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The Healthcare Performance Dashboard: Linking Strategy to Metrics

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Abstract

There is little doubt that the change in our global business environment will continue to outpace complacency and "tried and true" approaches for managing costs and increasing revenues. At the epicenter of this change we have a tsunami of data generated at the point of daily activities – data about patients, costs, operations and outcomes – but are we connecting that data to our strategy? Are we putting data to work for us or are we merely responding to that data?

Ultimately there are a panoply of techniques, methods and frameworks that can be put to work to help us manage more effectively. And while, we don't take a position with respect to one tool being better than another, we do think that those that put data to work for us and keep our goals in front relative to our actual performance will help us deliver strategy more effectively.

In this presentation, we will discuss opportunities for utilizing data for effective decision-making – both at the strategic as well as operational levels. As one of many decision support tools, the "Dashboard" can help provide insights that are seldom seen with mere gut and intuition. Case studies that highlight the use of the right metrics using the appropriate visualization (dashboard, scorecard, etc.) will help provide context and meaning that go beyond the buzzwords and technologies.

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Introduction

The global health care environment has widely divergent perspectives on the use of data and information for decision-making. On one hand, those paying the bills for healthcare (private and public entities that provide reimbursements to patients or their providers) have traditionally consumed data on par with banking and financial services companies. Their ability to collect and analyze data garnered from the point of patient care has been impressive. Healthcare delivery, however, has often been plagued by underfunded, less advanced methods of collecting and analyzing data. Most providers continue to evolve and are implementing electronic health records (EHR) systems and strive to integrate systems that combine both clinical and administrative data. Through this transition, we expect to see health care provider organizations take advantage of this data and explore analytics as a competitive tool as a method to help provide better care, improved outcomes and safer, more effective decision making. Taken together, systems and data cannot solve all of the problems that face our healthcare system alone. This requires an eye toward setting the strategy based on sound fundamentals along with policy decisions that govern the operations of our healthcare environment.

In this paper, we will outline some of the challenges that face our healthcare ecosystem and how data and analytics can provide the much-needed backbone to support improvements critical to achieving long-term success for healthcare. Furthermore, we will outline how management can alter the course of their organizations through the effective use of methods such as the Balanced Scorecard, LEAN Six Sigma and Business Intelligence (BI) and BI's cousin, advanced analytics.

Healthcare in the US and Abroad

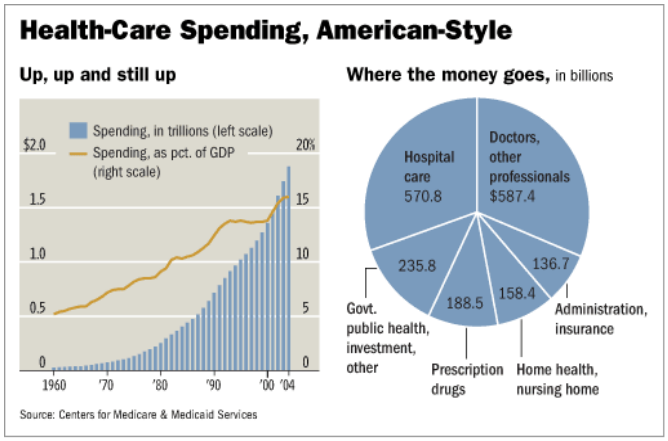
Healthcare in the United States has suffered a long a painful road. For an excellent summary of the past 80 years outlining our failed attempts to fix our system of healthcare, we highly recommend reading the New Republic's senior editor's treatment of the subject (Cohn, 2007). As Cohn posits, we have learned a lot about treating sick people in the early 1900's. However, this knowledge enabled health care providers to reliably treat most ailments and they began to charge more than most people could afford – especially since the Great Depression was soon upon us. This led to the advent of a program at Baylor Hospital in Dallas, TX that eventually became Blue Cross and what we now know as the private health insurance companies.

Since the 1930's, we have had a number of initiatives that were conceived of to try and fix the realities that we live with, namely:

A. **Inequalities with regard to access to affordable health care** (about 47 million Americans lack health insurance, up from about 40 million in 2000) (Pear, 2007)

B. **Increased costs and fewer benefits** (the United States pays roughly twice as much per capita for health care as Canada, France, and the United Kingdom – Kaiser Family Foundation, 2007); and

C. **Worse outcomes** (lower life expectancy than those countries and significantly higher infant mortality) (OECD, 2004)



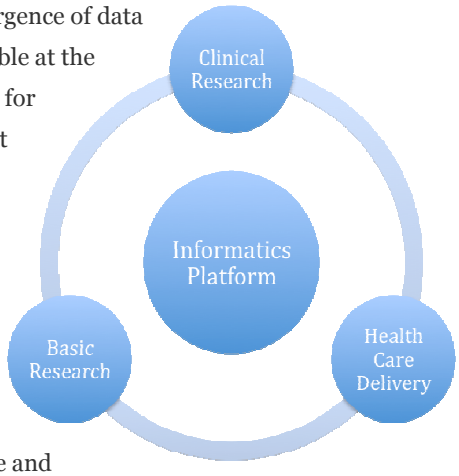
The goal of healthcare can be summed up in this simple statement from the Institute of Medicine: "*The right care for every person every time"* (IOM, 2001.) In other words, make care: safe, effective, efficient, patient-centered, timely and equitable. We also know from history that we need to make it both affordable (for patients) and sustainable (for those that provide and pay for healthcare.)

So while many of these issues need to be solved on a policy (and dare I say - political level), some of these can and can be managed at the micro level. Organizations focused on improving the effectiveness of their organizations and the efficiency in which it operates can use data and analytics to support our technically advanced, but financially troubled healthcare system. The fundamentals of cost, quality, safety, access and efficiency are things that we can have an impact on and raise awareness through our efforts as data jockeys, statisticians, analysts and BI professionals.

Convergence across healthcare

Healthcare is an industry that can be described as "Data Rich, but Information Poor." This, in part, is due to the way that the health care profession has evolved. Most health care providers, up until the last decade, used computers primarily for billing and scheduling and even less so, to support individual patient care decisions. It has only been a recent phenomenon that data has been used to provide evidence for patterns of care (the term "evidence-based medicine" first appeared in the medical literature in 1992 in a paper by Guyatt et al.) But as technology advances – making data more accessible, more reliable, and easier to use – and standards have evolved to improve interoperability and consistency between systems and organizations, the opportunity to use data for more than addition and division has grown exponentially.

As we have noted (Nelson, 2009), we are seeing a strong trend toward convergence of data and information in the healthcare ecosystem. Data that was once only available at the bedside is now being made available for both operational decisions as well as for secondary uses. Integrative concepts like translational medicine will no doubt serve to bridge the worlds of primary research, clinical research and bedside care – making decision support and predictive capabilities as common as the stethoscope in the care and treatment of patients.

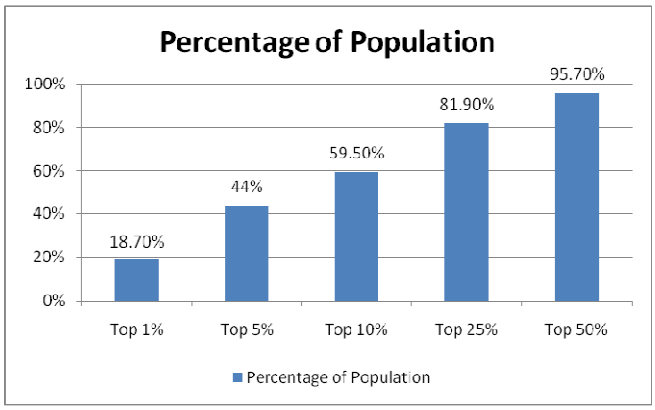


Value of data

As we move from an environment of facts and artifacts, systems and silo's, we quickly learn that data quality and data exploitation is everybody's business. The value of data in healthcare is prominent in both administrative and clinical domains in our healthcare system. For example, complete, accurate data is requirement in most, if not all, reimbursement scenarios. Programs like Pay for Performance (P4P), Physician Quality Reporting Initiative (PQRI) and ever evolving quality measures mandated by the Center for Medicare and Medicaid as well as private payers make data and analytic techniques part of any healthcare delivery organization's "right to operate." Public health surveillance, evidence-based medicine, health policy and even molecular medicine means that health care data will continue to expand both in size and breadth as we seek new ways to provide safe and effective health care to patients. Our ability to handle this tsunami of information will no doubt differentiate amateurs and professionals.

Unfortunately, most people take the easy route when it comes to diving into the data to drive out real insights from data. For example, many people have a good sense that healthcare expenses in the U.S. are rising, and perhaps a fair number of those know that expenses aren't evenly distributed among the

population-- but the actual numbers are quite striking. In a recent report, it was cited that 1% of the population accounts for almost 20% of all U.S. healthcare expenditures; 25% account for over 80% of all expenditures. It turns out, that people with chronic conditions (often preventable ones) account for a disproportionate percentage of expenses. Half of the population spends little or nothing on health care, while 5 percent of the population spends almost half of the total amount. Those in the top 5 percent spent, on average, more than 17 times as much per person as those in the bottom 50 percent of spenders (AHRQ, 2009.)



Had we stopped at the digital dashboard, we would have missed the where and why – which is all too often missing from the classic scorecard. This is the value of analytics.

As we have all seen, over and over again, *having* the data and *knowing* that you have it and can *access* it are critical to success. Understanding how you can capitalize on compensatory "data" for competitive advantage is where we will turn now.

Organizational Effectiveness

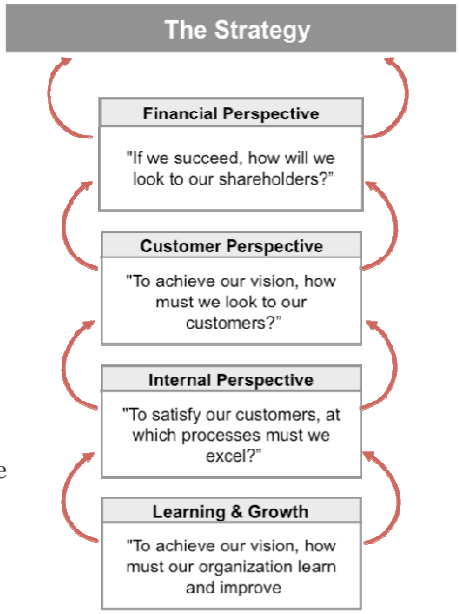
No matter who employs us, we all use data to get smarter about the decisions we make. Whether our role is to provide an integrated view of the patient, evaluating the safety and efficacies of drugs and therapies, or trying to understand patterns of care and costs across a patient population, we are trying to bring clarity to the decision making process. If we accept that, then shouldn't our roles tie into the strategy of our organization/ department/ division? This is fundamentally, the goal of strategy – to make it part of everyone's job - to link what we want for our organizations to what you and I do every day. Cascading those goals and objectives to a level where they can be influenced. Strategy is derived from the Greek word for general and is useful here as we translate our goals into a plan of action.

Management techniques that help us measure this impact can be found all around us, so let us now turn our attention to how the Balanced Scorecard, LEAN Six Sigma and Business Intelligence can support decision-making through better access to information.

Strategy Map and the Balanced Scorecard

The first step in the formalization of a strategy is the development of what Kaplan and Norton (2000) call the "strategy map." This is a diagram that describes the "chain of cause-and-effect logic that connects the desired outcomes from the strategy with the drivers that will lead to the strategic outcomes." It is basically the specification of the hypotheses that will lead to achieving the business objectives.

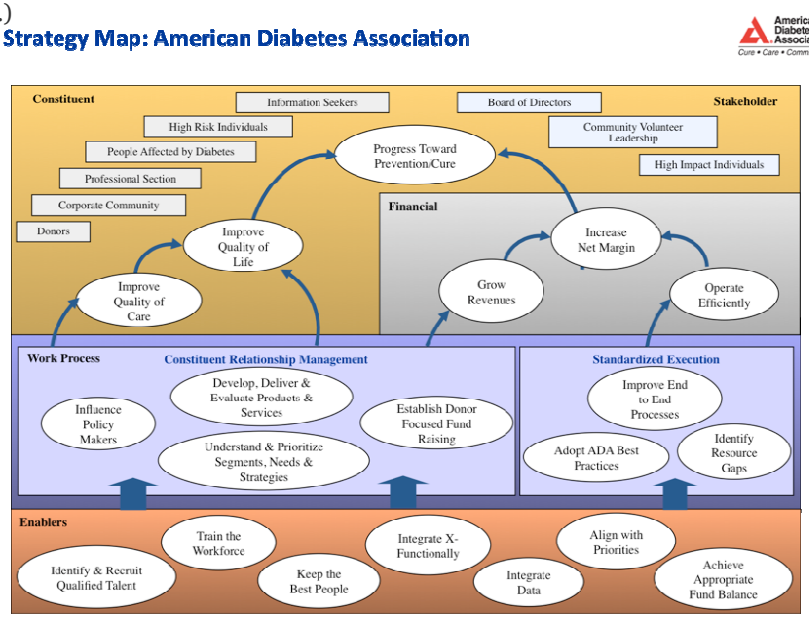
In the balanced scorecard methodology, we have multiple perspectives we maintain about our organization that support our strategy. Typically, these include the four perspectives outlined in this diagram. This provides a simple model of the value creation process for any organization.

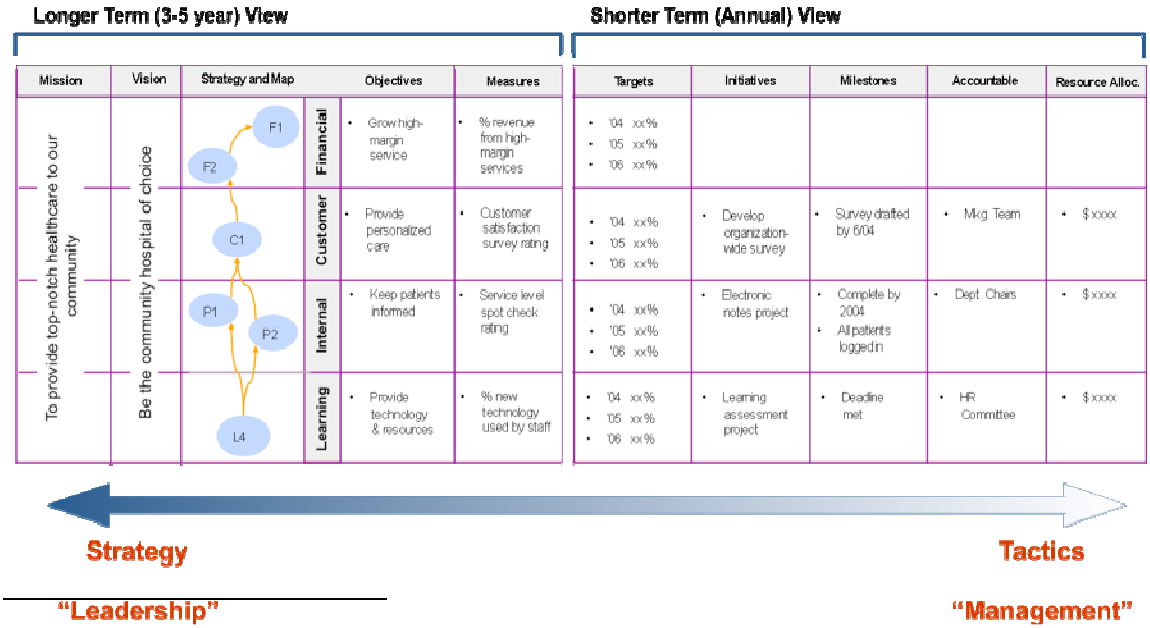


Let's take a look at one healthcare entity – the American Diabetes Association (ADA.) Their Mission, Vision, Goals and Values are as follows[1]:

- **Mission:** To prevent and cure diabetes and to improve the lives of all people affected by diabetes
- **Vision:** To make an every day difference in the lives of people affected by diabetes
- **Goal:** By 2007 we will continue to be the leading diabetes organization and will support our programs of research by increasing our income to $300MM while improving net margin
- **Values:** Integrity, Passion for making a difference, inclusion, leadership, ownership, trust

ADA's strategy was then translated into a set of operational tactics (remember, businesses are like researchers in that they create hypotheses.) The hypothesis is then tested with the implementation of their strategy through policy, communication and measurement. These are the fundamentals of the Balanced Scorecard approach – it provides a framework to link long term strategic objectives to short term targets, initiatives and accountability. These accountabilities are then translated into a "measurement" program.

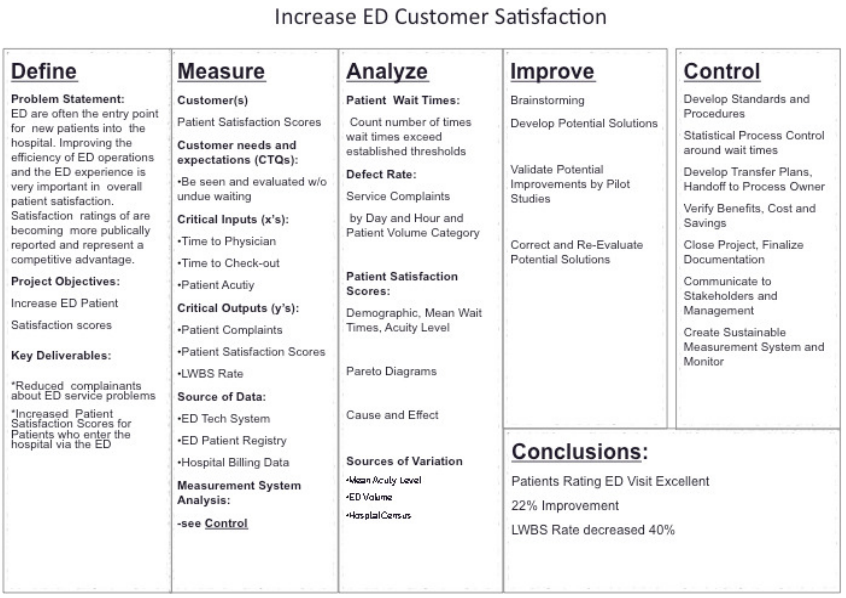




[1] As seen in Council of Engineering and Scientific Society Executives (CESSE) Pasadena, CA February 28, 2006

Six Sigma and LEAN

Often times just having people focus on the target (as seen above), you get better. We've all the heard the adage – "what get's measured, get's done". However, sometimes interventions need to occur in order to proactively achieve the desired results. Another management technique that helps us focus on becoming more effective and efficient is Six Sigma and its cousin, LEAN. As the manufacturing industry has realized, Six Sigma can help reduce unwanted variation in a process and LEAN helps us focus on reducing waste and improving flow. A cornerstone tool used in both Six Sigma and LEAN, is DMAIC – Define, Measure, Analyze, Improve and Control. As a management technique, DMAIC can help focus our attention on the right things. Here is an example of DMAIC in healthcare used to solve the problem of customer satisfaction.



Remember, we started with our Vision, Mission, Values and Strategy. From there, we looked at how our strategy could be cascaded throughout our organizations using multiple perspectives, including the customer perspective. The customer in our example is the patient (and their families and support systems.) We often need to do more than just **want** to improve customer satisfaction; sometimes interventions need to be implemented to make that happen. DMAIC is a tool that helps us strategize on techniques that make sense using a scientific approach.

Business Intelligence and Analytics

Central to Six Sigma/ LEAN and the Balanced Scorecard is measurement. By measuring the thing that we want to improve, we focus our attention on where we are and how much we have improved over time based on our theories about what impacts these key outcome measures. Metrics become critical to our success can:

- Provide a change agenda
- Translate the strategy to operational terms
- Link and align the organization around its strategy
- Make strategy everyone's job
- Make strategy a continuous process

Business Intelligence and analytics provide the technology and methodological foundation for measurement. As we have described (Nelson, 2007 and 2009), BI, or Business Intelligence is an umbrella term to describe the set of concepts and methods used to improve business decision-making by using fact-based support systems. Most people think of BI as reporting and querying through the web but it should be noted at BI can

also include the visualization of metrics through OLAP viewers, scorecards, dashboards or even the results from analytic processes.

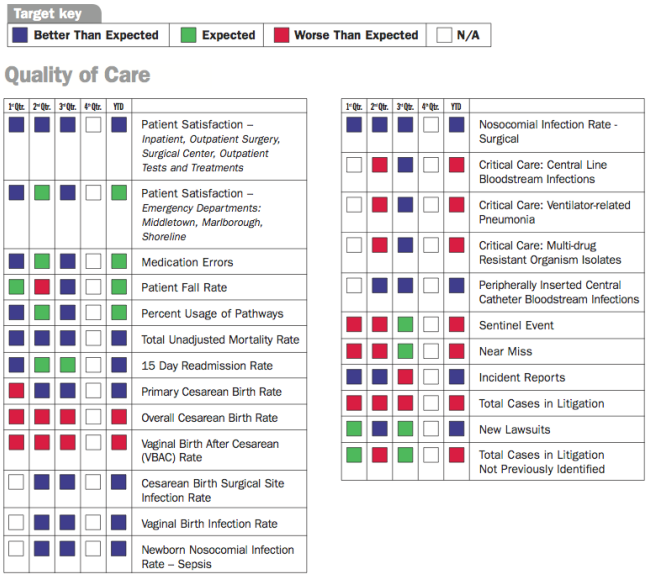
Business intelligence (BI) is about creating value for our organizations based on data or, more precisely, facts. From a modern business-value perspective, corporations use BI to enhance decision-making capabilities for managerial processes (e.g., planning, budgeting, controlling, assessing, measuring, and monitoring) and to ensure critical information is exploited in a timely manner. And computer systems are the tools that help us do that better, faster, and with more reliability.

Healthcare Business Challenges

As we seek to apply our newfound tools of BI, Balanced Scorecard and Six Sigma/ LEAN in healthcare, it is not difficult to find opportunities to demonstrate success. Here we'll outline just a few case studies.

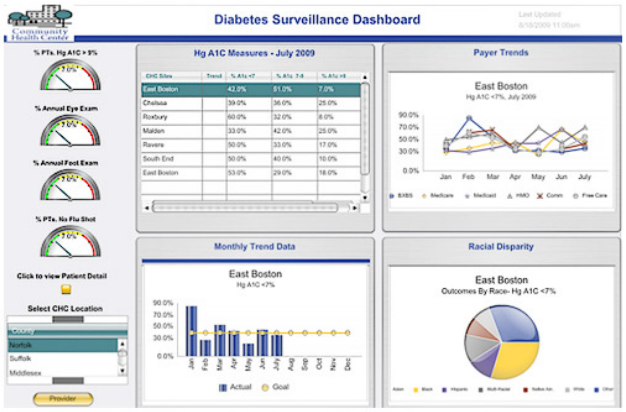
Clinical Quality, Outcomes and Patient Safety

The concept of evidence-based medicine is based on the simple supposition that if we see patterns in our data, we ought to pay attention to them. A hospital system in Salt Lake City, for example found that it unwise to perform caesarian sections on expectant mothers until at least 39 weeks. The data showed clearly a marked difference in the health of babies that were taken through caesarian before and after 39 weeks. This is evidence-based medicine – changing the way that medicine is performed based on data. The information, in this case, was taken from the organization's data warehouse that had accumulated information on thousands of patients and provided the basis for sounds decision-making.



While this example uses analytics to evaluate a theory that the physician may have about the world (health of babies and their mothers), the dashboard or scorecard can also provide an indication of success for measures that are critical to the organization's success.

For example, the dashboard presented below for a health system reflects on diabetes quality metrics over time. These provide high-level indicators as to the progress the organization is making toward their stated goals.

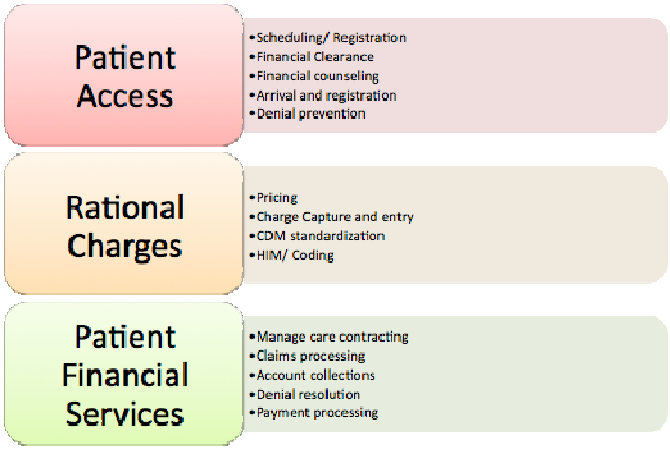


Other dashboards can provide visual cues of progress over time through traditional line charts, graphs and other dashboard indicators such as gauges indicating current performance.

The content of the dashboard is highly dependent upon the organization, its goals and what data is available. Risk adjusted healthcare quality measures such as inpatient mortality

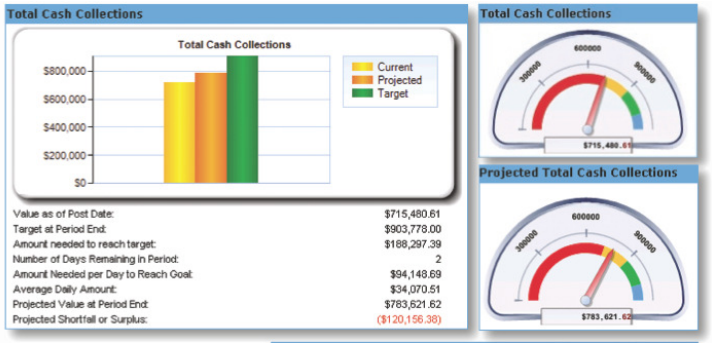
rate, readmission rate, complication rate are commonly accepted indicators of quality outcome success. It is often difficult to separate out quality measures from financial metrics as they often lead one to another. Having sound clinical processes are essential to achieving better than average healthcare quality outcomes. At a minimum, CMS mandated "core measures" should be considered for most quality dashboards. Furthermore, evidence based physician order sets and clinical care plans also provide a good foundation for quality process measures and physician compliance.

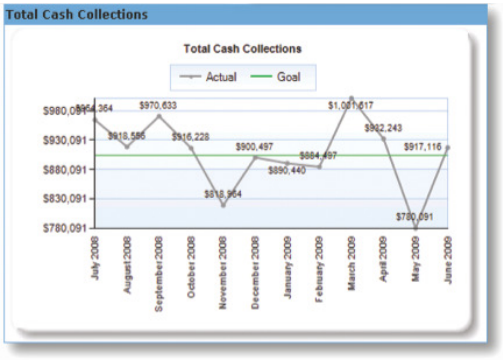
Revenue Cycle management



Revenue cycle management is another area ripe for BI and analytics. Revenue cycle management is all about facilitating cash flow. In healthcare, there are a number of obstacles that make this challenging. Traditionally, healthcare IT was focused on improving the bottom line and the systems used to support these, but neglected the entire life cycle flow of information. Early IT systems made sure that patient records were coded correctly so that invoices could be generated. As these systems have evolved, systems that manage information around the entire life cycle of revenue have grown into mature dashboards.

In the example below, a dashboard is used to monitor cash collections within a hospital.





Summary

As we have seen, there are a number of opportunities within healthcare to use management techniques to help link operations to organizational strategies. We have outlined just a few of these examples, but applications for Business Intelligence, Analytics, Scorecards and Dashboards within healthcare are limitless:

- Patient Risk Profiling
- Health Outreach Services
- Integration of comparative data
- Pre-hospital data integration
- Disease Management/Care Guidance
- Service Line Modeling
- Monitoring P4P contract metrics
- Public reporting measure improvement
- Patient safety monitoring
- Physician incentive programs
- EHR adoption and utilization tracking

- Monitoring and improvement of the consistency of care
- Capacity planning and optimization

It is with great excitement that we enter this second decade in the new millennium. Healthcare reform is getting the much needed attention it deserves and healthcare IT is focused on creating value from the data that is collected, managed and analyzed during the life cycle of a patient's experience – not just the financial remains of the patient.

We live in a time where BI is on the cusp of revolution (Nelson, 2010) – combining information, visualization techniques, social networking and new models of collaboration. The opportunities for improving our methods of decision-making will continue to grow as we seek to improve our effectiveness and efficiency.

As *The Economist* so eloquently articulated in a recent article (Economist, 2010), *"Information has gone from scarce to superabundant. That brings huge new benefits, [says Kenneth Cukier]—but also big headaches"*. The organization that can transform this data into insights will reap the benefits. No doubt that healthcare will become one of the beneficiaries of these advances.

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Biography:

Greg Nelson, President and CEO

Greg is a certified practitioner with over two decades of broad Business Intelligence and Analytics experience. This has been gained across several life sciences and global healthcare organizations as well as government and academic settings. He has extensive software development life cycle experience and

knowledge of clinical informatics and regulatory requirements and has been responsible for the delivery of numerous projects in clinical and business environments. Greg's passion begins and ends with helping organizations create *thinking data*® – data which is more predictive, more accessible, more useable and more coherent.

Mr. Nelson holds a B.A. in Psychology and PhD level work in Social Psychology and Quantitative Methods and certifications in project management, Six Sigma, balanced scorecard and healthcare IT.

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