/provider distinction. For



example, Aetna has shared with Banner Health, an Arizona-based hospital chain, data on costs and utilization and the algorithm for how it sets its premiums. The utilization data will be used at Banner to, for example, persuade some doctors to perform fewer imaging scans [6].

The U.S. government is, of course, the largest payer organization in the United States. Its analytical efforts are primarily focused on fraud reduction, particularly for Medicare (states administer Medicaid payments, and some states, such as New York, also have active fraud prevention efforts for that program). Analysis of claims data is leading to identification of fraud in such areas as double billing, upcoding, unnecessary services by providers and so forth [7]. In some cases this analysis involves collaboration with providers, but it is not the primary focus.

In summary, while payers are probably the most aggressive adopters of analytics within the healthcare system, there is still considerable room for integration – both within payer organizations, and particularly with providers and life sciences organizations.

ANALYTICAL INTEGRATION IN LIFE SCIENCES FIRMS

Life sciences firms – primarily pharmaceutical and medical devices organizations

– do a great deal of analytical research and decision-making. The research and development process, for example, is highly analytical, using analytics to determine whether the various phases of clinical trials are successful. Commercial analytics groups determine how best to market drugs and devices to physicians and patients. Health economics groups use analytics to determine whether treatment outcomes are beneficial and cost-effective.

One problem, however, is that these groups within life sciences firms tend to keep their data and analytics to themselves. They don't typically collaborate with analytical groups within their organization, and do so even less outside of their organizations. There are exceptions, of course – anyone within such firms who is analyzing clinical trials data must increasingly share data and analyses with external contract research organizations (CROs) – but for the most part there is little internal or external integration.

This is beginning to change, but greater internal integration for analytics is still in the early stages. Some managers (primarily in IT organizations) within a few pharmaceutical firms are beginning to advocate for a more coordinated and integrated approach to business intelligence and analytics. Within Bristol-Myers Squibb, a “real world research” organization has been created to

focus on post-market surveillance of drugs and analysis of data from non-interventional studies, and the group intends to foster collaboration with payer and provider organizations for those purposes.

Across all firms in life sciences, and in the industry in general, there is clearly a need for greater post-market surveillance. Life sciences firms, along with providers and payers, all possess information that would be useful in identifying harmful side effects of drugs and devices after their introduction. Yet there is little or no collaboration among organizations on this issue.

SUMMARY

Both within and across industry sectors, analytical integration is still in its infancy. Economic and regulatory trends in the industry are beginning to lead to efforts to combine and share data and analytics across organizations and sectors. For substantial progress to take place, healthcare organizations need to finish implementing basic transaction data systems. They need to create groups whose function it is to integrate and coordinate analytics within and outside the organization. And because these efforts will require investment, advocates for analytical integration need to work closely with senior executives to help them understand the need for and potential of analytics across boundaries. |

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REFERENCES

1. Paul Barr, "Mayo, Geisinger, Kaiser part of new data-exchange initiative," *Modern Healthcare*, April 6, 2011, online at www.modernhealthcare.com/article/20110406NEWS/30-4069959
2. "HIMSS Health Information Exchange, "ARRA HITECH FAQs Related to HIE," 2009, online at www.himss.org/content/files/12_04_09_ARRAHITECHHE_FactSheet.pdf
3. Chris Seper, "Health insurance company to spin out Blue Health Intelligence," *Minneapolis Post*, Jan. 10, 2011, online at www.minnpost.com/medcitynews/2011/01/10/24722/health_insurance_company_to_spin_out_blue_health_intelligence
4. Jonathan G. Bethely, "Blues plans are creating a giant claims database," *American Medical News*, Sept. 11, 2006, online at www.ama-assn.org/amednews/2006/09/11/bisc0911.htm
5. Patty Enrado, "California Blues' POET program delivers results," *Healthcare Finance News*, Jan. 8, 2010, online at www.healthcarefinancenews.com/news/calif-blues-poet-program-delivers-results
6. Anna Mathews, "The Future of U.S. Healthcare," *The Wall Street Journal*, Dec. 12, 2011, B4.
7. Lou Saccoccio, "Fighting healthcare fraud: A new prescription," *SAS Health Insights*, 2011, p. 7, online at www.sas.com/healthinsights