Analytics: A Leading Role in Driving Change in Healthcare
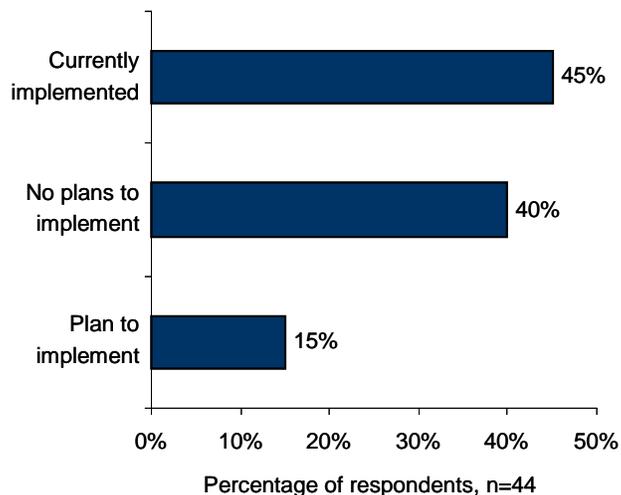
For better or worse, austerity measures in Europe and healthcare reform in the United States are leading to an era of value-driven healthcare. Healthcare providers will be rewarded for the quality of clinical outcomes, not the quantity of services delivered. This research report examines best practices for the use of analytics within healthcare delivery, and identifies opportunities for applying analytics within the current economic environment.

Data for this report is drawn primarily from the Aberdeen Business Review from December 2010, and the Aberdeen Group's December 2009 benchmark survey BI in Healthcare – A Prescription for Good Financial Health. The 2009 benchmark investigated how healthcare providers have used business intelligence (BI) to increase margin growth, improve productivity, and cut costs. Aberdeen identified top performing organizations (known as the Best-in-Class) based on three key performance criteria. Best-in-Class providers recorded higher excess revenue (profit) margins, were able to achieve payment on accounts sooner, and had lower nurse turnover rates than their peers.

Healthcare Suffers Head-on Collision with Economics

Less than half of all healthcare providers that took part in the December 2010 Aberdeen Business Review survey currently use analytics (Figure 1).

Figure 1: Current Adoption of Analytics in Healthcare Delivery

Percentage of respondents, n=44

Source: Aberdeen Group, December 2010

Analyst Insight

Aberdeen's Insights provide the analyst perspective of the research as drawn from an aggregated view of the research surveys, interviews, and data analysis

"I think the whole meaningful use / stimulus program is going to raise all boats, because it's going to get people thinking about these metrics and measurements in general."

~ George Reynolds, M.D., Chief Information Officer, Children's Hospital & Medical Center of Omaha

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It is an encouraging sign that 60% of providers either already have BI or plan to adopt such solutions. However, 40% of healthcare providers have no plans to introduce business intelligence - particularly worrying given the evolution of healthcare delivery.

New economic realities have focused the spotlight on healthcare spending in the western hemisphere. In the United States for example, although there is some short term investment in healthcare, the long-term objective is the reduction of healthcare delivery costs and the simultaneous improvement in the quality of care. Short term investment came from the American Recovery and Reinvestment Act (ARRA) which included $19 billion of incentives for healthcare organizations to adopt - and make "meaningful use" of - Electronic Health Records (EHRs) by 2014. At the same time, the Patient Protection & Affordable Care Act (also known simply as "healthcare reform") has placed a long-term focus on reforming healthcare delivery. For example, the Center for Medicare & Medicaid Innovation (CMI) has been created to experiment with new healthcare payment and service-delivery methods. The aim of this reform is to reduce Medicare and Medicaid costs, while simultaneously improving the quality of care.

Meanwhile, on the other side of the Atlantic, Europe's healthcare delivery systems are also facing pressure to transform. Most European governments are wrestling with record levels of debt and consequently are cutting services, including public health care. After 20 years of record investment to improve the services of the government-funded National Health Service (NHS), the United Kingdom's government is aiming to cut £20 billion from the NHS by 2015, by reducing waste and improving the quality of care.

Demographic changes are compounding the impact of budget cuts. The retiring baby boomers will increase the demand for healthcare services, whilst simultaneously draining away healthcare's most critical resource - nurses. In 2010, 47 million people were enrolled in the United States' Medicare program. In 20 years that number will grow to 80 million. Naturally, the growth in Medicare enrollees will include nurses - who, with a US population of 2.5 million, represent the largest single group of employees in healthcare[1]. The average age of a registered nurse in the US has increased steadily and was expected to reach 50 years old in 2010[2]. As more nurses move into retirement, skills shortages will worsen.
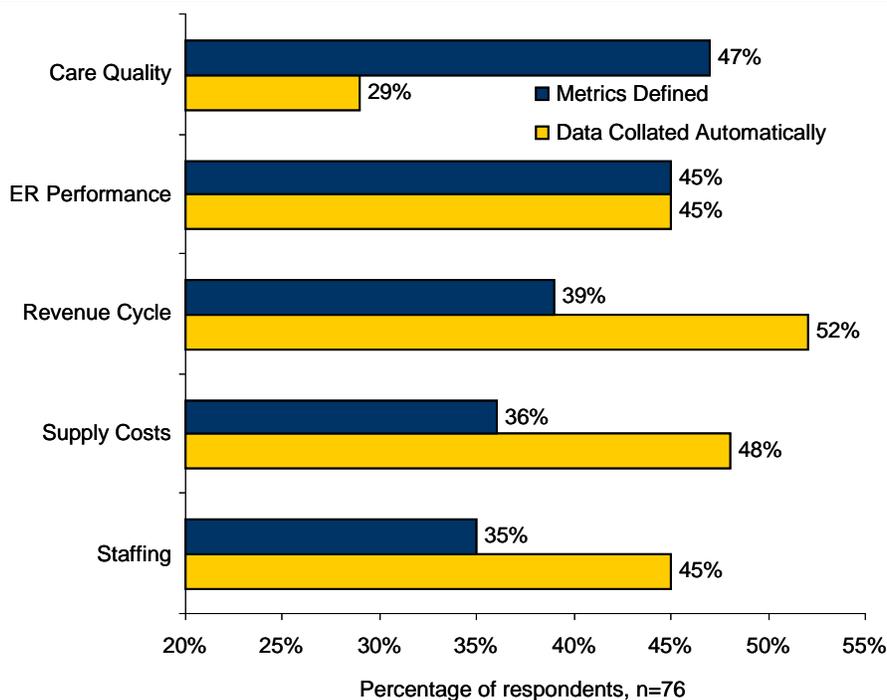
The Role of Analytics in Healthcare

The widespread adoption of Electronic Health Records can provide a strong foundation of data lacking in many US healthcare delivery organizations.

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[1] United States Department of Labor, Bureau of Labor Statistics, 2009

[2] United States General Accounting Office, Emerging Nurse Shortages, 2001

Healthcare providers' electronic data is often scattered amongst many distinct, stand-alone applications - which makes it difficult to use business intelligence to track and manage key performance indicators (KPIs). A single repository of management information can help to address these issues. The Center for Medicare & Medicaid Innovation will drive far-reaching changes in how healthcare providers are reimbursed. Providers will be paid for quality, not quantity. That is, they will be paid for improving clinical outcomes and care quality, not merely reimbursed for the volume of tests and procedures performed. European governments are moving in a similar direction. As a result, the ability to track, measure and improve clinical outcomes and financial performance will be fundamental to running a sustainable healthcare practice. To adopt and use analytics successfully, organizations must start with a foundation of high quality data. When deploying BI, the more data that can be concentrated into a single repository, the better. Making the use of electronic health records more pervasive can help provide this foundation, and ease the introduction of widespread business intelligence capabilities. Aberdeen's research shows that BI has had limited use in key healthcare functions so far (Figure 2).

Figure 2: Ability to Track Key Performance Metrics

Percentage of respondents, n=76

Source: Aberdeen Group, December 2009

Fast Facts

√ 45% of all organizations that track staffing metrics do so using business intelligence

√ 37% of all survey respondents that monitor key emergency room metrics manually compile those metrics from paper source records

Figure 2 shows the percentage of survey respondents that have metrics defined in each of five key areas related to the delivery of sustainable, high quality, cost effective healthcare (the blue bar). The yellow bar in Figure 2 shows how many of those same providers automate data collection for those key performance indicators.

Case Study — Children's Hospital and Medical Center

Children's Hospital and Medical Center is a 145 bed healthcare facility in Omaha, Nebraska. This provider has used analytics to simultaneously cut costs while improving productivity and quality of care, by adopting a culture of decision making supported by timely access to rich operational data. From an initial project in the pediatric intensive care unit (PICU), analytics have been expanded to clinical projects, as well as finance and operations. Dashboards are now so pervasive that almost all the executive leadership team has access to them.

This widespread use of analytics has led to numerous performance improvements, including:

- A 59% reduction in medication errors.
- A 12% increase in the rate of annual examinations for asthma patients.
- The shortest emergency room wait times of any children's hospital reporting data to the Child Healthcare Corporation of America.
- A 5% reduction in the hospital's operating budget

Nancy Knowles, B.S.N, M.D. is the medical director of a 35 physician practice affiliated with the hospital. "I've always been interested in quality and quality improvement," Nancy notes. "The way I look at it is, if we do what's best for the patient, everything else will fall into place." Consequently, the practice has adopted dashboards to track appointments for ADHD patients, the quality of asthma assessments, immunization status and the treatment of children with pharyngitis.

Three steps were key to the Center's successful implementation of BI. First of all, the support of senior executives was critical. Gary A. Perkins, president and CEO of Children's Hospital and Medical Center says, "I don't think the good ideas necessarily come from the C-suite. But, when ideas are generated that are consistent with the goals and vision of the organization, our C-suite gets 100% behind those goals and that vision." Secondly, they started simply – the first dashboard implemented was focused on one particular clinical area and displayed just a few performance metrics.. Third, they maintained a laser focus on data quality. If physicians do not find dashboard data credible, they will not give the system a second chance to regain their trust.

Insights into Care Quality

Forty-seven percent (47%) of healthcare respondents monitor care quality metrics. However, only 29% of all the organizations that monitor care quality metrics have been able to fully automate that process by integrating and aggregating that data, and reporting it via either BI reports or interactive analytics (Figure 3).

Figure 3: How Providers Collate their Outcomes Data
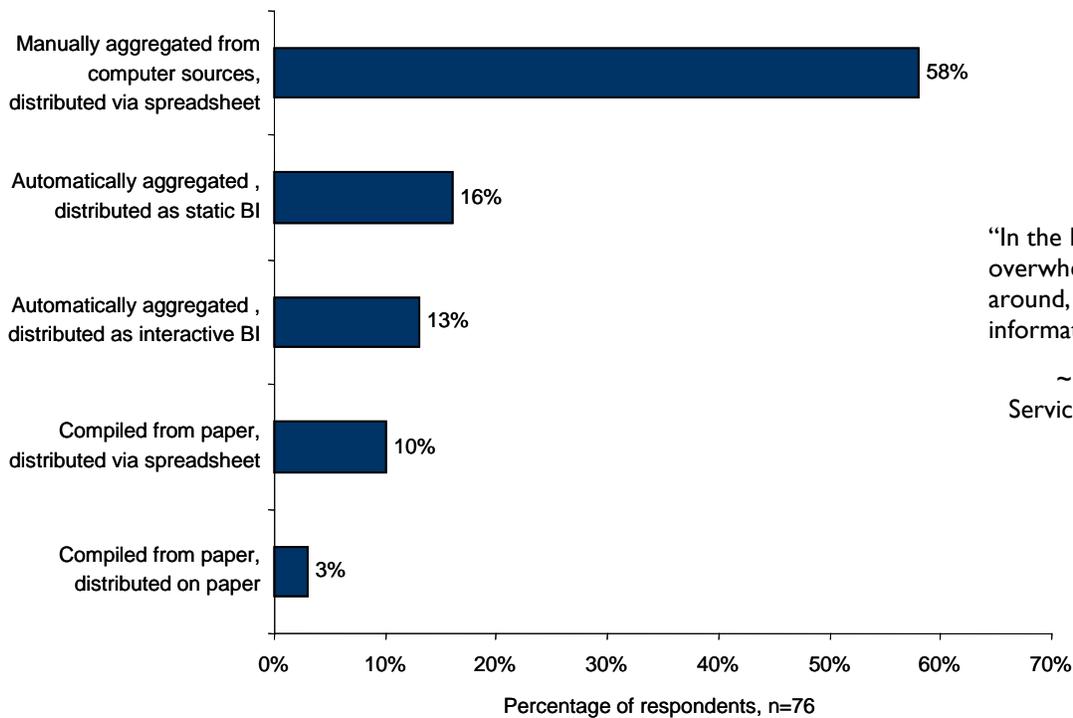
"In the NHS, there is an almost overwhelming amount of data around, but very little information."

~ Jan Nangle, Information Service Manager, North West NHS Collaborative Procurement Hub

Source: Aberdeen Group, December 2009

Aberdeen's survey respondents indicate that while much of the source data to track clinical outcomes is captured electronically, both data quality and data integration remain challenges. Fifty-eight percent (58%) of respondents tracked care quality by manually integrating that data and distributing the results via spreadsheet. The remaining 13% that track quality of care extract data from paper records and report the metrics either in a spreadsheet or as a paper report. Both approaches are of limited help in improving clinical outcomes.

Problems arise whenever extensive manual work is required to perform data integration. First, manual integration is error prone, simply because it is tedious and provides countless opportunities for data to be rekeyed incorrectly. Second, manual integration is difficult to scale - the bigger the institution, the more daunting the task of manual data integration. Third, manual integration is typically very time-consuming, which affects the refresh and update rates of data. Only 21% of healthcare organizations that integrate data manually update their adverse event rate every day. However, 42% of the providers with automated data flowing into BI tools can update the adverse event rate daily. The currency of data directly affects the ability of an organization to take timely corrective action to improve performance. The more often management information is updated, the more opportunities managers have to identify issues and take action.

If data is refreshed monthly, then performance can be reviewed and corrective action taken only 12 times a year. If data is refreshed daily, then performance can be reviewed over 200 times a year (discounting weekends and public holidays). The more quickly problems and opportunities are identified, the sooner they can be addressed, and the faster and more effectively clinical outcomes can be improved.

Improving the Revenue Cycle

Revenue cycle management (RCM) will be an increasingly high priority in healthcare delivery. Thirty-six percent (36%) of healthcare providers surveyed by Aberdeen in December 2010 reported that their days sales outstanding (DSO) had increased since the start of the economic recession. An increase in DSO can have a significant impact on an organization's cash-flow. Fortunately, many organizations are already better placed to manage and improve their revenue cycle than they are to manage and improve their clinical outcomes (Figure 4).

Figure 4: How Revenue Cycle Metrics are Compiled

Percentage of respondents, n=76
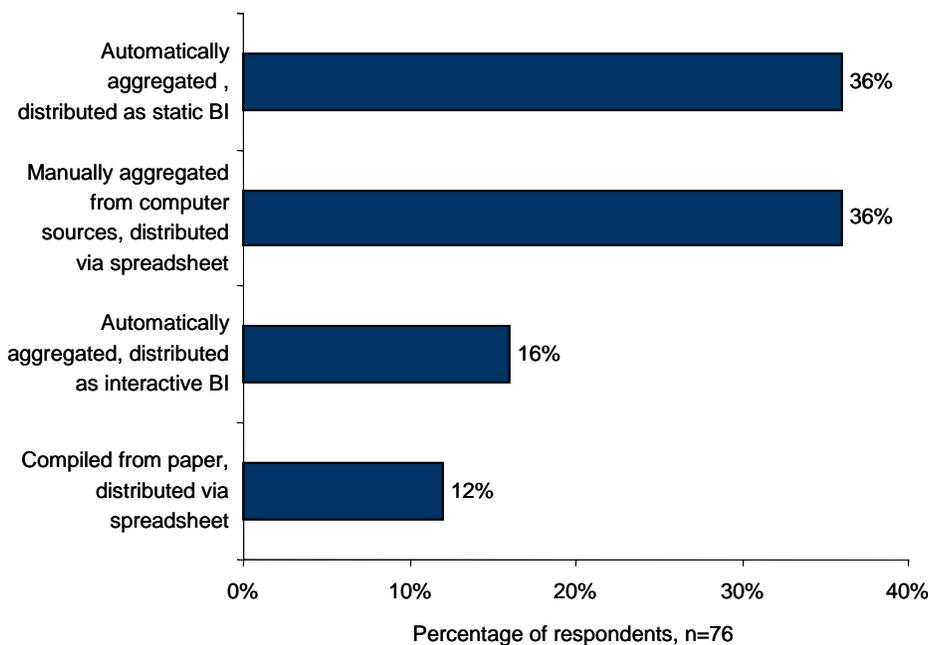
Source: Aberdeen Group, December 2009

Fast Facts

√ 35% of all survey respondents that track supply chain metrics do not monitor the percentage spent on physician preference items

Over half of all survey respondents (52%) automatically aggregate their RCM data and present information using some business intelligence tool. This is almost twice as high as the number of providers who were able to automatically integrate clinical data and present information using BI. This greater degree of automation is reflected in the update rates organizations achieve for key revenue cycle metrics. For example, over half of all survey respondents indicate that they are able to update accounts receivable (AR) days and their clean claims rate at least weekly - or in many cases daily.

However, while revenue cycle data is already highly automated, there is plenty of room for improvement in the update rate of metrics. Thirty-eight percent (38%) of providers only refresh AR days once a month. Healthcare organizations can increase the refresh rate of key RCM metrics to help meet their increasing cash-flow challenges.

Optimizing Staffing

With key healthcare skills already in short supply, providers can use business intelligence to make the best use of this precious resource. Almost all providers that took part in Aberdeen's survey monitor and update basic human resources measures, such as nurse turnover rate, at least monthly. However, top performing healthcare delivery organizations (the Best-in-Class) were using analytics to access operational data and optimize staffing daily, or even many times a day (Figure 5).

Figure 5: Using Analytics to Drive Nursing Productivity

Source: Aberdeen Group, December 2009
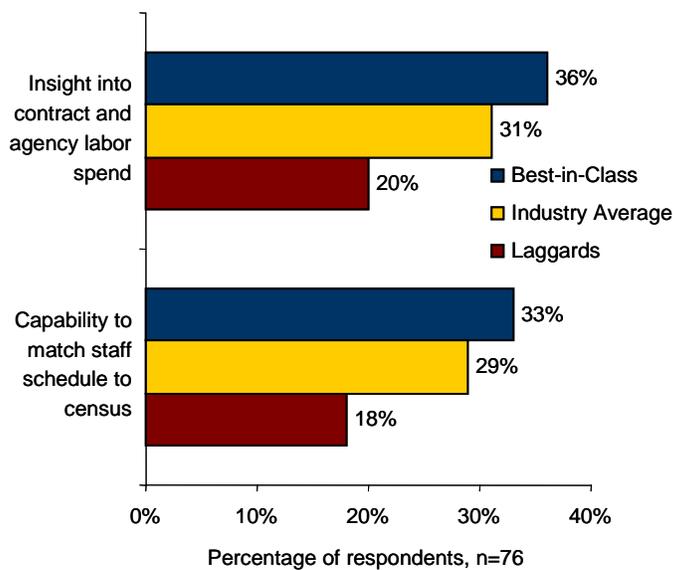
"Our dashboard shows what the patient volume is likely to be in the next few hours. With that level of visibility, we're able to send RN's home instead of paying them overtime if the volume allows that."

~ CFO,
regional acute care facility

Best-in-Class healthcare providers are more likely than others to be able to optimize productivity by matching staffing skills and staffing levels to the patient census at any time. This approach requires a fairly sophisticated level of data integration, but it has a significant potential payback, since nursing costs are often the biggest single operating expense for delivering healthcare services. Achieving this level of insight requires the integration and refresh of nursing credential data, nurse scheduling data, and the current and near-future patient census several times a day.

Without this level of near real-time insight, providers overstaff to ensure that patient safety is not compromised and care quality does not suffer. Overstaffing leads to nursing costs that are higher than budgeted, and also increases the likelihood that agency and contract labor will be needed to

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supplement employee nurses. Top performing hospitals are more likely than others to have timely insight into their agency labor costs.

Appropriate Analytics Technologies for Healthcare

Aberdeen research has found that top performing healthcare organizations (the Best-in-Class) use two classes of business intelligence technology more frequently than others (Figure 6).

Desktop BI - used by individuals - is in place at 42% of the Best-in-Class organizations, compared to 37% of all others. Likewise, 36% of Best-in-Class organizations have departmental analytics solutions that are used by small groups of workers, compared to just 22% of all others.

Figure 6: Best-in-Class Practice is for Personal / Departmental BI

Source: Aberdeen Group, December 2009
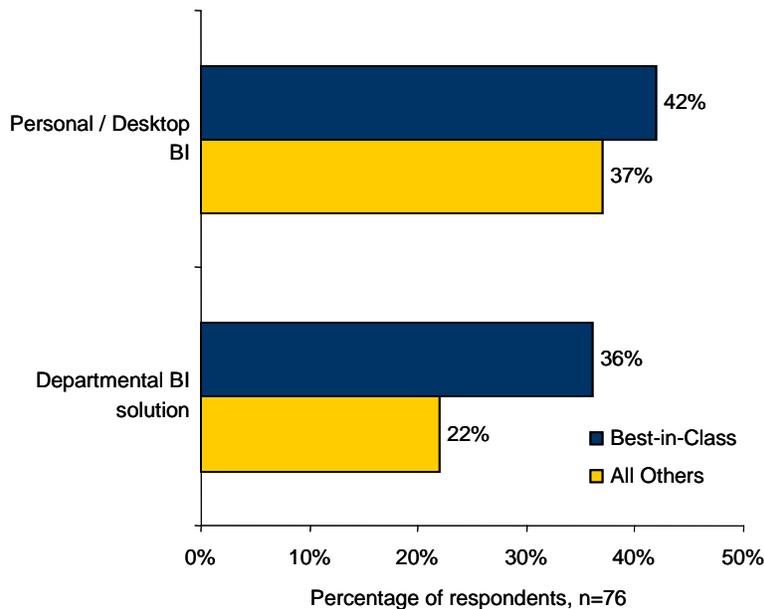
> "I looked at taking a big bang approach - building a large data warehouse with everything in it. But, there are a lot of dead bodies on the street from that - a lot of people have spent a lot of money and gained very little."
>
> ~ Paul Alcala,
> CIO,
> NorthBay Healthcare

This judicious - even niche - use of business intelligence is due in part to the patchwork quilt of transactional systems in healthcare environments. Providers often have a vast number of standalone applications capturing and storing data. Data in one such application is effectively walled off from data in the others, leaving healthcare enterprises with two main choices. One approach is to use many localized BI applications, each of which requires only a small subset of the enterprise's data in order to be effective. Alternatively, enterprises can integrate the data into a warehouse that can be used across the entire organization. However, with many healthcare providers having literally hundreds of data sources, total integration often isn't a realistic option. One director of IT that Aberdeen spoke with had worked in a healthcare system which maintained over100 interfaces to achieve point-point integration between applications and synchronize

transactions. Although piecemeal integration such as this can be achieved, it is difficult, costly and doesn't lend itself to building users trust in the data.

Aberdeen's data shows that - for now at least - the localized approach to BI has the upper hand. As potential source data for analytics is so fragmented, healthcare providers may be better served by following a pragmatic approach, starting small and deploying BI either as a desktop or departmental solution. Analytics can be deployed more easily and effectively by addressing specific business problems and the finite data set needed to analyze them, than by attempting to build an enterprise-wide data warehouse.

Key Takeaways and Recommendations

To mitigate the impact of funding cuts and maximize revenue from outcomes-driven reimbursement, healthcare providers should consider the following actions and recommendations:

- Consider a long-term, executive-led program to change how decisions are made. Future healthcare reimbursement will be centered on quality of care and on improvements in clinical outcomes. In Europe, funding cuts have been brought on by the economic downturn. In the US, the inexorable rise in the cost of healthcare is unsustainable, and systematic change is inevitable – whether through government mandate or not. Ultimately, the spoils go to providers that can provide high quality care cost-effectively. For many healthcare delivery institutions, this is a departure from business as usual. Success will require significant change in the way decisions are made, and in the processes which drive decision-making. Such changes must be driven by senior executives and reinforced continuously. Aberdeen's March 2011 research into agile business intelligence (Agile BI: Three Steps to Analytic Heaven) found that organizations with the most widely used BI deployments were 60% more likely than other organizations to incorporate cultural change into their BI project plans when necessary.

- For data-driven decision-making to become the norm, managers need easy access to up-to-date, high quality information. Aberdeen's research found that top performing healthcare systems are more likely to use business intelligence at the departmental, or individual, level. With potential source data for BI scattered across scores or even hundreds of different systems, small-scale BI projects provide a way to drive change without trying to boil the ocean.

- It's clear that healthcare providers will be required to monitor new metrics and aim for different goals. Unfortunately, it's not yet clear in many cases what those metrics and goals will be. Healthcare organizations would be wise to ensure that any BI solution they introduce is agile enough to accommodate rapid change. Aberdeen research into business intelligence (Agile BI: Three Steps to Analytic

Heaven) found that enterprises with the most agile and flexible business intelligence implementations shared a number of characteristics. From a technology perspective, these organizations were more likely than others to provide business managers with fully interactive tools that supported drill-down capabilities. If chosen wisely and implemented well, such tools allow managers to easily explore the data available, answer new questions as they arise, and discover new insights that can drive change - all without the intervention of the IT group. When BI is this flexible, managers are better able to find the information they need in the timeframe required to support the decisions they have to make.

- Healthcare providers also need to educate manages on the use of analytics in general, and their chosen BI tool in particular. Fifty-three percent (53%) of enterprises where analytics is widely used provide formal training in BI skills and knowledge for line managers. Managers need to be comfortable with the general concepts of analytics, and the intricacies of their tools and data. This will ensure that decision-making is underpinned by information and that managers are self-sufficient in software use. Corporations with the most agile BI solutions also incorporate IT and analytics skills into their business units. Situating people with these skills close to managers encourages self-sufficiency; local resources often respond faster when in-depth assistance is needed. This nurtures flexibility and agility in the business intelligence solution.

Healthcare delivery must evolve. For patients, the financial, physical and emotional burden of not evolving the way healthcare is delivered would be too great. A transition to data-driven decision making is a necessary step for that change to happen, and analytics will be at the forefront of that change.

For more information on this or other research topics, please visit www.aberdeen.com

Related Research	
Agile BI: Three Steps to Analytic Heaven; March 2011	_Different Strokes: Multi-Site Wireless LANs in Higher Education, Healthcare, Hospitality, and Retail_; March 2010
Talent Management in Healthcare: Post-Hire Strategies to Build from Within; August 2010	_BI in Healthcare – A Prescription for Good Financial Health_; December 2009
Surviving Healthcare Reform with Data-Driven Decisions; May 2010	

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