

Developing an Analytics Strategy to Drive Change

You've got to think about big things while you're doing small things, so that all the small things go in the right direction.

—Alvin Toffler

An analytics strategy is more than simply a data utilization strategy, a data analysis strategy, a technology strategy, or a quality improvement strategy. In fact, elements of all these are required for an effective analytics strategy. An analytics strategy is necessary to ensure that an organization's analytics capabilities are aligned with its quality and performance improvement needs. This chapter discusses what an analytics strategy is, and will outline the steps necessary to develop an effective analytics strategy. In developing a strategy, the chapter will discuss the components of and inputs to an analytics strategy, stakeholders who must be involved in developing the strategy, communicating the strategy, and how to implement it for maximum success.

Purpose of an Analytics Strategy

The purpose of an analytics strategy is to guide a healthcare organization's (HCO) ability to rapidly respond to the information needs of stakeholders while maintaining a consistent direction in supporting the quality and business goals of the HCO. It provides a guide for sorting through many, perhaps conflicting information and analysis needs, and prevents the HCO from being too swayed by vendor hype and other distractions.

The strategy provides analytics teams with the focus and direction needed to establish analytics and business intelligence (BI) as a strategic resource for healthcare leaders, quality improvement teams, and other decision makers within the HCO. Ultimately, the analytics strategy must aid the HCO to determine:

- What data is most required to address key quality, efficiency, and performance issues facing the HCO;
- What major analytics development projects to undertake and on what tasks to focus the analytics team;
- What skills and knowledge are necessary in the HCO's analytics team;
- What data and integration infrastructure is necessary to support analytics initiatives;
- What analytics software and hardware tools to invest in; and
- How to maximize return on investment in analytics tools, teams, and training by demonstrating value to the HCO.

One definition of strategy is “a bridge that connects a firm's internal environment with its external environment, leveraging its resources to adapt to, and benefit from, changes occurring in its external environment,” and as “a decision-making process that transfers a long-term vision into day-to-day tactics to effect the long-term plan.”¹ This definition is pertinent to an analytics strategy because the analytics strategy will enable the HCO to leverage its information and analytics resources as it responds to and begins to control the many factors, both internal and external, that impact overall quality and performance. An analytics

ANALYTICS AND BUSINESS INTELLIGENCE

The analytics strategy is a critical adjunct to an HCO's BI strategy, because the hardware, data integration, and data management required for BI also enables the use of analytics. If an HCO is just embarking on the development of a BI infrastructure (perhaps including enterprise data warehouse development), then analytics requirements should be considered during the requirements gathering phase. If a BI infrastructure is already in place, an analytics strategy can help to identify any gaps that exist in BI that might need to be addressed to fully enable the desired analytics requirements of the HCO.

strategy also helps to guide day-to-day decisions regarding systems, people, tools, and techniques, with the long-term goal of enabling analytics to provide information and insight regarding the most pressing problems facing the HCO.

HCOs should develop a strategy for analytics to ensure that the information resources of the organization are aligned with the activities necessary for achieving the HCO's quality and performance goals. Having a strategy cannot guarantee success, but without a strategy, analytics and IT development, team formation, and infrastructure procurement will proceed without the benefit of any clear plan or mandate. This likely will result in an investment of money and time (both resources usually in short supply) in analytics infrastructure, technology, and development projects that *may not* contribute to the fundamental goals of the organization, and may distract the HCO from achieving its goals.

One of the most challenging aspects of working in a healthcare environment is the “emergencies.” Not the medical emergencies—those are the domain of the clinicians—but the frequent and urgent need for data and information. These urgent requests range from information required by government agencies, to data for critical incident occurrence reviews, to a quick aggregation of data for a researcher racing to meet a grant deadline. These are a fact of life when working with healthcare data and cannot be avoided, but they should not result in complete and utter chaos within an analytics team.

One struggle for healthcare analytics teams is to maintain sight of “true north,” that is, to know where and when to resume work on strategic priorities despite many competing demands. The analytics strategy can help prevent analytics teams from becoming overwhelmed and underproductive by keeping the organizational priorities in focus. Without a strategy that outlines what the analytics priorities are and against which to judge the priority of new and urgent requests, what gets done is usually the request initiated by the person who is the most persuasive, or the problem that seems the most interesting to the analytics team, not necessarily the issue or problem that is the most important to the organization as a whole.

An analytics strategy that aligns with the quality and performance goals of an organization will help the analytics team balance competing requests with strategic priorities and help the team maintain their productivity by reducing the feeling of being overwhelmed. A solid analytics strategy will help enable the analytics team to become a strategic information resource for business improvement and not simply purveyors of reports and data. When analytics teams are primarily occupied fulfilling the data requests of others, the result is that not much time is available for the strategic development of the group.

STRATEGIC DEVELOPMENT VERSUS DEVELOPMENT BY AGGREGATION

I often joke (somewhat ruefully) that analytics tools and capabilities within an HCO are developed through aggregation instead of through design and strategy. For example, whenever an analytics team gets a request for information, they might add the report, dashboard, or other analytics tool to the general analytics or BI repository because “somebody else might need it.” The result is a sizable collection of reports and other tools that even the team doesn’t remember what they all do. To make matters worse, this causes work to be replicated because one analyst may not be aware of what somebody else has done, or because the original work has been lost in the collection.

Analytics Strategy Framework, with a Focus on Quality/Performance Improvement

In most healthcare information technology (HIT) initiatives, the information technology (IT) department of an HCO is primarily responsible for the implementation and maintenance of the technology itself (that is, the hardware, software, implementation, testing, and maintenance). The primary *users* of HIT, on the other hand, reside within the business side of the organization, and it is also the business side that gains benefit and value from having such tools in place. The partnership between the business side and IT in development of an effective BI and analytics infrastructure may at times be at odds, not because of competing interests necessarily, but because each group may not be aware of or fully understand the interests and priorities of the other.

Building an Analytics Strategy—Templates

To download sample templates and worksheets for developing an analytics strategy within your organization, please visit this book’s web site, <http://HealthcareAnalyticsBook.com>.

Healthcare analytics is not immune to this requirements tug-of-war between IT and the business side of an organization. For example, with

clinical applications such as EMRs, the end users are decidedly clinical, whereas IT personnel, who are primarily nonclinical, are responsible for system deployment, support, and maintenance. Analytics development tends to require significant input and participation from both the IT and business side of the organization and should include clinical, data, statistical, application, and technical subject matter experts. With the diversity of skills, knowledge, and people working on analytics for quality improvement and other projects, the analytics strategy helps HCOs:

- Recognize and agree on the quality and performance goals of the HCO;
- Determine the best methods for achieving those goals;
- Identify the analytics required to enable those methods; and
- Assemble the team, build and/or buy the tools, and implement the techniques necessary to make the analytics work.

Figure 3.1 illustrates an analytics strategy framework that incorporates the key components of an effective healthcare analytics system that supports



FIGURE 3.1 Analytics Strategy Framework

quality and performance improvement. The areas that should be considered in a comprehensive analytics strategy include:

- Business and quality context
- Stakeholders and users
- Processes and data
- Tools and techniques
- Team and training
- Technology and infrastructure

These components of an analytics strategy framework are discussed in the following sections.

Business and Quality Context

The business and quality context outlines the business problems facing the HCO, and the quality, financial, and performance goals to which the HCO is committing to address those problems. It is essential to start drafting the analytics strategy with a clear understanding of the needs and requirements of the business; without clear guidance from the needs of the business, analytics may not provide the insight and information required to support the evidence-based decision making necessary to achieve the desired quality and performance goals. To this end, all elements of an analytics environment should be aligned in support of the needs of the business.

The root of every successful analytical venture in which analytics is actively used throughout an HCO by decision makers is a detailed description of the problem being addressed and a clear articulation of why solving that problem is important to the organization. A well-articulated business problem defines a gap between the current (undesirable) state and the future (more desirable) state. Without a clear and concise problem definition, much effort and resources may be focused on addressing mere *symptoms* of a much deeper-rooted problem, or on issues that are not really a priority at all.

There are many types of problems facing HCOs, ranging from financial pressures to regulatory requirements; problem statements identify which are the most pressing for an individual HCO to address at a given time. The types of problems that HCOs need to address will also direct the types of analytics (and supporting data) required. Some problems typical of those experienced and expressed by HCOs include:

- **Clinical quality.** Is the HCO providing the best possible care and diagnostics at the right time, to the right patients, and in the most efficient and safe manner possible?

- **Financial.** Is the HCO making clinical, operational, and administrative decisions that are the most financially sound while still in the best interest of the patients?
- **Patient throughput and value.** Is the HCO providing value to its patients by minimizing the time they must wait for appointments, assessments, treatments, or other services within the organization, and are they satisfied with the performance and care they experience?
- **Human resources.** Is the morale and well-being of the HCO's staff consistent with HR guidelines and, more importantly, consistent with positive patient experiences?

Quality and performance targets are a necessary accompaniment to the problem definition. HCOs cannot possibly improve every process, eliminate every inefficiency, and reduce every risk at once; otherwise, chaos will ensue and *nothing* will improve. Quality and performance targets define what the current priorities of the HCO are, and help to focus the efforts of quality improvement and analytics teams.

The quality goals represent the most pressing problems that have been identified by stakeholders in the organization, highlight what most needs to improve, and indicate the desired or target performance levels. An analytics strategy needs to include the most relevant and important quality goals. This is because an HCO needs to communicate these critical goals to all relevant programs, departments, and units that will be held accountable for their performance.

Stakeholders and Users

From a project management perspective, stakeholders are “individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution” and “may also exert influence over the project and its results.”² Likewise, an analytics stakeholder is a person or group of persons who are impacted by, will be users of, or otherwise have a concern or interest in the development and deployment of analytical solutions throughout the HCO. In a modern HCO there are few people who are *not* impacted in some way by the use of analytics to improve quality and performance, and there are fewer yet whose roles could not be enhanced through the innovative and effective use of analytics.

When developing an analytics strategy, it is important to elicit and document what each of the stakeholders will require, and develop approaches to ensure that their information needs are being met. There are many stakeholder groups within an HCO; analytics stakeholders typical within an HCO are summarized in Table 3.1.

TABLE 3.1 Summary of Stakeholder Types within an HCO

Stakeholder	Description
Patient	The person whose health and healthcare experience we're trying to improve with the use of analytics.
Sponsor	The person who supports and provides financial resources for the development and implementation of the analytics infrastructure.
Influencer	A person who may not be directly involved in the development or use of analytics within the HCO, but who holds considerable influence (positive <i>or</i> negative) over the support of analytics initiatives.
Customer/user	A person within the HCO who accesses analytical tools, or uses the output of analytical tools, to support decision making and to drive action.

Patient. The most important analytics stakeholder within an HCO is the patient. The patient is the reason healthcare exists, and is whom we are trying to care for in safer, more efficient ways through the use of analytics. Most pertinent quality improvement methodologies implore quality improvement practitioners not to lose sight of what is the best for the patient. Although it is possible to forget this fact when not working on the front line, analytics professionals must always remember that they are building analytics to directly support the teams that improve the health and in-hospital experience of the patient.

Sponsor. The sponsor may be one of the most critical stakeholders in the successful implementation and application of analytics within the HCO. The project sponsor is “the individual or group within or external to the performing organization that provides the financial resources, in cash or in kind, for the project.”³ This is the individual (or group of individuals) within the organization at a corporate level who approves, or provides a very strong recommendation to approve, the financial resources necessary to implement a viable analytics infrastructure. In many HCOs, the sponsor may be the same executive who recommends and/or approves funding for other IT initiatives. Keep in mind, though, that analytics efforts cross the boundary between IT and the business so there are likely to be clinical, business, and/or technical sponsors for analytics initiatives.

Customer/user. From a project perspective, the customer is the individual or group that makes use of a project's product.⁴ Although the customers and users are often synonymous, within a large organization the customer is often the one who *pays* for the product or work, and the users are the ones who make direct use of the product. The customers and/or users are the

individuals within the HCO who require and use the information and insight available with analytics. It is important not only to know *who* these analytics users and customers are, but *how* they intend to interact with the analytics tools and resultant data. For example, will the results of analytics be used to influence clinical decision making, financial planning, quality/process improvement, or for other reasons?

Influencers. Influencers are people who, though not directly involved in the development or use of analytics within an organization, wield significant influence over it. Influencers can be found at almost every layer of an organization. It is important that influencers be informed of and understand the benefits of analytics within an HCO. Without the support of influencers at all levels of the HCO, important analytics initiatives may suffer or even be shut down. Nothing is worse for analytics within an HCO than apathy—the thinking that the “same old” data and information is good enough when it clearly is not.

An obvious subset of customers are the “traditional” users of analytics—the decision makers, analysts, and quality improvement facilitators. It is not uncommon, however, to see more frontline staff, including physicians and nurses, receive information regarding their performance. In addition, analytics tools are making their way to the point of care as they become embedded in clinical applications, which in turn provides critical decision support evidence and insight to frontline providers when and where it is needed most.

Stakeholders classified as users are likely to be the most diverse, and will vary on several important dimensions. Table 3.2 lists several typical customers or users of analytics, as well as a few high-level analytics use cases for each user that are indicative of how analytics will be applied.

TABLE 3.2 Sample Analytics Customers with Analytics Use Cases

Customer	Sample Analytics Use Cases
Physician	Use real-time analytics for improving diagnostic accuracy. Use personalized performance report to adjust care practices.
Unit manager	Determine which patients are likely to exceed length-of-stay targets.
Quality improvement team	Identify bottlenecks in patient flow. Evaluate outcomes of quality improvement initiatives.
Executive	Evaluate and monitor overall performance of the organization.

Analytics Use Cases

Discuss and document analytics use cases with all stakeholder groups; this information will inform future decision making concerning data, infrastructure, and usability.

When developing the analytics strategy, it is a good idea to document analytics use cases, or how stakeholders intend to use analytics to make decisions and guide quality and performance improvement projects. Analytics use cases, in combination with goals and objectives of the organization, identify what data elements are most important, what indicators will be necessary to calculate, and what types of accessibility and usability factors (such as dashboard design, configuration of automated alerts, and mobile access) need to be considered. Information elicited from stakeholders to develop analytics use cases should include:

- Specific problems being addressed by the HCO.
- Decisions for which analytics insight is required.
- Actions that are triggered by analytics indicators.
- Risks that analytics identifies and/or helps to mitigate.
- What key processes need to be monitored and/or improved.
- What indicators are required to monitor quality and performance.

Obtaining as much information as possible about the possible uses of analytics will help to identify any gaps in analytics capabilities and reduce the likelihood that critical analytics needs will be missed.

Strategies for Working Well with Stakeholders

Analytics initiatives are most likely to succeed when stakeholders are involved throughout all phases of a project. Here are a few strategies for working well with stakeholders.

- Identify key members of each of the stakeholder groups.
- Understand the needs of each stakeholder group, and the needs of members within each stakeholder group.
- Listen to, acknowledge, and act on the input of stakeholders.
- Keep stakeholders informed of progress.
- Deliver on promises made to stakeholders and demonstrate the value of analytics in addressing the stakeholders' needs.

Processes and Data

Accurate, timely, and readily available data is the backbone of all analytics used for decision making, especially in quality and performance improvement projects. Without data, it is impossible to determine baseline performance, use a verifiable decision-making process to decide on improvement opportunities, or evaluate outcomes. Modern computerized clinical systems, such as EMRs, contain dozens if not hundreds of individual data elements; with multiple systems online within HCOs, the potential exists for thousands of possible data items from which to choose. Even if every data item captured from available computerized systems within an HCO is made available via an enterprise data warehouse or other data store, most of this data would require additional processing and analysis to be useful. To make data useful, an analytics strategy must address:

- How to determine which data is most important for quality and performance improvement.
- How the data is managed and its quality assured.
- How the data links back to business processes for necessary context.

See Table 3.3 for a summary of strategy components relating to data and processes.

TABLE 3.3 Strategy Components for Data and Processes

Strategy Component	Issues
Data sources	<p>What are the sources of data available? What data is necessary for the analytics required to address key business issues?</p> <p>What data sources (and data elements) are most important to address financial, quality, and performance issues of the organization?</p> <p>How is data integrated from source systems?</p> <p>How and where is data stored and made accessible to analytics; for example, is there an enterprise data warehouse?</p>
Data quality	<p>How good is the quality of available data?</p> <p>Is the data quality “good enough” for analytics?</p> <p>What gaps in data exist?</p> <p>Does metadata (documentation) exist for the data?</p>

(continued)

TABLE 3.3 *(continued)*

Strategy Component	Issues
Data management and governance	Who is responsible for data management, governance, and stewardship? What policies and procedures exist for data governance and management?
Business processes	What business processes and workflows align with important quality and performance issues of the organization? What data is available for measuring performance and quality of key processes? If no data exists, what proxy measures are necessary or available? What additional processing and analysis is required on available data?

Please see Chapter 5 for a thorough discussion on data quality, management, and governance issues and practice.

DATA QUALITY, MANAGEMENT, AND GOVERNANCE Before any analytics are possible, the relevant and necessary data must be understood and made available. Given the many possible sources of data within an HCO, one challenge is integrating data from these source systems into a manageable and accessible framework from which data can be drawn for analytics. These multiple data sources must all be managed to ensure suitability and usability for analytics purposes.

Tip

Data from source systems must be inventoried, analyzed, documented, and aligned with business processes.

Successful execution of an analytics strategy requires relevant data to be identified, documented, processed, and made available to appropriate analytics users and applications. It may not be possible, feasible, or even necessary to account for every available data source. When initiating, or improving, the use of analytics within an HCO, focus on ensuring access to data that is related to the organization's major quality goals and key business objectives. Trying to encompass too much will only serve to water down the strategy document and risk sully the insight and information required by stakeholders. Remember that a goal of the analytics strategy is to focus efforts on

achieving the most important quality and performance objectives of the HCO. As the organization's priorities evolve, so, too, can the strategy document remain aligned with the priorities of the organization. At this point, new business problems and additional data can, and should, be considered.

Tip

Remember that the goal of the analytics strategy is to focus efforts on achieving the most important quality and performance objectives of the HCO.

The quality of data available and used for analytics impacts what information, insight, and value can be derived from such toolsets. Data stewardship is a critical function in the management of large and complex data sets. Improper management of data can lead to BI producing incorrect information. Because the needs of every organization are different, the analytics strategy will help the HCO determine what data management and governance structures are best suited to the HCO based on the extent of existing and future data sources, IT support, and any existing governance structures already in place.

BUSINESS PROCESSES One of the other data-related challenges facing HCOs is adding context to data. From an analytics perspective, data and processes are inseparable; knowing what a value “is” is almost useless without knowing what it “means.” Knowledge of business processes provides essential context to and understanding of what data represents. A business process is the collection of actions taken to transform an input (such as raw material, information, knowledge, commitment, or status) into a desired outcome, product, or result and performed according to established guidelines, policies, procedures, rules, and subject matter expertise.⁵

The business processes are what provides context to the data, and without context, data is almost meaningless. Essentially all quality improvement methodologies require indicators and metrics that examine intervals on the other process measures. This requires a strong alignment between business process components and the data that measures those components. As part of the analytics strategy, you should consider if and how current business processes are documented, and how data items are mapped to these documented business processes.

Tools and Techniques

Once the business problems, quality goals, stakeholder requirements, and available data items have been identified, the necessary tools and

techniques, plus their acquisition strategy (build versus buy), need to be outlined in the strategy. Selection of appropriate software, statistics, or models is necessary to ensure that the “right kind” of analytics can be performed to address stakeholder needs and the HCO’s business problems. Inappropriate tools and misaligned capabilities can lead to issues as basic as providing an inappropriate summarization to using a predictive model that does not work with the data available or is inappropriate for the use an HCO was intending.

For example, if an HCO is looking to determine its geographic catchment area based on ZIP codes to fine-tune a marketing campaign, that information might be best presented visually using some sort of geographical representation rather than a table of numbers and ZIP codes. Not having the tools to properly visualize data in meaningful ways for decision makers would be a capability gap. Another example relates to advanced analysis; many reporting tools do not include anything other than basic statistics (such as mean, median, etc.). Yet sometimes an analysis needs to look beyond these simple statistics to determine correlation or to implement more complex statistical models.

Because there are many ways in which analytics can be used, there are many different types of analytics tools. Several of the most common types of analytics tools include:

- **Statistical.** Statistical tools are used for deeper statistical analysis that is not available in most “standard” BI or reporting packages, including correlation and regression tests, ANOVA and *t*-tests, nonparametric tests, and statistical process control chart capabilities.
- **Visualization.** Beyond the static charts and graphs typical of almost all spreadsheet and business analysis software, some analytics users are looking for advanced visualization tools that allow them to interact visually with and explore data that is dynamic (that is, the visualizations update as the data is updated).
- **Data profiling and quality.** Because the volume of healthcare data is growing, HCOs are increasingly relying on software to identify and highlight patterns of good and poor data within a data set, and to help fix and prevent instances of poor-quality data.

If an HCO has invested significantly in a BI infrastructure, there may not be much money available for analytics-related capabilities beyond what comes with the BI suite. Adding new and specialized tools to the analytics tool belt can become cost-prohibitive (especially when expensive “value-add” modules of already expensive base software are required). The good news is that there are very good open-source tools such as R (www.r-project.org) that can provide significant analytical horsepower without a prohibitively high price tag.

For More Information on Tools and Techniques

The landscape is constantly changing regarding the available tools for analytics. For an up-to-date summary of the most important tools and most recent developments, please visit this book's companion web site, <http://HealthcareAnalyticsBook.com>.

Team and Training

Analytics is a very quickly evolving field, and it is impossible for one person to be an expert in all aspects of BI and healthcare analytics. Training and professional development are key to ensuring that a knowledge gap does not become a gap in analytics capability within an organization. Professional development can (and most definitely should) involve both autodidactic and instructor-led instruction on the use of existing tools, the introduction to new tools, and education on new innovations in analytics (e.g., predictive analytics) and related technologies (e.g., new database formats for “big data”). Investing in analytics training is one of the smartest choices an HCO can make from the perspective of using available information to the maximum extent possible to enable evidence-informed decision making and smarter quality and performance improvement activities.

Analytics teams, especially those working closely with quality improvement teams, are not composed solely of “analytics professionals” (that is, expert developers, analysts, and/or statisticians). HCOs are creating more interdisciplinary teams to tackle quality performance improvement issues. For example, it is common to have MBAs and engineers working alongside nurses and physicians to tackle various issues facing an HCO. So, too, are analytics teams becoming more interdisciplinary. In fact, it benefits an entire HCO to ensure that stakeholders who rely on analytics have some degree of knowledge about tools, techniques, and technologies available for analytics. The information gathered in the “stakeholders” section of the strategy document can be used to identify what type of knowledge is required of all analytics users, and to develop a plan to ensure necessary information and/or training is made available.

There are many skills at which a healthcare analytics professional must be proficient. In general, healthcare analytics teams require broad knowledge in several key areas—the business of healthcare (both clinical operations and finance-related); technology (such as data warehouses, BI and analytics systems, and source systems such as EMRs); analytical techniques (including data and statistical modeling); and communications.⁶ See Table 3.4 for a summary of the common types of skills required of healthcare analytics professionals.

TABLE 3.4 Sample Skill Sets Useful for Healthcare Analytics Professionals

Skill Set	Description
Communications	<p>Analytics professionals must be effective communicators, both in listening and explaining. They must be able to listen to end users and subject matter experts to understand what information they need and how they intend to use it. They must also be able to explain analytics to those same people in a way that gets the point across.</p> <ul style="list-style-type: none"> ■ Effective, clear, and accurate writing ■ Data graphing and visualization ■ Requirements elicitation
Technical	<p>Analytics can be a highly technical field, therefore analytics professionals need to be competent in several key areas in which healthcare analytics intersects with other technology disciplines.</p> <ul style="list-style-type: none"> ■ Intermediate programming and computation skills ■ Database query skills
Clinical	<p>Healthcare analytics professionals must know enough about the business of healthcare, from both a clinical operations and a financial perspective, so that they are aware of the context from which the data used is drawn.</p> <ul style="list-style-type: none"> ■ Basic healthcare processes ■ Basic healthcare financing models
Quality improvement	<p>One of the primary uses of healthcare analytics is for quality and performance improvement, and therefore healthcare analytics professionals must be familiar with at least the major approaches and methodologies in use within their HCO. They may not need to be Six Sigma Black Belts, but should be able to converse with the practitioners of quality improvement methodologies.</p> <ul style="list-style-type: none"> ■ Lean, Six Sigma, or other improvement methodology ■ Process mapping ■ Team and group facilitation
Analytical	<p>Needless to say, healthcare analytics professionals must be analytical and curious in nature. The toughest of all challenges in healthcare analytics is identifying the root of a problem—and this requires more than simply going through the motions of applying statistical tests and building data models.</p> <ul style="list-style-type: none"> ■ Ability to think critically and analytically ■ Data centered; obsession with evidence-based problem resolution ■ Familiarity with and ability to use scientific principles in addressing quality and performance problems

In addition to bringing the right mix of people onto the analytics team, keeping their skills up to date and relevant is another important aspect of managing analytics teams. There are always new tools, approaches, and knowledge in the field of analytics. Regular training is required to keep analytics users' and developers' skills up to date, and they should be encouraged to maintain their own professional development. In this regard, there are certifications available in the field of analytics, and professional organizations, which enable analytics professionals to remain up to date.

It is unlikely that a single person can be proficient at all the necessary skill sets required for effective analytics within an HCO. However, there may be strong generalists who are good at several of the key areas. It is important to recognize what skills are required to develop, implement, and utilize the particular types of analytics your organization requires, what gaps may exist, and what to do to address any gaps.

Finding the Right People

It is absolutely critical to have the right mix of people on an analytics team. Look for people who are naturally analytical, curious, and creative, and who will mesh well within a team environment.

Technology and Infrastructure

Note: HIT infrastructure is a very large and important topic. It is impossible to do it justice in one small section of a book. The purpose of this section is to provide a high-level overview of how business and analytical considerations should drive technical requirements, not to delve deeply into all aspects of technical infrastructure.

Interestingly, technology and infrastructure are often the first stops along the analytics path taken by IT professionals. There are numerous reasons for this. Many analytics professionals reside in the IT departments within HCOs, and IT departments are naturally drawn to think about servers, networks, and other infrastructure requirements.

Analytics must remain very business-focused because of the information and insight needed by healthcare leaders, quality improvement teams, and other decision makers. The technology required to enable analytics, however, can be complex especially in larger organizations with numerous data sources and many stakeholders. Because of the volumes of data that may be available, the variety of sources supplying data, the sophisticated algorithms that can be applied to the data, and the speed at which decisions need to be made, analytics is growing beyond what can be accomplished

by a single analyst running statistical software on a stand-alone computer. Instead, a highly connected and reliable communications and data infrastructure to enable the sharing of what information analytics produces is necessary to drive evidence-informed decision making in most modern healthcare environments.

Aligning the Needs of the Business and IT

Ideally, the analytical needs of an organization and the technological requirements to supply those needs figure prominently in the organization's IT infrastructure deployment strategy.

An HCO's data infrastructure is the backbone of analytics. The three key elements of the infrastructure include the *network* (that provides connectivity between all elements of IT infrastructure), *servers* (on which applications are run and data is made available), and *physical storage* (the devices on which data are stored),⁷ and now cloud computing (in which case the data used for analytics may not be housed by the HCO at all). All these components are typically managed by an HCO's IT department, and they must be chosen and scaled appropriately to support the many applications and services required by an HCO.

Closely related to these more physical elements of infrastructure is what is sometimes called a *knowledge and discovery layer*. This layer of infrastructure is where integration of various data sources occurs. For example, the data resulting from a hospital visit by a single patient may span multiple source systems, such as admission/discharge/transfer, electronic patient record, lab information system, and radiology information system. For analytics, it is best if this information is integrated into a single view and the knowledge and discovery layer helps to logically link these various independent sources of data into a cohesive, comprehensive, and cross-silo representation of a patient's visit.

Although there are many different applications and tools that fit within this layer of infrastructure, the tools that are most pertinent to analytics and the most common in HCOs include Extraction/Transformation/Load services that copy information from source systems, transform it (into a form suitable for a data warehouse), and load it into a data store so that it is accessible for analytics. Newer approaches to integration include loose coupling of data so that a unified view of data spans multiple sources of data without necessarily needing to copy it all into a completely different data store; in other words, through a modified data schema, a "virtual" database can access data from source systems directly.

One challenge of developing an infrastructure to support analytics is that analytics requirements will undoubtedly expand as more data sources are added, new problems and issues confront the HCO, new analytical capabilities are required, and new hardware and software systems, optimized for analytical performance, emerge on the marketplace. Scalability, which “allows us to maintain a consistent level of performance regardless of changes and growth,”⁸ must be built into an analytics infrastructure so that the HCO has spare capacity to grow into as the amount and types of data, as well as analytics needs of stakeholders, continue to evolve and expand.

Although the analytics strategy may not necessarily state what technical infrastructure should be acquired, the strategy should make it clear what the near- and long-term analytics needs of the business are going to be. The decisions made regarding hardware selection and infrastructure design and configuration essentially set the boundaries for what analytics will be capable of within the organization. The analytics strategy can be a very important input to the HCO’s overall technical strategy—the sooner that analytical requirements can be incorporated into an HCO’s IT development plan, the less likely it is that technology will be purchased that is not appropriate (either insufficient or complete overkill) for the analytical requirements of the organization.

Developing an Analytics Strategy

Developing an analytics strategy is critical to ensuring that the analytical needs of an HCO are being met. Most HCOs will not be starting from square one, however. In all likelihood, there are many pockets of analytical know-how throughout every HCO, suffering through some inadequacy in analytics capabilities and not living up to an analytics potential. For example, some of these analytical pockets may be using outdated or inadequate tools for data management or analysis, some may be reaching the limits of poorly designed data warehouses, and others might simply be so overwhelmed with report requests that they are unable to perform any “real” analytics.

An analytics strategy is the starting point to help organizations achieve maximum benefit from their data. A completed strategy will help an organization identify what it does well, what it needs to do better, where it can consolidate, and where it needs to invest.

The three main steps in creating an analytics strategy are:

1. **Document the current state.** Review the six main components of strategy discussed above, and speak with stakeholders who are current (and potential users) of analytics to identify how analytics is currently used and what capability is required but does not yet exist, as well as what exists now but can be improved.

2. **Identify gaps.** Documentation of the current state will reveal a laundry list of things that are needed. Some of these gaps will be in infrastructure, some will be in software/tools, some will be in knowledge/training of the team, and some will be in knowledge of what is possible with analytics.
3. **Execute strategy.** Once the gaps are identified, identify which gaps are a priority to address and which can be addressed quickly and affordably, and develop a plan to implement the strategy's recommendations.

Many organizations in all industries spend a significant effort on developing a strategy but in the end fail miserably at executing on the strategy and achieving any of the goals and objects that the strategy was to enable. The bottom line is that developing a strategy is a wasted effort without a true intention and/or capability to execute on it. Having a strategy is simply not enough; organizations must find ways to actually execute what is set out in the strategy, otherwise it will become another piece of "shelfware."

An analytics strategy is not set in stone; it needs to evolve as the analytics needs of the organization and its stakeholders evolve, as technology becomes better and/or less expensive, and as the state of the art in analytics itself changes. An organization should not be afraid to revisit the strategy frequently to ensure that it is up to date and that its execution is successfully meeting all stated requirements.

Developing and Implementing an Analytics Strategy

For a full analytics strategy template that you can use to create and implement a detailed analytics strategy for your organization, please visit the companion web site to this book, <http://HealthcareAnalyticsBook.com>.

Notes

1. Steven Stralser, *MBA in a Day: What You Would Learn at Top-Tier Business Schools (If You Only Had the Time!)* (Hoboken, NJ: John Wiley & Sons, 2004), 153.
2. Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK Guide) 2000 Edition* (Newton Square, PA: Project Management Institute, 2000), 208.
3. Ibid, 16.
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5. Roger T. Burlton, *Business Process Management: Profiting from Process* (Indianapolis, IN: Sams Publishing), 72.
6. Steve Miller, "BI, Analytics and Statistical Science," Information-Management.com, April 19, 2010, www.information-management.com/blogs/business_intelligence_analytics_statistical_science_bi-10017679-1.html.
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