Patient Safety and Quality Reporting for Governance: Data Reporting Guide for Hospital Staff
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Preface

Hospitals today have several disparate and centralized data sources that can be used to construct valid measures of performance, quality, safety, and service/product utilization. Application of standardized risk methodologies also allows for the computation of comparative metrics that can be used for outcomes monitoring. Faced with increasing demands from leadership, payers, and regulatory agencies to demonstrate and quantify improvement, hospital staffs are challenged to decide which measures need to be monitored and tracked over time. It is now widely acknowledged that measures are needed that can be computed at any given level within the organization. The measures being computed at the organization level need to be the same as those at the department/service line and practitioner levels to provide a common framework for understanding and communication.

Due to the diverse performance domain requirements of health care institutions and the current environment of increased accountability for governing boards, board members (trustees) need to be more vigilant than ever before in overseeing all of the activities of the hospital, including monitoring the quality and safety of care. While hospital board members do not direct daily operations or indicate to physicians and other health care providers how to treat their patients, they do need to monitor the quality and safety outcomes of care based on key indicators and metrics of performance. To this end, administrative staff or departments involved in preparing governing board reports need to utilize data visualization methods for selected measures that can be easily understood by board members. Performance data need to be presented in ways that allow trustees to easily pinpoint opportunities for improvement and gauge degree of improvement over time.

This data reporting guide provides a framework that can be used in synthesizing and making available data reports in formats that support review of progress toward meeting quality and safety improvement goals by the governing boards of hospitals.

Sanjaya Kumar, MD, M.Sc., MPH
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Introduction

Growth in the scope and complexity of health care delivery has complicated and expanded the task of monitoring organization performance. To meet this responsibility hospital boards and the staff that support them have looked outside the health care industry to adopt performance dashboards, scorecards, and other report types and statistical methods to provide a comprehensive and clear view of a health care organization’s performance.

The sample reports, scorecards, and dashboards presented in this monograph seek to distill performance data in several key areas into a few succinct metrics, providing boards and executives with user-friendly “snap-shots” of a complex organization’s overall performance, including insight into areas for improvement.

The composite reporting formats can be applied to metrics resulting from patient quality and safety efforts within the organization, as well as to the development of a quality, safety, and compliance dashboard. The selection of indicators for this dashboard can include national measures that would provide benchmarking capabilities, and those recommended by leading organizations focused on quality and safety. However, to be meaningful the dashboard metrics should reflect the organization’s priorities and what is most meaningful to the hospital’s patients and leadership (see Criteria for Selection of Indicators for Governance Reporting below).

Dashboard type indicators can be presented in many different ways; however, it is important that the data be easily interpreted and presented in a concise manner. Use of graphic formats that also demonstrate the relationship of the indicators to each other and to the organization’s goals are useful in indicating patterns and trends of performance. They also provide an additional level of functionality – globally identifying intervention focus areas—and can help trustees raise the kind of questions essential to good governance and oversight functions.
What are Indicators/Measures of Performance?

The JCAHO defines a health care indicator as “…a quantitative measure of performance that is used to evaluate and improve outcomes as well as the performance of various functions or processes of care.” There are two ways of measuring performance – assessing the level of compliance with accepted processes of care and evaluating the outcome of care as a whole.

A process-based indicator measures the degree to which the specific process being monitored is being followed, taking into consideration applicable population eligibility and inclusion/exclusion criteria, for example, monitoring how often eligible patients with an acute myocardial infarction that are admitted to the hospital receive aspirin within 24 hours of their arrival. Process-based indicators do not require any risk adjustment when performing comparative or benchmarking types of analysis. The degree of acceptance of process-based indicators is dependent upon the evidence base from published literature and accepted clinical care protocols and guidelines.

Outcome indicators on the other hand provide an insight into how well the organization may be functioning as a unit, for example, proportion of acute myocardial patients discharged dead, average length of stay, post-operative surgical
site infection rate, 30-day readmission rate, etc. To compare and benchmark outcome indicators, it is highly recommended that they be risk-adjusted.

Over the last two decades several standardized indicators/measures have been constructed from different data sources. Indicators constructed from administrative billing data are most commonly used. The Agency for Healthcare Research and Quality (AHRQ) has made available definitions of several key indicators constructed from administrative billing data for quality, safety, prevention, and health care services utilization. Quality and safety indicators from primary data sources are derived from specific programs or initiatives that the hospital is participating in. Examples of programs currently in place include the ORYX Core Measures program from the JCAHO, the National Healthcare Quality Improvement program from CMS, the Leapfrog Hospital Rewards Program, and the National Quality Forum’s (NQF) set of adopted measures.
The primary objective when selecting indicators/measures should be to include metrics that are indicative of the type of care and how well that care is being provided. In addition, indicators for governance reporting should reflect multiple organization aims, domains and accepted dimensions of performance. Since the publication of the IOM report *Crossing the Quality Chasm* in 2001, the industry has adopted the six organization aims and domains of performance included in the report. The grid on page 8 provides an example of how this can be done easily.

Indicators selected need to be common across different organizational levels, allowing all (from the top down) to understand the performance focus and the organizational strategy. For each indicator selected for inclusion on reports, the rationale for selection needs to be provided. See example depicted on page 8.
### Sample Indicators and Performance Domains

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Safety</th>
<th>Efficacy</th>
<th>Patient Centric</th>
<th>Timeliness</th>
<th>Efficiency</th>
<th>Equitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative/Invasive Procedures (Surgery)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Prophylactic antibiotics</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td>Timely prophylaxis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3.</td>
<td>Post-operative surgical site infections</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Selection of Performance Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rationale for Inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total unadjusted mortality</td>
<td>Data regarding mortality have become a primary focus of consumers, insurers, and public health agencies on the local and national level</td>
</tr>
<tr>
<td>Nosocomial infection rate</td>
<td>Nosocomial (facility-acquired) infections have a significant impact on cost and quality of care; tracking infection rates identifies potential problems in the surgical practice for selected procedures</td>
</tr>
<tr>
<td>14- and 31-day readmission rate</td>
<td>Unscheduled readmissions for same or related condition have significant impact on cost, quality of care, and patient wellness</td>
</tr>
<tr>
<td>Medication errors</td>
<td>Though less costly on an individual basis than nosocomial infections, medication errors are more common and suggest communication breakdowns among clinical staff</td>
</tr>
<tr>
<td>C. section rate</td>
<td>Measures total primary and repeat c. section rates; tracks hospital’s efforts to reduce the number of c. sections performed</td>
</tr>
<tr>
<td>Patient falls</td>
<td>Proxy for quality of care; patient falls also affect the cost of care provided</td>
</tr>
</tbody>
</table>
Suggested Indicator Reporting Formats with Examples

The examples of reporting formats depicted below provide an overview of how data from measures, metrics, and performance rates can be displayed to help trustees analyze performance to provide direction or guidance or determine whether to request additional information to better understand overall performance and trends. Discussion of each report format includes:

- **Purpose:** Indication of why and when such a reporting format can be used for visualization of indicator results. It also includes the type of information and inferences the report can provide and any limitations it may have. Included in this section are report preparation tips that will enhance and aid ease of interpretation for trustees.

- **Use:** Describes what trustees should be able to interpret from the report and as appropriate, what conclusions it does not allow trustees to reach, that is, what additional information board members may want to ask for to better understand performance. This section also suggests the level at which the particular report would be most useful—full board, committee review or both.
• **Questions for Trustees:** The kinds of questions trustees should be able to ask from interpreting the data presented in the report format depicted.

**Note:** The data contained in the scorecards/dashboards and reports/charts presented are for demonstration purposes only and do not reflect actual performance.

**Report Type 1**

**Composite Performance/Risk Meter or Speedometer Chart**

This type of chart provides an aggregated summary of performance based on a specific set of metrics and logic. It is best developed from data from multiple measures compiled into a single index. Very quickly the reader can tell whether or not there is need for concern. Details or drill downs can be provided for any areas of concern. The example below depicts a “Safety Risk Meter”. Color coding allows easy visualization of performance.

Another type of composite performance chart is depicted on page 11 and alternatively referred to as a Speedometer Chart, a Gauge Chart, or a Dashboard Chart. It is possible to achieve the desired effect by constructing a combination chart with a Donut Chart series and one or more Scatter Chart series, as shown.

**Purpose:** This type of chart is used for easy visualization of performance/risk of a domain-specific index or single indicators. The scale can be depicted using percents or a proportion from 0 to 1. The individual sectors have
further drill down and detailed data beneath in case the reader wants more information on why the index was at the rate indicated. In addition, benchmark or peer rates can also be plotted for comparative purposes.

**Use:** Use this type of chart for any selected reporting period when an index or composite/bundled metric can be computed, for example, depicting the overall performance of acute myocardial infarction process-of-care-based measures. The drill down will allow a view of individual indicators that make up the composite/bundled metric. In addition, the industry benchmark or prior period’s performance can be depicted by simultaneously plotting two arrows on the chart. This will show whether this metric improved or not over time or in comparison to the established benchmark for that period. This chart type will also work for reporting any continuous or composite measures across the dashboard of selected indicators. *Note that the scale can be reversed based on the direction of performance of the indicator.*

**Questions for Trustees:** A quick review of these charts will allow the reader to ask why the performance is within the category depicted. For example, when the indicator of performance is in the green region of the Safety Risk Meter, it denotes minimal risk. In this example, the green is the best place to be, as opposed to the red region of the chart.

Because there are summary level charts, detailed performance is not depicted. For indicators not performing within the desired performance range, trustees can ask for more focused information to be provided.
The radar/spider diagram (or radar chart) provides users with a “snapshot” of the performance of multiple measures as a whole at a fixed moment in time. The chart enables users to view interrelationships among various (often dissimilar) metrics as well as variances from target performance.

Best practice is to balance the diagram by choosing approximately the same number of metrics from each category. The diagram should include a circular line indicating target performance; the performance of each indicator is plotted in relation to that line. The outside edge (or circumference) of the radar chart represents the highest conceivable level of performance; the center point (or “bull’s-eye”) represents the poorest level of performance.

**Purpose:** The primary purpose of spider/radar charts is to provide a simple way to highlight and visualize the differences between the actual and target value for a
selected set of indicators for a given time period. This type of diagram also can demonstrate any interrelationships between the different indicators.

**Use:** As denoted above, the spider diagram can be used to display performance data on many indicators at once and in one graphic. It can be divided into quadrants to represent categories of indicators (as shown above). Spurious relationships may be evident, that then would lead to an investigation to either confirm or negate any relationship between indicators. An example might be a rise in nosocomial infections with a related increase in the nursing vacancy rate. Very quickly the reader can tell whether to be concerned or not based on thresholds and goals for each metric. Details or drill downs can be provided for any areas of concern.

**Questions for Trustees:** Trustees can see how the organization is faring in achieving the objectives represented by the indicators presented. The spider/radar chart is a good way to elicit a number of questions, such as:

1. How far from the target are this period’s results?
2. Have we exceeded the goal for this indicator?
3. Did we set the goal too low?
4. What was the benchmark used to select the target value?
5. Ask for indicator categories that might show relationships, for example safety metrics and nurse staffing indicators.

**Report Type 3**

**Risk Focus Chart (Risk areas represented in quadrants)**

This type of chart provides an aggregated summary of performance for two linked or associated measures at a time. The example below shows Average Length of Stay (LOS) on the Y-Axis and the ratio of Harm Vs. No Harm Medication Errors on the X-Axis. Each data point represents a value for Average LOS and Medication Errors for a given period of time (daily, weekly, monthly, quarterly, etc.).

Based on the quadrant within which any point falls, the reader can tell whether to be concerned or not. For example, the top right quadrant indicates more harmful medication errors within the selected reporting period with high average LOS.
**Purpose:** Different color contrasts quickly point out which regions are desirable. Quick eyeballing allows unusual outlier time periods to be identified outside the main cluster of data points.

**Use:** This report can help trustees identify zones of potential risk. Each point represents different time periods with associated X-Y Cartesian coordinates. A positive sloped football cluster shows strong positive correlation between both indicators. A perfectly rounded circle cluster shows no correlation and a rectangular cluster shows independence between the two indicators. A key or legend explaining how to interpret correlation data will help trustees more effectively use this chart. A single outlier can make correlation small or high; therefore, when constructing this type of chart, it’s better to eliminate any outliers before calculating correlation between the two measures.

**Questions for Trustees:** Data points falling in the red region require attention from trustees. Zooming in using a control chart will allow trustees to draw some conclusions across these time periods.
Report Type 4

Improvement Opportunity Charts (also commonly known as Pareto Charts)

This type of chart provides quick visualization of indicators to focus on for a given time period to gain maximum benefit. The data are represented from high to low rate of occurrence with a cumulative line. Based on this a reader can determine the measures at which improvement efforts should be targeted.

The chart presented below shows the proportional rate of self-reported events (Medication Errors, Adverse Drug Reactions, Falls, Privacy Violations, and Complaints) for a quarter. By drawing a horizontal line at 80% on the Y-Axis and then drawing a vertical line to the point that the horizontal line intersects with the cumulative rate, we determine that ME, ADR, and Falls need to be reduced as a priority.
**Purpose:** A pareto analysis is the process of ranking the items on the x axis. The chart provides information on the most frequently occurring event (as above) or the most common issue or problem identified. This chart can also be used to represent overuse or misuse of services.

**Use:** This chart is used to pinpoint the most important issues to pursue. The line drawn to intersect the X and Y axes at the 80% level shows that under this square and to the left are 80% of the issues or problems. This assists the user to make a quick visual decision as to what needs to be focused on, the “vital few” that have the most impact.

**Questions for Trustees:** Upon viewing data presented in the Pareto chart, trustees can see the issues or problems in the far left of the X-axis. They can then ask if and how these top 1, 2, or 3 issues are currently being addressed.

**Report Type 5**

**Bar Charts**

Bar charts are useful for showing measures with specific target values providing across time, objective indication of performance and rate of improvement (or regression). The target value could be a national benchmark rate for that measure.

Dashboards should contain both a primary target and a secondary “action trigger” target, beyond which immediate remedial action must be taken.

**Purpose:** Bar graphs are used to display measures of quantity. The length of the bar indicates the size, amount, or whatever unit is represented.

![Nosocomial Infection Rate](source: Health Care Advisory Board Interviews and Analysis)
Use: Bar graphs are used to make comparisons between different variables easy to see. They clearly show trends in data, that is, they show how one variable is affected as the other rises or falls. Bar graphs are one of the most simple and commonly understood type of charts.

Questions for Trustees: Time is a usual variable on the X (bottom) axis, so the information can easily show trends over time: months, quarters or years. Questions from trustees might be related to the differences over time that would have an effect on the values of each bar.

Report Type 6
Statistical Process Control Chart
These types of charts, based on the type of indicator shown, are very useful for judging trends and their significance. They are routinely plotted for one measure at a time over a defined period set by the user. The greater the number of points, the better trends can be judged. Additional information available on interventions can be super-imposed and plotted on the process control chart.

Purpose: The purpose of a control chart is to determine whether a special investigation is merited when the data from common cause variation is compared to the data displayed. An easy way to understand a control chart is to think of it as a normal distribution curve turned on its side. The peak of the bell curve is at the mean and median. The next lines are 3 standard deviations (SD) from the mean and tell the viewer how far away from the mean the data points are. The term “Translating” that appears on the sample chart on page 18 identifies the need to readjust performance measures based on the success of interventions implemented.

Use: This type of chart is used to determine if the variation in the data points is the result of common cause (expected variation) or from a special cause. If data points are outside the UCL and LCL lines, the cause for this variation requires further investigation because it is not a “normal and expected variation.”

Questions for Trustees: When data points appear outside either the UCL or LCL limits, the chart should include an explanation of the results of any investigation done
to find out the special cause for the variation. If such an explanation is not present, then trustees should inquire about the actions planned to address the variation.

**Report Type 7**

**Balanced Scorecards and Dashboards**
These types of reports are used to depict performance of multiple measures at the same time. Below are examples of scorecards and dashboards that show the measure, its performance, the desired goal, and a corresponding trend to date. The objective of dashboards is to focus senior executives’ attention on the institution’s most critical metrics and provide users with a more balanced view of the organization’s performance. Ideally, the dashboard should directly link to the organization’s strategic plan.
Preferably, the length of the dashboard report should be 1-2 pages, containing the metrics summary results in categories (clearly labeled). The usual form of presentation is tabular with control or trend charts to indicate performance over time. Dashboards usually also allow for comparison of current performance to baseline, short-term goals, and long-term goals.

**Purpose:** An executive dashboard is a powerful tool to keep everyone focused on the organization’s key issues and strategies. Well-chosen performance indicators displayed in an “at-a-glance” format that is easy to read, help identify areas that are doing well and areas that need improvement. A dashboard can include indicators such as financial viability, clinical outcomes, patient safety, quality of care, or employee, patient, and physician satisfaction.

**Use:** The measures in a dashboard should reflect the organization’s major objectives and strategies. Comments should be included where necessary to assist the reader.
in understanding and interpreting the information. It is important that the measures be compared to organizational targets and benchmarks to put the information in the proper perspective. The following key attributes need to be considered when constructing a balanced scorecard.

1. Have key strategic indicators linked to a vital few organizational objectives that require oversight or focused attention, for example pay-for-performance metrics.

2. Select key organizational measures that cover multiple critical dimensions of care.

3. Include performance targets that are benchmarks or best in class. These can be obtained from past performance, other facilities within the

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**Example 1: Sample Dashboards Indicators**

**QUALITY**

**Congestive Heart Failure Discharge Instructions***

<table>
<thead>
<tr>
<th>Percentage of Patients Receiving Comprehensive Discharge Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qtr 3/03</strong></td>
</tr>
<tr>
<td>62.4%</td>
</tr>
</tbody>
</table>

*Data shown are for illustrative purposes only and do not represent actual performance.

**Safety – OSHA Reportable Incidents***

<table>
<thead>
<tr>
<th>Incidences Per 100 FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Qtr 4/03</strong></td>
</tr>
<tr>
<td>8.4</td>
</tr>
</tbody>
</table>

*Data shown are for illustrative purposes only and do not represent actual performance.

**Target Derived from Department of Labor Statistics for Hospitals Nationwide.**

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**Source:** Center for Healthcare Governance
organization, from external sources or from published literature.

4. Use measures that will serve multiple reporting purposes.

Questions for Trustees: The dashboard is used to hold management accountable for meeting and exceeding benchmarks and targets and to instill a culture of responsibility and accountability for results. Questions need to be directed toward leadership regarding strategies or interventions being put in place to impact performance of selected measures.

Source: Center for Healthcare Governance
Example 1: Sample Dashboards Indicators (continued)

**Finance**

**Operating Margin**

Percent Operating Revenues Minus Operating Expenses

- 2004 Target: 1.8%
- 2005 Target: 2.3%

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qtr 4/03</td>
<td>3.1</td>
<td>2.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Qtr 1/04</td>
<td></td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Qtr 2/04</td>
<td></td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>Qtr 3/04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qtr 4/04</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data shown are for illustrative purposes only and do not represent actual performance.*

**Source:** Center for Healthcare Governance
Example 2: Sample Scorecard

Bronson 2004 Scorecard*

Clinical Excellence
- Overall Mortality Rate
- Overall Morbidity
- Evidence Based Medicine
- Patient Safety

Customer & Service Excellence
- Overall Patient Satisfaction
- Patient Satisfaction "Delighted"
- Physician Satisfaction "Delighted"
- Physical Surroundings Dissatisfaction
- EOS Leadership Scores

Corporate Effectiveness
- Growth
- Efficiency
- Net Operating Margin
- Community Perception

*Data shown are for illustrative purposes only and do not represent actual performance.

Source: Bronson Healthcare Group, Kalamazoo, MI
References


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