CHAPTER 10

Usability and Presentation of Information

[Design is] not just what it looks like and feels like. Design is how it works.

—Steve Jobs

Besides accuracy and timeliness, usability and accessibility are two of the most important qualities of effective analytics. Software that is not easy to use, for example, only results in frustration for the end users, who will then generate countless workarounds to bypass the source of frustration. If, on the other hand, software is easy to use, people are more likely to use the tool more often and be able to focus more on the task at hand. The usability and accessibility of analytics follow very much in the same vein.

One aspect of usability is presentation and visualization of information. Not everyone who needs information and insight for decision making, however, will be directly accessing a portal or other analytical tool, or will be a "professional" analyst used to working with data in multiple formats. Therefore, making the insights generated via analytics more accessible and easy to use by applying best practices in data visualization and presentation helps to ensure that the desired message is communicated clearly and effectively.

Presentation and Visualization of Information

People cannot use information they cannot understand or make sense of. The clear and appropriate use of graphs, charts, and other data visualizations can facilitate understanding of patterns in data, enable rapid evidence-based decision making, and effectively communicate the results of an improvement initiative (especially to people who may not always work with numbers).

Tip

The clear and appropriate use of graphs, charts, and other data visualizations can facilitate the understanding of patterns in data, enable rapid evidence-based decision making, and effectively communicate the outcomes of an improvement initiative.

The inappropriate or incorrect use of data visualization, however, may cause confusion, be misleading, and, in the worst-case scenario, result in unnecessary or inappropriate actions being taken (or necessary actions not being taken). For these reasons, data presentation and visualization is so much more than simply adding "pizzazz" to numbers; data visualization is a critical tool for healthcare analytics in the transformation of healthcare quality and performance.

Tip

Data visualization is more than simply an alternative to presenting data in a table.

Data visualization serves several important quality and performance improvement functions, and is a lot more involved and useful than simply making pretty pictures out of data as an alternative to simply presenting data in tabular form. Data visualization expert Nathan Yau states, "One of the best ways to explore and try to understand a large dataset is with visualization," and that it is possible to "find stories you might never have found with just formal statistical methods."[1]

The many data visualization functions include:

- Identifying trends and signals in quality and performance data.
- Communicating goals, objectives, and targets of the healthcare organization's (HCO's) strategy.
- Sharing results of improvement activities with quality teams, managers, and other stakeholders.
- Making numerical and statistical analyses more user-friendly.

The proper visualization approaches can clearly illustrate where problems in a process or workflow exist, can demonstrate trends, and can be much more intuitive than numbers or statistics alone. One example of the importance of visualization is the graphical analysis inherent in statistical

LEARNING MORE ABOUT DATA VISUALIZATION

For more information about data visualization, including full-color examples and design hints, please visit this book's web site, http://HealthcareAnalyticsBook.com, for additional resources.

process control (SPC) charts (as discussed in Chapter 9). When properly constructed, SPC charts can highlight changes in process performance and identify the need to take corrective action.

What Is Data Visualization?

Data visualization is the process of taking the output from analytical tools and processes (which may be in a raw statistical or numeric form) and visually representing that information in ways that allow decision makers and quality improvement (QI) teams to more easily comprehend and ultimately act on that information.

There are many ways that data may be visualized. Most commonly, visualizations will include charts of various types (such as bar, column, and line charts). Charts may be used on their own, as part of a report, or as a component of a performance dashboard. There are many other ways in which information users can interact with the output of analytics systems as well. As mobile devices such as smartphones and tablets become more ubiquitous and more powerful, many healthcare decision makers are demanding that information be available via these devices. Analytics visualizations implemented on mobile devices range from simple mobile versions of desktop-type reports and dashboards to fully interactive data exploration tools that take full advantage of the unique and powerful user interface capabilities of these devices.

Presenting and Exploring Information Effectively

Up to this point in the book, significant effort has gone into ensuring that high-quality data is available for analytics, and that appropriate analysis is performed on that data to ensure meaningful results. As illustrated in

Data Visualization

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Chapter 6, even basic data visualization in the form of histograms, for example, can help clarify and elucidate patterns in the data that may not appear through statistics alone.

Although healthcare research and the financial management of HCOs have always relied on data and its analysis, there has recently been literally an explosion in the use of data in almost all aspects of management in nearly every industry. This is because the amount of data available is increasing, and the tools to analyze the data have been becoming more powerful and easy to use. As the computational power of information systems has grown, so has their visualization capabilities. Before the advent of high-power graphics on computers, data (and the results of calculations) was most often displayed with simple tables and low-resolution black-and-white charts. Fortunately, we are no longer forced to consume information in this way. The visualization capabilities of most analytics tools, when used effectively, can now make most information easier to understand, especially when coupled with high-resolution digital displays and color printing capabilities.

As already mentioned, visualization is not about how fancy the analysis and reporting of a particular data set can be made to look. In fact, visualizations such as charts, graphs, and other representations overloaded with too much extraneous decoration (such as multiple fonts, colors, pictures, etc.) that do not add clarity to the information being presented actually become a distraction, can make representations look amateurish, and can confuse decision makers. Graphics should serve only to focus attention on the content of the intended message to be conveyed with a visualization. Edward Tufte, a pioneer in effective data visualization, coined the term "chartjunk" for all the extraneous decorations on a graph or chart that actually take away from the message being conveyed.[2]

The starting point for all data visualizations is to determine the message that is to be conveyed by the visualization, then selecting appropriate visualization approaches (such as type of chart) that suit both the message to be conveyed and the audience for whom the message is intended. Visualizations must be selected and drafted very carefully, because they may be viewed by an audience with varied experience in the context both of the data and of the visualizations employed.

Common ways in which visualizations are used are to demonstrate a relationship between data points, show a comparison between data points, illustrate a composition of data, or show a distribution of data,[3] as well as to display a trend over time and to highlight deviation.[4] These points are discussed in the following list.

- **Relationship**—examines if a correlation exists between two or more data points, for example, to see if a relationship exists between time waiting in the waiting room and left-without-being-seen rates.

- **Comparison**—contrasts different variables, for example, the number of admissions to each of a hospital's inpatient units over the last month.
- **Composition**—portrays a complete picture of a variable, for example, a tally of the different surgical procedures performed at an outpatient surgery clinic, or a summary of the different types of lab tests ordered, during a selected reporting period.
- **Distribution**—used to study how data points are distributed throughout a data set, for example, to plot the distribution of response times to an overhead page for an EKG technician, or to examine the wait-time distribution for patients on a surgical waiting list.
- **Trend over time**—used to plot a time series of a variable, for example, the number of patient arrivals to the emergency department, or the number of coronary artery bypass surgeries performed over the last 30 days.
- **Deviation**—used to detect when values deviate from historical or baseline levels, such as when evaluating the outcomes of QI projects and needing to determine if a change in process is having an effect.

Tip

Visualization involves determining the message that is to be conveyed and selecting the appropriate visualization approach that suits both the message and the intended audience.

Dashboards and modern analytics software tend to rely heavily on data visualization for communication of analysis and insights. Because users of information throughout the HCO will have different levels of experience with different types of visualizations, reports and dashboards with fairly widespread distribution must be made clear enough and straightforward enough for the majority of viewers to quickly grasp the point of the visualization. Less common graphing techniques, such as the trellis chart or the box-and-whisker plot, should not distributed in reports or dashboards without a clear explanation of how to interpret such visualizations.

Information Visualization and Graphing

There are myriad ways to display information to support quality and performance improvement, and healthcare decision making in general. In its most basic format, information can be displayed in a simple data table format (the type of report that has been available now for decades). More commonly, information is expressed in a graphical format such as bar charts, scatter plots, histograms, and maps, among many others.

Finding the Right Chart Type

The challenge is not to find a chart type to convey the information to be communicated, but to pick the *right* type for the information you are presenting and the intended audience.

The data visualization capabilities of much analytics and business intelligence (BI) software, and even common spreadsheet software, are rapidly expanding. The few choices that used to be available (such as bar charts, pie charts, and line graphs with a choice of 16 colors) on such tools have now exploded into a veritable arsenal of data visualization tools ranging from box-and-whisker charts and trellis charts to "sparklines" and bullet graphs. The challenge now is not to find a chart type to convey the information to be communicated, but to pick the *right* type for the information you are presenting and its intended audience. Table 10.1 provides a suggested mapping of data visualization techniques such as scatter plot and line chart for the various types of use (such as to display a relationship in data). Keep in mind that these are not hard-and-fast rules, but merely suggestions of what graphing techniques work best for which types of messages to convey. In addition, there are many other types of information display techniques (such as bullet graphs and sparklines) that I have not included in Table 10.1; as display techniques evolve, the list of available options will continue to expand. Remember that even though software vendors may invent creative new ways to display information, always be sure to choose the chart or graph that most clearly conveys the intended message of your information display.

Refer to the book's website at http://HealthcareAnalyticsBook.com for examples of the different chart types listed here (plus several others) and how they can be used to enhance the communication of information.

TABLE 10.1 Suggested Mapping of Information Display Techniques

	Scatter	Line	Bar	Column	Pie	Data Table	SPC	Box Plot
Relationship	✓	✓				✓		
Comparison	✓	✓	✓	✓	✓	✓		
Composition			✓	✓	✓	✓		
Distribution	✓	✓		✓				✓
Trend		✓		✓		✓		
Deviation		✓	✓	✓		✓	✓	

Note that SPC refers to a statistical process control chart, and Box Plot refers to a box-and-whisker plot.

Because of the number of options now available in many tools, the appropriate selection of data visualization is more important than ever. I know that many HCOs have had the experience of developing a dashboard, scorecard, or report that was critical for decision making, only to have it rendered essentially useless due to poor design choices. Any analytics visualization that focuses on "form," such as featuring multiple "gauges," 3-D effects, and unnecessary graphics over the clear, simple, and effective communication of information is likely doomed from the start!

Consider Figure 10.1, which illustrates a chart displaying the average number of X-rays per shift for a diagnostic imaging department. To "pretty up" the chart, a picture of one of the X-ray rooms is layered in the background. To make the picture more visible, a transparency was applied to the bars, which causes them to blend into the background—a poor design choice, given that the information presented via the bars (the average number of X-rays) is the reason this chart was created in the first place! To make matters worse, the designer of this chart included a pie chart to highlight the percentage of portable X-rays performed (the dark slice) versus the nonportable X-rays (the light slice). Even though the intent of adding the image, adjusting the bars' transparency, and including the pie charts is to make the chart more "interesting" and to convey more information, the actual effect is to make the information harder to understand. The exact same information is conveyed in Figure 10.2, which is not as visually distracting, thereby allowing users of the information to make sense of it more quickly and easily. Figure 10.2 very clearly shows that, on average, the 0700–1500 shift

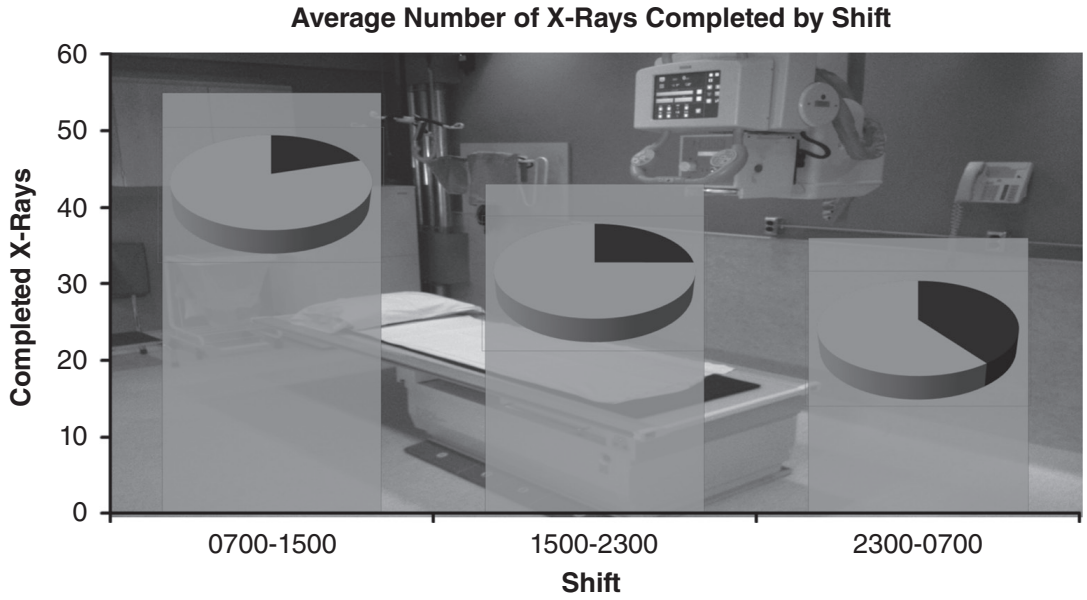

FIGURE 10.1 Sample of a Chart Exhibiting "Chartjunk"

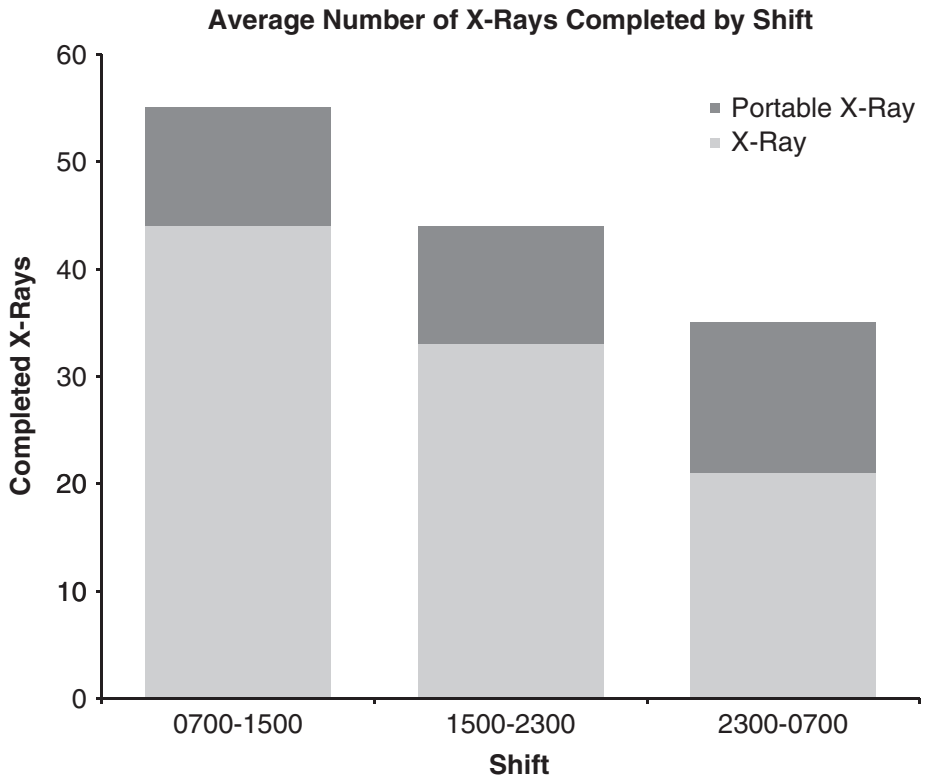

FIGURE 10.2 Sample of a Chart with "Chartjunk" Removed

performs the most X-rays, and that proportionately more portable X-rays are performed during the 2300–0700 shift.

How to Make Better Information Displays

It can be very frustrating to decision makers and other users of analytics when it is difficult to interpret or otherwise use the information that is contained on a chart. The causes of poor chart usability have been studied and grouped into types of problems that can negatively impact on the chart's ability convey the message intended.[5] A few examples of the types of problems identified are:

- **Explanation.** Some data element or other component is not explained (i.e., no definitions or descriptions are provided).
- **Discrimination.** Discrimination issues occur when items on the charts are not easily distinguished, such as charts designed for color but printed out in black and white, or symbols made too small to be readable.
- **Construction.** The layout of the chart itself is in error, such as tick marks that are incorrectly spaced, labels that are incorrect, incorrect scales, and other similar issues.

Many of these issues are illustrated in Figure 10.1. In particular, there is no explanation as to what the pie charts represent and the key information in the chart is difficult to discriminate because the bars have a transparency applied and tend to blend into the background.

In addition to the major problems to avoid that are given in the previous list, there are other tips that can greatly improve the usability of charts.[6] Some of these tips include:

- Make the data stand out (after all, it is the entire point of the chart).
- Do not clutter the data region—any additional "decoration" in the data region will detract from the overall message of the data.
- Use reference lines when appropriate.
- Strive for clarity—above everything else, the chart should be made as clear as possible so that the person looking at the chart does not need to work hard to clearly understand the message.

Don't let information presentation and visualization be the Achilles' heel of your analytics system. I have seen too many great analyses and insights ruined because somebody elected to use the default chart settings on a spreadsheet program or because somebody tried to show all the possible 3-D widgets on a single performance dashboard. A lot of time and effort goes into cleaning data, preparing metrics, designing reports, and building dashboards—spend the extra bit of time required to ensure that the intended message of a chart or other visualization is clear and that nothing in it detracts from that message.

Dashboards for Quality and Performance Improvement

The increasing pace with which decision makers and QI leaders must make decisions demands new compact methods of presenting information that enable more efficient synthesis of information and decision support. Computerized dashboards are now a very common approach with which to assemble the most important performance and quality information into a compact, accessible, and understandable format for decision makers.

Unfortunately, the term "dashboard" is perhaps one of the most abused words in data visualization today. It seems as though almost every executive, manager, and other decision maker wants a dashboard for their own particular use consisting of data that is uniquely important to them. Eager to comply, health information technology services and dashboard developers are happy to assemble a mash-up of the requested charts, tables, and gauges and deploy it, often without consideration of what other dashboards and visualizations are necessary or available.

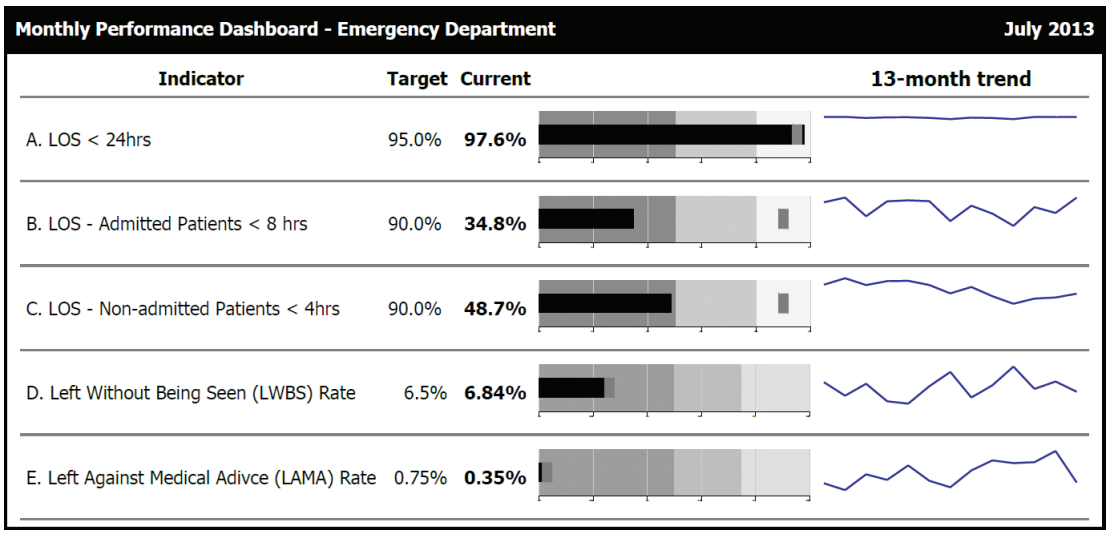

FIGURE 10.3 Sample Performance Dashboard

One of the best definitions of the term *dashboard* that I've come across and use to guide my own work is from Stephen Few, who states that "a dashboard is a visual display of the most important information needed to achieve one or more objectives, consolidated and arranged on a single screen so the information can be monitored at a glance."[7] By this definition, it is important (and essential) to see that dashboards are much more than a simple collection of charts, graphs, and numbers.

Most decision makers and QI facilitators request dashboards as a tool with which to quickly assimilate information, to determine if problems exist and where those problem areas are, and to guide decision making. Although some dashboards are primarily numerical, the power of dashboards is that they are highly graphical, compact, and can often communicate insight more effectively and efficiently than numbers and text alone, or more traditional report formats.

Dashboard

"A dashboard is a visual display of the most important information needed to achieve one or more objectives, consolidated and arranged on a single screen so the information can be monitored at a glance."

Despite the promise of information clarity and superior usability offered by dashboards, many have the opposite effect and serve only to confuse the user. That is why special attention must be paid to how the information will be used, how that information will be perceived, and what design elements are most appropriate for communicating the intended message. Dashboards do not have to be cute, but they must be functional.

See Figure 10.3 for a sample dashboard that highlights five basic performance indicators for a notional emergency department. The dashboard combines numeric and graphical elements that highlight current performance and compares it against the organization's past performance. To illustrate the emergency department's performance on each indicator over a 13-month period (July 2012 through to July 2013, inclusive), the dashboard uses a graphing technique known as "sparklines," which are in essence mini–line graphs without axes or value labels. Sparklines are useful when you need to communicate previous performance trends on a dashboard but not the actual values. Intended to be condensed, data-intense, and simple in design, the purpose of sparklines is to provide a historical context of performance data; additional details can be provided in supplemental graphs or reports.[8] In this case, adding a complete line graph for each indicator would both consume valuable space on the dashboard, and be unnecessary because the trends are clearly visible without axes and labels present. The dashboard in Figure 10.3 also uses a bullet chart to illustrate the percent of cases that achieved or exceeded performance targets. Bullet charts are designed to "display a key measure, along with a comparative measure and qualitative ranges to instantly declare if the measure is good, bad, or in some other state."[9] Bullet charts consist of a series of background colors or shades that denote performance ranges such as "bad," "satisfactory," and "good." Bullet charts also include a marker that identifies the target value or comparative measure and the main bar itself that encodes the performance measure in question.

The purpose of a dashboard is to achieve one or more objectives, and therefore it should not be splattered with every indicator and data element available. This will reduce usability and perhaps lead to information overload. If dashboards are to serve for quality and performance improvement purposes, the information relayed on them must be related to this purpose. This means ensuring that true performance indicators and other measures related to QI are the sole focus of specific dashboards.

Tip

If a piece of information does not highlight a problem or impending issue, suggest a course of action, or evaluate the outcome, then the information should not be on the dashboard.

In my experience, building a special-purpose dashboard requires a focus on the specific indicators needed to monitor and evaluate a QI project. This focus in turn helps keep the QI team focused on the activities necessary to

There are many outstanding books, web sites, and other resources on the topic of effective dashboards. For a comprehensive listing of excellent resources on the design, development, and deployment of dashboards for quality and performance improvement, please visit this book's web site at http://HealthcareAnalyticsBook.com.

achieve the project goal, since the indicators serve as a reminder of what is necessary and important. QI dashboards that serve HCO administrators can replicate key project-specific indicators to allow a visual glance of how each individual QI project is performing.

Dashboards should fit on a single screen, on the reasoning that all the information a user needs to make a decision on an issue is available at a single glance. This is an important consideration; if a dashboard spans several computer screens or several printed pages, then you've created a report. I certainly do not disparage reports; however, if the need is for a single at-a-glance collection of key information required for decision making, then stick to a single-page dashboard.

A well-designed dashboard, or a series of dashboards, can be an invaluable tool for improving quality. With the right metrics defined, proper targets identified, and necessary action triggers, a dashboard can provide true insight into the performance of an organization. It is critical, though, that as much thought and design effort go into building dashboards that truly facilitate an analytical view as went into identifying quality goals, indicators, and targets in the first place.

Dashboard Design Hints

Dashboard deployment projects seem deceptively simple, yet often result in something less than useful. In my experience, a few critical success factors are necessary to create truly useful dashboards that support decision making and taking action to improve quality and performance:

- **Focus on the indicators that are most critical to quality.** Quality dashboards should include only those indicators that are aligned with the quality goals of the organization, or are essential to the ongoing monitoring and evaluation of current improvement projects. Information not directly relevant may still be important, but probably belongs somewhere else such as a separate dashboard or supplemental report.
- **Display appropriate indicators.** When displaying indicators on dashboards, be sure to select visualization approaches that allow important

information to "pop out." For example, drawing a simple line graph of a quality indicator may not be as clear as displaying information as a deviation from a target value. Because there may be multiple indicators on a dashboard, the information necessary to make a decision must be made as salient as possible.

- **Don't be afraid to develop multiple dashboards.** Too much information crammed onto a dashboard simply to meet the one-page definition only leads to confusion and greatly decreases overall usability of the dashboard.
- **Avoid all unnecessary clutter and decoration.** Many dashboard tools are offering more and more "eye candy," such as 3-D charts and fancy gauges, yet do not provide a strong suite of tools to draw simpler but more visually effective information displays such as bar charts and line charts, and lack support for truly innovative and effective information display tools such as bullet charts.
- **Include end users in the design of dashboards.** End users must be involved in the design of dashboards, because ultimately they are the ones who will be using the information on them to make decisions. Dashboards may lack relevance and decision-making impact without the consultation of end users.
- **Make the dashboard as visually appealing as possible.** Although in previous points I have stated that the dashboard designers should avoid trying to be cute or fancy in their designs because these elements detract from information usability, dashboards should still be visually appealing (even if it's in a plain vanilla sort of way). I am sure that everyone has seen dashboards that are strikingly ugly. Even though everybody has different tastes when it comes to design, by following the design guides for data visualization listed elsewhere in this book, and using common sense, it is possible to design a dashboard that is attractive, functional, and relevant to the quality and performance initiatives it is built to support.

With the goal of keeping dashboards on-message, Stephen Few has identified a library of essential display media components for the display and/or highlighting of data on dashboards. The components identified by Few consist of graphs/charts, images, icons, drawing objects, text, and organizers.[10] The most common of these are described in the following list.

- **Graphs.** The most common display media due to the preponderance of quantitative data to be analyzed and shared, the appropriate graph or chart to be used must match the type of data being graphed and the purpose for which the information will be used.

- **Icons**. Icons are simple images with a clear meaning whose job it is to showcase certain information and highlight trends within a dashboard; simple shapes such as circles, squares, and triangles often work best and do not contribute to clutter or chartjunk when used appropriately.
- **Text**. Although by their nature dashboards are designed to be primarily graphical, text is useful for communicating information that may not be suitable for graphical representation (for example, when reporting a single stand-alone measure or value that is not compared to other values, and for labeling chart axes).
- **Images**. In some cases, an image such as a diagram or photo on a dashboard can help clarify or highlight information (for example, a unit's floor plan that indicates which rooms need cleaning), but images should never be used purely for decoration.

See the book's website at http://HealthcareAnalyticsBook.com for examples of these various media and how they can be used to enhance information displays on dashboards.

Agents and Alerts

Another factor that enhances the usability of analytics is automation. Currently, much of healthcare analytics is "self-serve" or "push." Self-serve requires users to go get the information that they need to make a decision (such as run a report, or view a dashboard), they may not be inclined to do so (because they are too busy, don't like the tools, or for any number of other reasons). Self-serve BI and analytics is ideal because it eliminates the dependency on analysts and developers to constantly run data requests; people can get what they need on their own.

Some people, however, just don't want to get information on their own, or may need to be alerted when a condition has changed. Analytics "push" may risk turning decision makers and other information users into passive recipients of information. Many busy people in healthcare prefer to get daily statistics, dashboard updates, and other information delivered into their e-mail in-box. The downside of "push" is that people may tend to tune out information deliveries (that is, reports and dashboards in their in-box)

> Real-time data systems now make it possible to create meaningful alerts that can notify decision makers when certain conditions are being met.

if it's always the same information that is received. I have seen many cases where managers, executives, and other users of information within an HCO come to rely on the push of information, and lose the ability (or sometimes the interest) to access the analytics portal and to query information sources themselves.

It is ideal when decision makers are notified when a situation warrants attention instead of being consistently flooded with information. Real-time data systems now make it possible to create meaningful alerts that can notify decision makers when certain conditions are being met or specific situations arise. When alerts are used appropriately, executives, managers, quality teams, and others can be notified of these situations using e-mail, paging, messaging, or other means. This prevents them from having to continually monitor performance dashboards, and reduces the risk of missing something important when issues do arise.

In essence, alerts (or "agents") programmed to detect certain predefined conditions or to execute certain business rules scan available real-time data, or repositories of retrospective data, for instances that violate a business rule or predefined condition. These types of agents require data that can be used to calculate the business rules, and such data must be updated frequently. The data available, and the frequency at which it is refreshed, greatly impacts the complexity of the rules that can be executed and how often they can be run.

Some of the uses that I have seen alerts employed for include:

- Identifying patients for inclusion in clinical research studies (by comparing presenting medical conditions, prior history, and other data with study inclusion requirements) and notifying researchers and/or intake nurses; and
- Alerting executives when excessive ambulance offload delays are occurring (by calculating the length of delays based on arrival time).

Although alerts can provide very timely information to executives to allow for quick action to be taken, alerts are not a solution for everything. A few things to consider are:

- People quickly become "alert fatigued"; ensure that alerts are truly the best way to induce action; otherwise, too many alerts will lead to them just being ignored.
- Send alerts to the real decision makers; if alerts are sent to delegates without decision-making authority, the alerts may not be triggering timely enough action.
- Ensure alerts are accurate; decision makers do not want to be woken at 3 a.m. because a data glitch inadvertently triggered the alert.

Providing Accessibility to and Ensuring Usability of Analytics Systems

Most BI suites offer a portal-type interface where users can navigate throughout a file structure (similar to most computer operating systems) or more intuitive and interactive web-based interface to find the reports or other information they need. This is fine so long as the number of folders, files, reports, agents, and analytic applications remains manageable and well organized. Much like on any computer, however, as the number of resources needed to be organized increases, the more difficult it is to keep the structure logical and easy to navigate. The additional challenge with an analytics or BI portal is that the navigation structure is usually somebody else's idea—or, perhaps worse, is designed by committee—and so it may not be easy to remember or may not even make any sense to the person who did not design it.

As the information needs of an HCO expand, so do their existing analytics and reporting portals. This may have a very negative impact on usability; if users need to spend a lot of time searching for the report, dashboard, or analysis that they need, they either will find some other source of information, or, more likely, will contact the analytics team to find (and execute) the report they were looking for in the first place. This second scenario is especially wasteful given that it consumes both the decision maker's *and* the analyst's time with a request that should have taken almost no time at all.

One of the ideals of BI and analytics is "self-serve," where decision makers and other users who need information from dashboards, reports, or other analytical applications can access the tools within a portal or some other repository, run the application or dashboard, and retrieve the data they require. The win-win for self-serve is that people who need information can get it when they need it, without relying on an analyst to pull it for them. The analytics professionals are thus freed to put effort into building even better self-serve tools and to work on solving more in-depth problems than simple data requests.

The two main barriers to self-serve are poorly designed portals (as described above) and reports and other tools that take a very long time to run. A few enhancements to most analytics portals can greatly improve their usability and their utilization within the HCO. A few of the enhancements I would suggest include:

- Organize the portal effectively
- Provide comprehensive documentation
- Reduce/reuse
- Minimize runtime

Organize effectively. Although everybody thinks and organizes information differently, try to organize the portal logically; for example, organize based on quality goals and other groupings of strategic interest to the organization. For example, grouping dashboards, scorecards, reports, and other analytics tools by functional area, strategic objectives, or even tactical projects would be a format that most end users of the information would understand. But I would avoid groupings that make sense only to the developer (such as grouping by request date, or by original requestor).

Provide documentation. Users need to know how the analytics portal is organized. Ensure that comprehensive documentation is available (in either downloadable form or an online "wiki" format) that clearly outlines how the portal, data warehouse, or other repository is structured; what resources and reports are available and what information they provide; and how to run available reports and tools.

Some strategies that I have seen to improve the ease of navigation through analytics portals include a web page on the opening screen that includes quick highlights (for example, a "what's new"), a frequently asked questions (FAQ) section, and quick links to the most commonly needed dashboards, scorecards, reports, and other tools.

Reduce/reuse. One of the factors that decreases usability is the sheer number of reports and other tools that are available within a repository. Chances are that not all of those are active; those that haven't been run in a year or two, or are otherwise clear, can probably be removed from the repository. Try to reduce the number of reports by consolidating; many reports within a repository are likely variations on a theme. If there are many similar reports, for example, group them into a single report but create a user interface that allows for users to select which data items they need; this will allow users to run the report and retrieve only the information they require.

Minimize runtime. Another barrier to self-serve and analytics usability is the runtime of some reports, scorecards, and other analytics tools—especially if they are running on data that is not preaggregated and in which the server must process each record individually as part of the calculations. Needless to say, there are numerous reasons analytics tools run slowly, ranging from issues with the way the report is programmed to network latency and database indexing and other optimization issues. Analytics team members may need to work with additional technical specialists (such as database administrators) to help identify root causes of slowly performing analytics and to identify solutions.

These tips represent mitigations to the most common usability issues that I have seen regarding the use of analytics and BI portals. Overall, analytics teams need to be aware that how the information is made available in portals or other means impacts the usability of that information, and should strive to develop as intuitive, clutter-free, and easy-to-navigate analytics portals as possible.