Cardiovascular Roundtable
The Advisory Board Company

The Outcomes-Driven Enterprise

Best Practices for Optimizing Data Collection and Utilization

- Streamlining Accurate Data Abstraction
- Facilitating Problem Recognition
- Building a High-Performance Infrastructure
- Promoting Accountability

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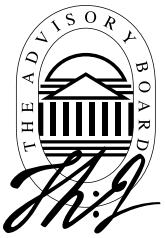

Cardiovascular Roundtable

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The Outcomes-Driven Enterprise: Best Practices for Optimizing Data Collection and Utilization is intended for broad dissemination among cardiovascular leaders (both administrators and medical directors) as well as other individuals involved in cardiovascular strategic planning, marketing, and program management. Roundtable members are welcome to unlimited copies without charge. To obtain additional copies of this study or other Cardiovascular Roundtable publications, please call 202-266-5920 and ask for a delivery services associate, or fax the order form below. Publications may also be ordered via our website at http://www.advisory.com.

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I. Preamble: Heeding the Call

Cardiovascular Care in the Spotlight

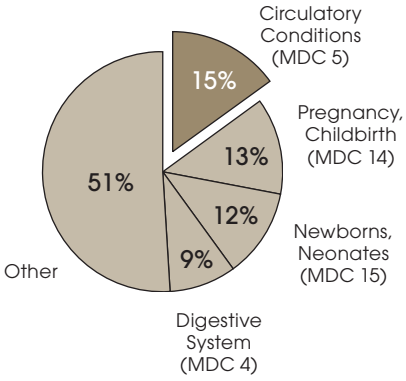
In terms of health care utilization and costs, cardiovascular care dominates all other clinical terrains. Specifically, circulatory conditions affect more patients than any other group of conditions. Moreover, while circulatory conditions represented 15 percent of hospital discharges in 2007, 20 percent of total hospital costs were allocated to treating these conditions, suggesting that cardiovascular services consume a disproportionate amount of resources.

CV of Critical Economic Importance

Hospital Discharge Distribution by MDC[1]

All Payer, 2007

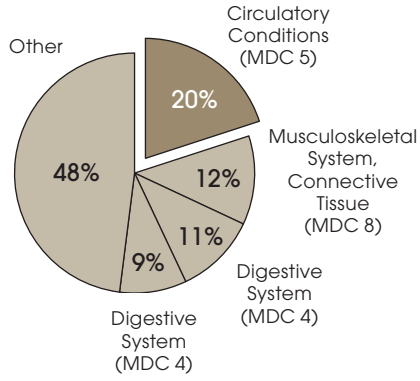
($39.5M Discharges)



Cost Distribution by MDC

All Payer, 2007

($343.9M)

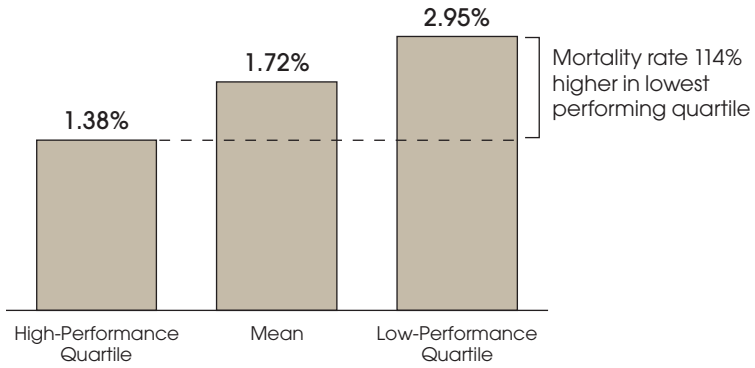


[1] Major diagnosis category.

Source: Agency for Healthcare Research and Quality, available at: http://www.ahrq.gov/data/hcup/, accessed September 1, 2009; Cardiovascular Roundtable interviews and analysis.

Significant Variations in Outcomes

In-Hospital Risk-Adjusted 30-Day Mortality Rates for Isolated CABG Surgery in New York State, 2006 Discharges



Inconsistent Outcomes Increasing Scrutiny

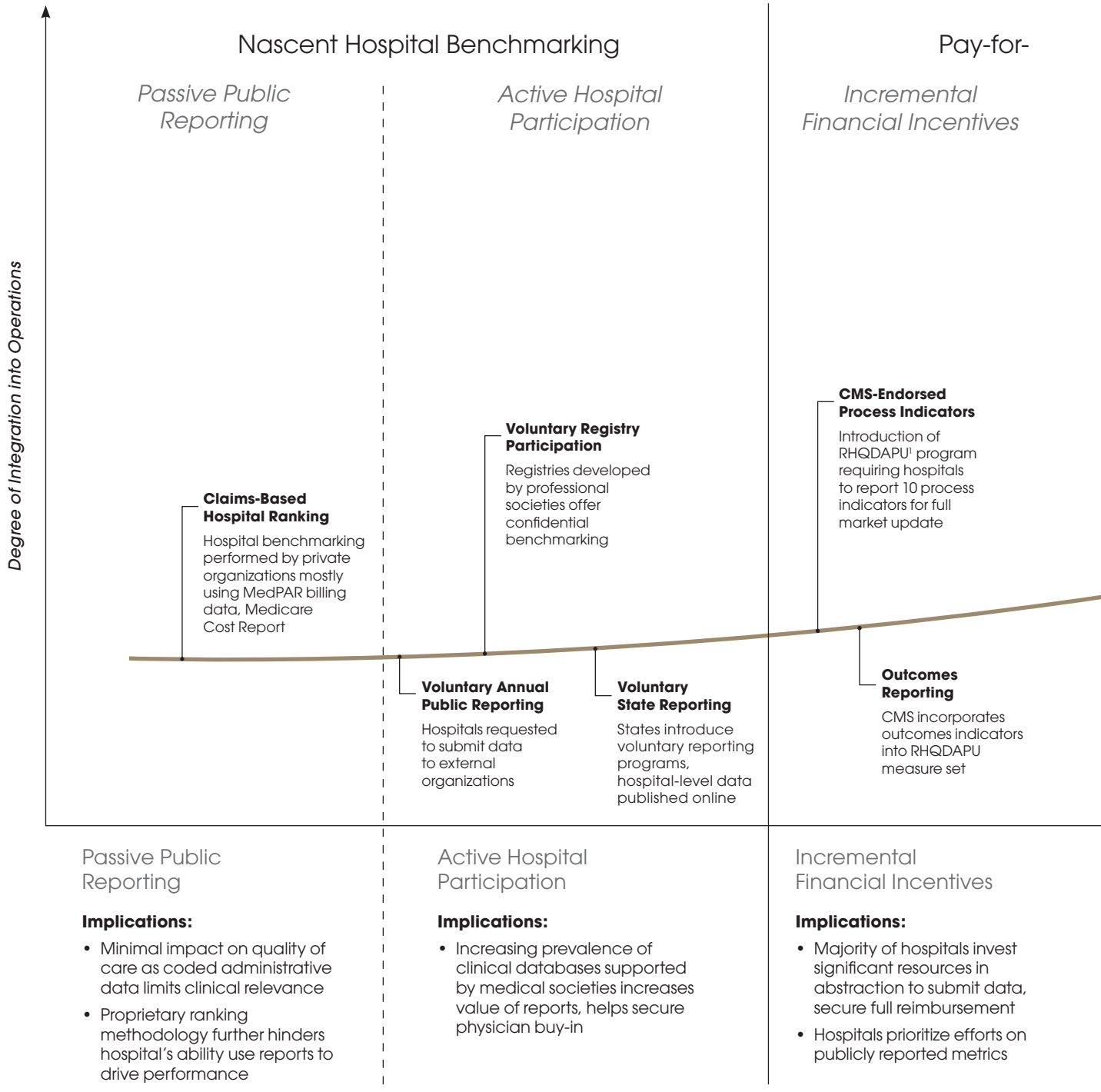
Furthermore, as highlighted by in-hospital 30-day mortality rates in New York, clinical outcomes vary considerably—mortality rates were 114 percent higher in the low-performance quartile as compared to the high-performance quartile in 2006.

As a result of the socioeconomic significance of cardiovascular services and variations in outcomes, payers have implemented a number of initiatives to elevate quality.

Source: New York State Department of Health, "Adult Cardiac Surgery in New York State 2003–2005," available at: http://www.health.state.ny.us/statistics/diseases/cardiovascular/, accessed October 9, 2008; Hospital Compare, available at: http://www.hospitalcompare.hhs.gov, accessed August 1, 2007; Cardiovascular Roundtable interviews and analysis.

Three Key Stages of Mandated High Performance

Payer initiatives to link reimbursement and quality can be grouped into three categories according to the extent to which quality improvement is integrated into hospital operations. The categories include: nascent hospital benchmarking, which ranges from claims-based hospital rankings to registry participation; pay-for-reporting initiatives, which may include incremental incentives to report data or place the entire payment at risk; and finally, pay-for-performance where reimbursement is directly tied to specific quality goals.



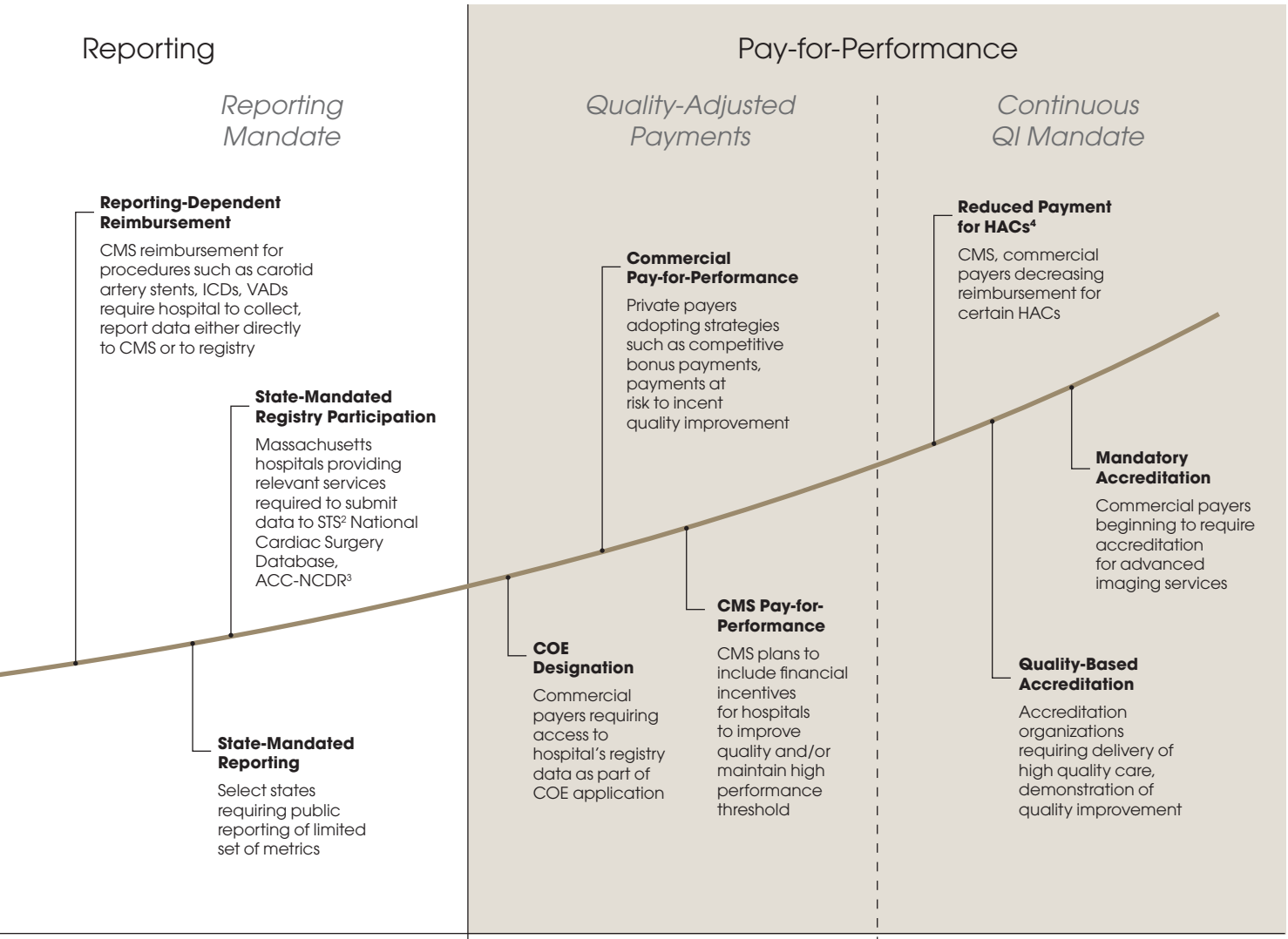
[1] Reporting Hospital Quality Data for Annual Payment Update.

[2] Society of Thoracic Surgeons.

[3] National Cardiovascular Data Registry.

[4] Hospital-acquired conditions.

While currently only a small portion of most hospital's reimbursement is at risk, the Roundtable expects pay-for-performance initiatives to continue to gain traction, particularly in light of recent health care reform proposals, all of which include aspects of pay-for-performance. Therefore, beyond simply collecting and reporting required measures, hospitals must integrate quality improvements into daily operations to help mitigate the risks of quality-based payment.



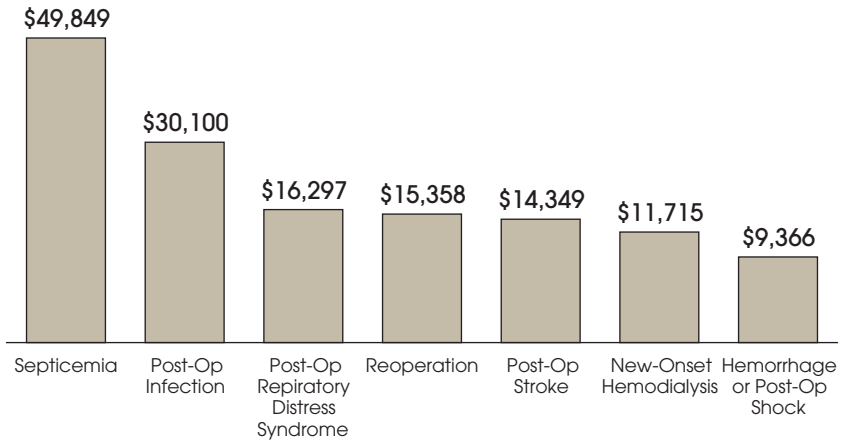
Source: Cardiovascular Roundtable interviews and analysis.

Quality Affecting Both Sides of the Profit Equation

In addition to affecting revenue, poor quality increases the cost of care. A recent study published by *The Annals of Thoracic Surgery* shows that the risk-adjusted incremental cost for complications such as septicemia and post-op infections are approximately $50,000 and $30,000, respectively. While the implementation of acuity-adjusted payment may result in incrementally higher payment for cases with complications, the additional reimbursement rarely covers the incremental cost of treating the complication.

Complications a Costly Business

Risk-Adjusted Incremental Cost of CABG Complications



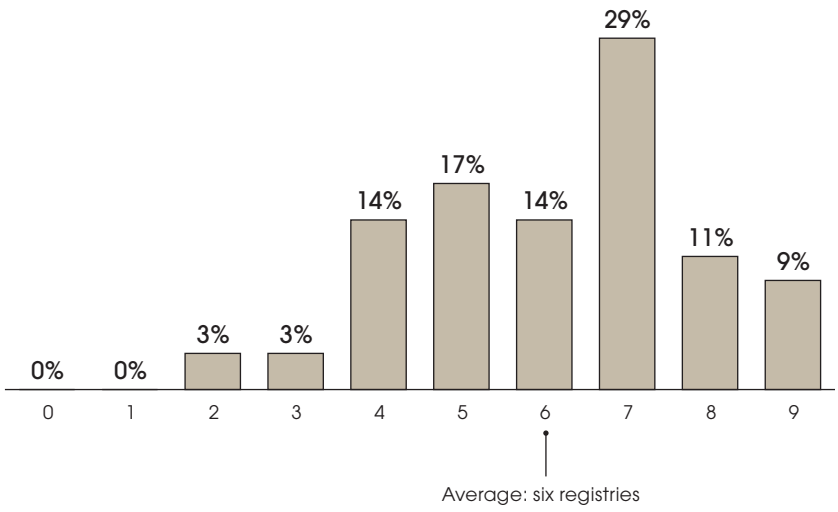
Majority Participating in Multiple Registries

Due to these financial implications and the imperative to monitor performance to help ensure that patients receive optimal care, most cardiovascular programs participate in registries. Results from the 2008 Cardiovascular Roundtable member survey indicate that hospitals participate in an average of six different registries. In addition to well known registries sponsored by the American College of Cardiology (ACC) and the Society for Thoracic Surgeons (STS), over half of survey respondents also participate in registries supported by Leapfrog, Premier, and the American Hospital Association (AHA).

Registry Involvement the Norm

Registry Participation Distribution

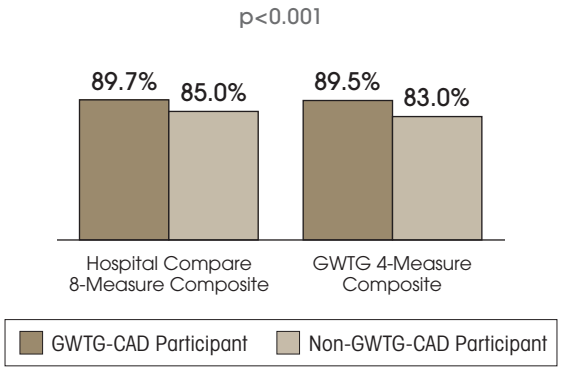
Cardiovascular Roundtable Survey Respondents



Source: Brown PP, et al., "The Frequency and Cost of Complications Associated with Coronary Artery Bypass Grafting Surgery: Results from the United States Medicare Program," *The Annals of Thoracic Surgery,* 2008, 85: 1980–1987; Cardiovascular Roundtable Outcomes-Driven Enterprise Survey, 2008; Cardiovascular Roundtable interviews and analysis.

QI Programs Elevate Guideline Adherence for AMI

Comparison of CAD[1] Composite Scores Between GWTG-CAD[2] and Non-GWTG-CAD Participants



Excerpt from Multivariate Analysis Comparing Composite Measure Scores Between GWTG-CAD, Non-GWTG-CAD Participants

Variable	Estimated Increase in Compliance with GWTG-CAD Participation	P Value
GWTG 4-measure composite	2.5%	0.03
ACE inhibitor treatment on discharge	4.7%	0.02
Tobacco cessation counseling	5.8%	0.05
Hospital Compare 8-measure composite	0.9%	0.37

Study in Brief

- Compared compliance with process measures of GWTG-CAD participants (223) with non-GWTG-CAD participants (3,407)
- Calculated two composite scores for each hospital: eight-measure composite score including all Hospital Compare AMI measures, four-measure composite score including the four "performance measures" used to guide performance achievement award selection in the GWTG-CAD program
- Composite scores calculated by dividing the number of treated cases by the number of eligible cases for the measures combined
- Results of hospital-based multivariate regression showed that GWTG-CAD participation predicted increased adherence in four-measure composite score
- Other independent variables including teaching status, number of hospital beds, AMI volume, and located in the Northeast predicted improved adherence in both composite measures

Registry Participation Linked to Elevated Quality

A recent study published in *Archives for Internal Medicine* provides evidence that registry participation is associated with improved adherence to evidence-based medicine.

Researchers created two composite scores—an eight-measure composite that included all Hospital Compare AMI measures and a four-measure score that included a subset of measures that Get With The Guidelines (GWTG) uses for performance award selection criteria—and compared performance between GWTG participants and non-participants. GWTG participants outperformed non-participants for both composite measures. Furthermore, GWTG participation was associated with reduced variation in compliance scores. However, the multi-variate analysis indicates that only the four-measure score (i.e., not the eight-measure score) was correlated with a statistically significant increase in compliance. These findings suggest that while registry participation is associated with improved outcomes, improvements will focus on metrics that are tied to incentives such as GWTG performance award selection criteria or pay-for-performance incentives.

[1] Coronary artery disease.

[2] Get With The Guidelines—Coronary Artery Disease.

Source: Lewis WR, et al., "An Organized Approach to Improvement in Guideline Adherence for Acute Myocardial Infarction," *Archives of Internal Medicine*, 2008, 168: 1813–1819; Cardiovascular Roundtable interviews and analysis.

Summarizing NCDR and STS registry Offerings

The NCDR and STS databases are the most dominant and nationally recognized registries with 91 percent of members participating in at least one NCDR and one STS registry. To assist members in evaluating registry participation, the Roundtable has provided a summary of each organization's registry offerings.

The NCDR is actively recruiting hospitals to five registries and is developing a sixth registry called Improving Pediatric and Adult Congenital Treatment (IMPACT). The organization is also developing an award recognition program for all NCDR registries and is collaborating with the American College of Radiology (ACR) to continue to develop appropriate use criteria and facilitate quality improvement initiatives in the imaging arena.

In addition to offering the registries listed, the STS has partnered with the Congenital Cardiac Anesthesia Society (CCAS) to develop an anesthesia component for the Congenital Heart Surgery Database. The STS and CCAS plan to introduce the updated Database in January 2010. Since January 2009, general surgeons have been eligible to participate in the General Thoracic Surgery Database. The Adult Cardiac Surgery Database encompasses approximately 90% of the cardiac surgery programs in the United States.

[1] National Cardiovascular Data Registry is an initiative of the American College of Cardiology Foundation, with partnering support from the following organizations: the American Hospital Association, the Society for Cardiovascular Angiography and Interventions, the Society of Interventional Radiology, the American Academy of Neurology, the American Association of Neurological Surgeons/Congress of Neurological Surgeons, the Society for Vascular Medicine, the Society for Cardiovascular Angiography and Interventions, and the Heart Rhythm Society.

[2] Carotid Artery and Revascularization.

[3] Carotid artery stenting.

[4] Carotid endarterectomy.

[5] Information is current as of August 31, 2009.

[6] Physician Quality Reporting Initiative.

NCDR[1] Overview

Registry	Number of Hospital Participants	2009 Fees	Recent Upgrades
CathPCI	1,100	$3,595	Version 4.0 links with ACTION registry, eliminating redundant data entry of 80 overlapping metrics
ICD	1,490	$3,395	Version 2.0 will include leads and pediatric implants
CARE[2]	173	$3,595	CAS[3], CEA[4] data collected, reported
ACTION Registry-GWTG	365	No cost	Recently merged with AHA's GWTG-CAD, which will close in 2009
IC[3]	300 physician offices	No cost	Approved for Physician Quality Reporting Initiative (PQRI) data submission

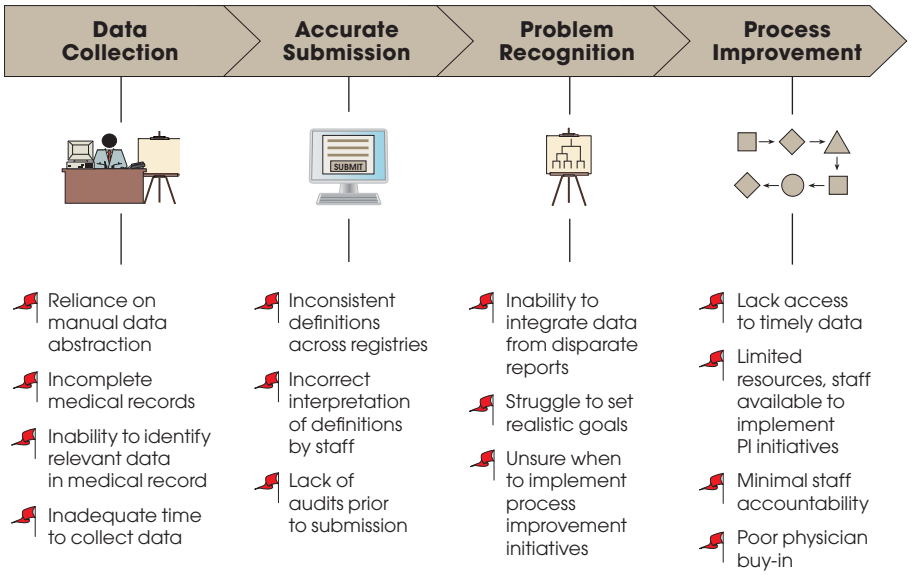
STS National Database Overview[5]

Registry	Number of Participants	Participation Fees	Database Upgrades
Adult Cardiac Surgery Database	995 Surgery Practices *(2,873 surgeons)*	$2,750 or $3,450 per participant	• Introduced unique patient identifiers to enable linking databases both within STS and with external databases • 30 fields mapped to ACC in definition and coding, 16 in definition only • Development of web-based collection tool to enable PQRI[6] registry reporting
General Thoracic Surgery Database	146 Surgery Practices *(499 surgeons)*	$400 per surgeon *(STS Member)* or $500 per surgeon *(non STS Member)*	• Expanded eligibility of participation to include general surgeons • Version 2.081 specifications currently available, mandatory start date January 1, 2009 • Number of metrics tracked will increase from 154 to 174
Congenital Heart Surgery Database	81 Surgery Practices *(220 surgeons)*	$2,000 or $2,500 per participant plus $1.00 per patient record	• Upgrade during 2009 to start January 1, 2010 • Will contain unique patient identifiers to enable linking databases both within STS and with external databases

To access a Comprehensive Registry Overview, please visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Source: American College of Cardiology, Washington, DC; Society of Thoracic Surgeons, Chicago, IL; Cardiovascular Roundtable interviews and analysis.

Key Barriers to Data Collection and High Performance



Numerous Roadblocks to Integrated Quality Improvement

While registry involvement is an important first step towards improved quality, participation alone does not guarantee success. Barriers such as inefficient abstraction, inaccurate data submission, inability to prioritize process improvement efforts, and a failure to invest adequate resources in process improvement initiatives are common among hospitals.

The Outcomes-Driven Enterprise

Best Practices for Optimizing Data Collection and Utilization from Progressive Institutions

Building a Robust Foundation

Streamlining Accurate Data Abstraction

#1 Empowered Registry-Aligned Coordinators
#2 Hardwired Documentation Hierarchy
#3 Physician-Supported Structured Documentation
#4 Selective Electronic Abstraction
#5 Two-Pronged Data Audit
#6 MS-DRG-Registry Cross-Validation

Facilitating Problem Recognition

#7 Customized Dashboard Metric Selection
#8 Principled Performance Targets
#9 Actionable Metric Triggers
#10 Dynamic Dashboard Deployment

Driving Higher Performance

Building a High-Performance Infrastructure

#11 Integrated Quality Governance
#12 One-Stop PI Support
#13 Process Improvement Tools

Promoting Accountability

#14 Performance-Based Incentives
#15 Improvement-Focused Repercussions
#16 Tiered Employed Physician Bonus Model
#17 Community Physician Incentives
#18 Outcomes-Based Review Criteria

Eighteen Strategies for Building an Outcomes-Driven Enterprise

In light of these common challenges and missteps and recognizing the substantial impact effective process improvement initiatives can have on the success of the service line, the Roundtable has identified 18 best practices for building an outcomes-driven enterprise, with a special focus on streamlining accurate data abstraction, facilitating problem diagnosis, building a high-performance infrastructure, and promoting accountability.

Source: Cardiovascular Roundtable interviews and analysis.

II. Streamlining Accurate Data Abstraction

Practice #1: Empowered Registry-Aligned Coordinators

Practice #2: Hardwired Documentation Hierarchy

Practice #3: Physician-Supported Structured Documentation

Practice #4: Selective Electronic Abstraction

Practice #5: Two-Pronged Data Audit

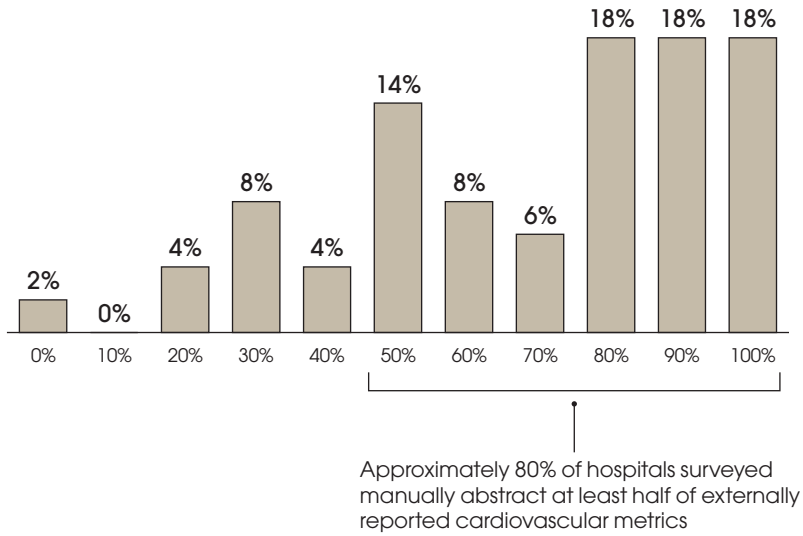
Practice #6: MS-DRG-Registry Cross-Validation

Overreliance on Manual Data Abstraction

The greatest investment associated with registry participation and public reporting is the time required to collect and submit registry data. Unfortunately, free text data entry, dictation, IT system silos, and handwritten notes have forced hospitals to rely on manual data abstraction. Survey results show that 80 percent of hospitals manually abstract at least half of externally reported data.

Failing to Automate Abstraction

Distribution of Survey Respondents by Percentage of Data Collected Manually



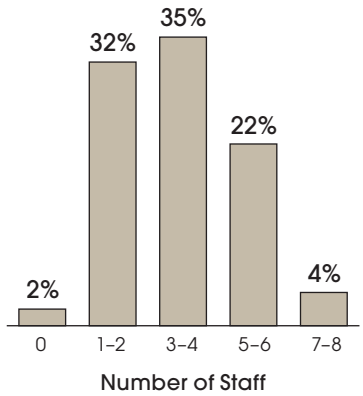
Dedicated Data Collection Staff Becoming Unavoidable

Due to the resource intensiveness of data responsibilities, the vast majority of Roundtable members have hired dedicated staff to collect and submit data to external agencies adding a considerable financial burden to the institution. Beyond the direct costs associated with this investment, programs must also contend with oftentimes complex departmental reporting structures for these staff, which can threaten data accuracy.

No Longer an Add-On Task

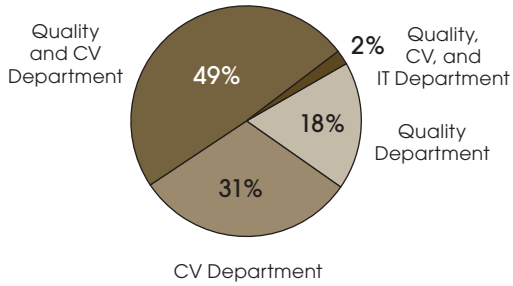
Staff Dedicated to Collecting, Submitting Cardiovascular Patients' Data[1]

Survey Respondents



Departments to Which Dedicated CV Abstractors Report

Survey Respondents



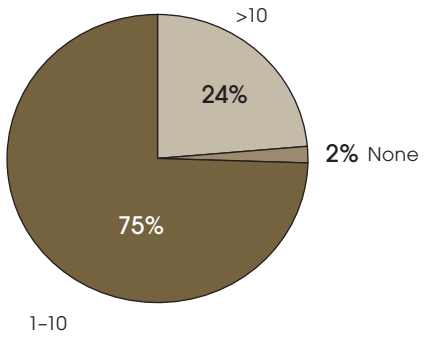
[1] Does not sum to 100 percent due to rounding.

Source: Cardiovascular Roundtable Outcomes-Driven Enterprise Survey, 2008; Cardiovascular Roundtable interviews and analysis.

Research Suggests Data Far from Accurate

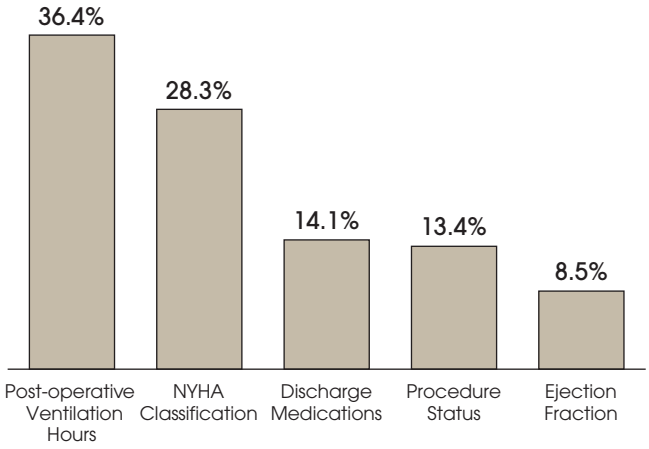
CRSTI[1] Finds Discrepancies in Data Submitted to STS

Audited Records with Discrepancies



Top Five Risk- and Outcomes-Related Metrics with Discrepancies

Percentage of Charts with Discrepancies



Study in Brief

- Study conducted by Cardiopulmonary Research Science and Technology Institute in Dallas, Texas
- Audited 247 (approximately 10 percent) of the clinical records of patients undergoing surgery at the institution in 2001 and correlated them with all 315 data elements of the STS National Cardiac Database for verification of accuracy
- Outcomes discrepancies analyzed by four major categories: components of pre-operative risk algorithm, operative mortality, major complications, and other outcomes
- Discrepancies noted in 5 percent or fewer fields for 98.8 percent of records

Deficits in Data Quality

In fact, research conducted by The Cardiopulmonary Research Science and Technology Institute suggests that the data submitted to registries often include errors. Researchers at the institute audited approximately 10 percent of their clinical records for patients undergoing cardiac surgery and compared them against all elements reported to the STS database. The results showed that while three quarters of the charts had 10 or fewer discrepancies, a high error rate was identified for several metrics that impact risk-adjusted outcomes. For example, post-operative ventilation hours and the New York Heart Association (NYHA) classification for heart failure were often incorrect, which not only affects the department's perceived performance but could also impact clinical care decision making for future cases.

[1] Cardiopulmonary Research Science and Technology Institute.

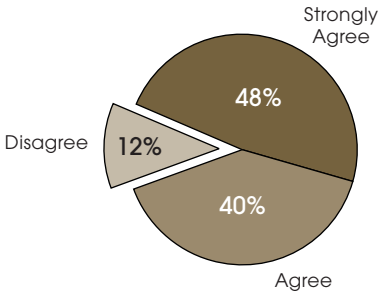
Source: Herbet MA, et al., "Are Unaudited Records from an Outcomes Registry Database Accurate?," *The Annals of Thoracic Surgery,* 2004, 77: 1964–1965; Cardiovascular Roundtable interviews and analysis.

Hospitals Struggling with Definitions

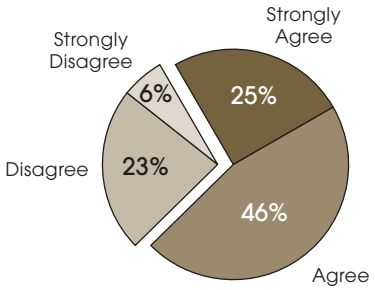
Arguably, the greatest source of error in submitting data is incorrect interpretation of definitions, a challenge which is exacerbated by inconsistent definitions across registries. As highlighted by the Roundtable's survey results, 70 percent of members either agreed or strongly agreed with the statement that incorrect interpretation of definitions by staff is a major challenge. That said, many national registries have begun to standardize definitions of particularly error-prone metrics.

Principal Challenges with Data Collection, Submission

Inconsistent Definitions Across Registries



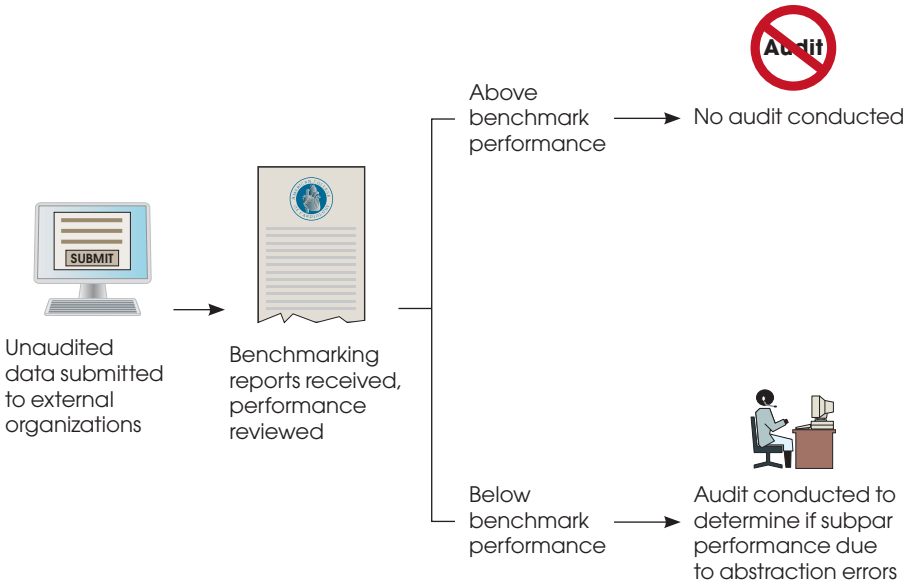
Incorrect Interpretation of Definitions by Staff



Many Auditing Only When Signs of Trouble

Despite acknowledging concerns about staff incorrectly interpreting definitions, many hospitals overestimate accuracy of their data and only audit when performance is below benchmark or expected performance. While external agencies such as CMS, STS and ACC randomly audit charts, the relatively small number of metrics reviewed and the infrequency of these audits means that hospitals must self-audit to ensure that the data used to inform decision making are accurate.

Typical Internal Audit Process Misses Opportunity to Proactively Address Deficits



Source: Cardiovascular Roundtable Outcomes-Driven Enterprise Survey, 2008; Cardiovascular Roundtable interviews and analysis.

Practice #1: Empowered Registry-Aligned Coordinators

Case Study:

Clarian Health Partners Investing in Cardiovascular Expertise

Clarian Health

Job Title: Cardiovascular Data Coordinator

Summary: This position is accountable for supporting excellence in clinical practice. The incumbent is responsible for coordinating activities required to meet the internal and external specified service line needs.

Essential Functions: All employees will be held accountable to the Standard of Service that is defined by Service Excellence.

Selection of Required Skills, Qualifications

- Registered nurse degree with experience in cardiovascular terrain; Bachelor's degree preferred
- Current state of Indiana license as registered nurse
- At least five years of experience in treatment of cardiovascular patients in clinical setting
- Knowledge of government regulatory, payer submissions requirements
- Knowledge of outcomes management, demonstrated ability practicing outcomes management with complex patient population
- Advanced data management, statistical analysis, presentation skills
- Ability to communicate, collaborate effectively with all members of multidisciplinary team

Setting Clinical CV Experience as a Baseline Requirement

Acknowledging the complexity of accurate abstraction, Clarian Health System, located in Indianapolis, Indiana, aligns abstractors by registry and requires all abstractors to be registered nurses with at least five years of cardiovascular experience. To minimize disruption due to turnover and vacations, the majority of coordinators are cross-trained on a second registry.

Adding Value Beyond Data Collection

Abstractor aligned by registry, provided extensive registry-specific training

Roles and Responsibilities

1. **Data Collection, Submission**
   Input data into cardiovascular database, audit data for accuracy, submit data
2. **Data Analysis**
   Query data, run reports to identify opportunities for improvement
3. **PI Facilitation**
   Provide leadership, coordination to multidisciplinary team focusing on designated cardiovascular populations
4. **Education**
   Educate physicians, staff, leaders in the use of clinical registry data and the evaluation of evidence-based medicine

To access the Cardiovascular Data Coordinator Job Description, please visit the online appendix for this study at the Roundtable's publication archive at www.advisory.com/cr.

Developing Registry-Specific Gurus

Realizing the need to ensure that benchmarking reports provided by the registries are used to elevate quality, coordinators are responsible for data analysis, process improvement facilitation, and education, in addition to collecting and submitting data. Clarian further integrates abstractors into the clinical setting by moving the abstractors from the administrative building to offices near the cath lab and operating room. Colocating abstractors not only streamlines data abstraction as clinicians are immediately available to answer questions, but also reduces physicians' frustration with data collection efforts as a registry expert is available to answer questions.

Source: Clarian Health Partners, Indianapolis, IN; Cardiovascular Roundtable interviews and analysis.

Practice #2: Hardwired Documentation Hierarchy

Managing Multiple (Potentially Conflicting) Data Points

While registry-aligned abstractors reduce the risk of incorrect interpretation of definitions, they cannot eliminate inconsistencies caused by conflicting information. For example, patients often have multiple tests performed to measure ejection fraction and the results can be quite different. Similarly, given that patients are often seen by multiple physicians, patient history may differ.

To address these inconsistencies, the STS abstractor at Exempla St. Joseph Hospital, located in Denver, Colorado, worked with the cardiac surgeons to develop documentation hierarchies for ejection fraction results and family history of CAD.

Case Study:

Exempla Identifying, Eliminating Sources of Inconsistencies

Problem:

Contradictory Data

1 Ejection Fraction Results:

LV Gram: 60% ≠ **Echo: 45%**

2 Family History CAD

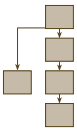
Surgeon: *Father diagnosed with CAD at age 50*

≠

Cardiologist: *No family history of CAD*

Solution:

Physician-Approved Documentation Hierarchy



- Abstractor identifies metrics with conflicting sources of information
- Meets with surgeons to develop hierarchy, secure physician buy-in
- Uses template to determine which data point to use

To access Data Hierarchies, please visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Eliminating Subjectivity from Data Collection Efforts

By creating hierarchical rankings for tests and sources of information based on accuracy, the abstractor streamlined data collection and increased consistency, thus improving physicians' confidence in the data and their willingness to change practice based on the analysis of these data.

Data Hierarchies Securing Multiple Gains

Improved Data Consistency

Removes objectivity from abstraction, prevents "gaming" of metrics

Reduced Physician Pushback

Decreases risk of physicians' discounting analysis, as data included were from the wrong test

Increased Abstractor Efficiency

Prevents abstractor from requiring assistance when data points contradict each other

Source: Exempla St. Joseph Hospital, Denver, CO; Cardiovascular Roundtable interviews and analysis.

Practice #3: Physician-Supported Structured Documentation

Case Study:

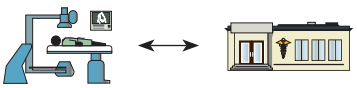
St. Peter's Incorporating Value-Added Functionality

1

Automatic Document Distribution

Enables cardiologists to send physician note to referring physician electronically; process streamlined by hospitals uploading referring physicians' contact information

2



Office-Based EMR Interface

Allows cardiologists access to patient information including physician notes, images from their office-based EMR

3

Hospital EMR Interface

Provides ward access to physician note immediately through hospital EMR

4

Remote Access

Enables physicians to access clinical notes, images through the Web

Securing Buy-In Through Added Features

While investing in an appropriate staffing infrastructure and eliminating sources of inconsistencies are critical first steps, the most viable long-term strategy to meet increasing reporting mandates is to automate data abstraction by investing in structured documentation.

Realizing this imperative and being mindful of physicians' resistance to structured reporting, St. Peters Hospital, located in Albany, New York, secured physician acceptance by designing a system that met their stated needs. Specifically, St. Peter's incorporated functionality that improved physician workflow, such as automated documentation distribution, interfaces with office-based EMR and hospital EMR, and remote access, into their structured documentation system.

Safeguarding Physician Productivity

Reduce Manual Data Entry

- Interfaces with ADT[1], hemodynamic systems
- Auto-populates information collected during procedure
- Drop-down menus

Provide Convenient Access

- Documentation lounge located near cath lab
- Dual monitors allow physicians to view image, document simultaneously
- Single sign-on shortens log-on process

Allow Flexibility

- Free-text fields allow physicians to capture details not incorporated in drop-down menus

Integrating Documentation into the Workflow

In addition, St. Peters reduced manual data entry by auto-populating as much data as possible, provided convenient access to documentation software through a number of methods including adopting single sign-on technology, and incorporated free-text fields to enable physicians to capture information not included in the drop-down menus.

[1] Admissions, discharges and transfers.

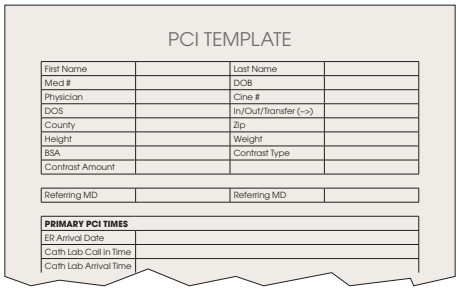
Source: St. Peter's Hospital, Albany, NY; Cardiovascular Roundtable interviews and analysis.

Intermediary Paper Templates Reduce Learning Curve

Finally, during the planning phase, St. Peters introduced a paper template, which formed the foundation of the electronic form. This allowed physicians to become familiar with the form in advance of go-live, which helped reduce physician resistance to implementation. The template also helped reduce costs, as modifications were made to the paper rather than electronic template.

Supporting the Transition

Leveraging Paper Templates Prior to Go-Live



PCI TEMPLATE

First Name		Last Name	
Med #		DOB	
Physician		Cine #	
DOS		In/Out/Transfer (-->)	
County		Zip	
Height		Weight	
BSA		Contrast Type	
Contrast Amount			
Referring MD		Referring MD	

PRIMARY PCI TIMES	
ER Arrival Date	
Cath Lab Call in Time	
Cath Lab Arrival Time	

Benefits of Paper Template

1. Physicians become accustomed to template documentation prior to go-live
2. Modifications to template made at minimal cost
3. Productivity loss minimized at go-live, since paper template forms the basis of electronic template

Providing Comprehensive Instruction

Once the infrastructure was in place, the hospital ensured physicians were comfortable using the system by prioritizing investments in training. Administrators provided extensive multifaceted training at each stage of implementation. Most notably, St. Peter's created a test environment to allow physicians to practice using the system prior to go-live.

Over-Investing in Training

Providing Support at Each Stage

Before Go-Live

- Training tools such as CDs, videos distributed to increase familiarity with software
- At-the-elbow training provided to address physicians' specific training needs
- Test environment created to allow physicians to practice

Go-Live

- IT support available in cath lab during implementation to reduce anxiety
- Widescreen TVs in physician areas guide physicians through documentation process

After Go-Live

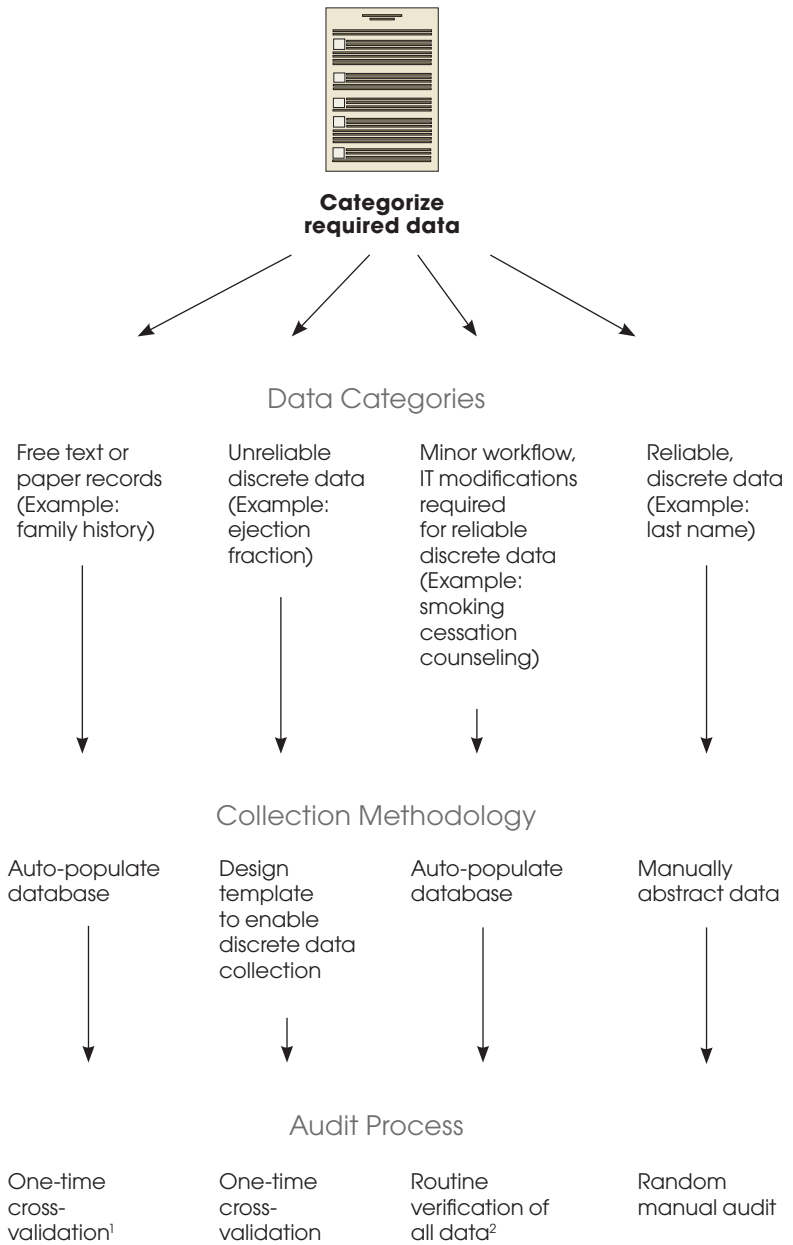
- Around-the-clock IT personnel available to provide support if necessary
- Widescreen TVs continually review recent updates to minimize disruption of upgrades

Source: St. Peter's Hospital, Albany, NY; Cardiovascular Roundtable interviews and analysis.

Practice #4: Selective Electronic Abstraction

Case Study:

Norton Stratifying Efforts by Data Accuracy



To access the Stroke Data Collection Matrix, please visit the online appendix for this study at the Roundtable's publication archive at www.advisory.com/cr.

Focusing Auditing Efforts on Unreliable Data

While structured documentation streamlines data abstraction, it can also introduce errors if all data entered into the system are assumed to be correct. This is because clinicians, who enter data into documentation systems, are not necessarily registry experts and may be unfamiliar with registry definitions. In order to minimize manual abstraction without sacrificing accuracy, Norton Healthcare stratified data according to accuracy and managed each category differently.

Whenever possible, information available in a discreet format is auto-populated into the database used to submit registry data. However, the audit process varies depending on the reliability of the information. For example, abstractors cross-validate any data points that are unreliable by reviewing the medical chart prior to submission, whereas reliable data such as demographic information are assumed correct and only a one-time cross-validation is conducted.

[1] Cross-validation involves checking the original documentation source manually to verify auto-populated data is correct. Reliable, discrete data can be cross-validated one time, after the database and electronic documentation source have been integrated.

[2] Unreliable, discrete data should be cross-validated on an on-going basis.

Source: Norton Healthcare, Louisville, KY; Cardiovascular Roundtable interviews and analysis.

Practice #5: Two-Pronged Data Audit

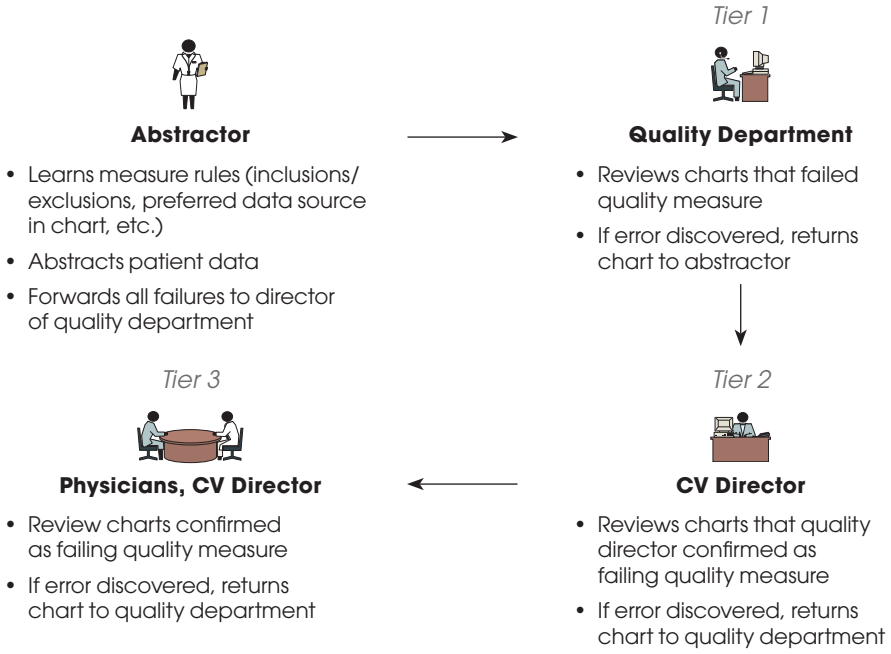
Ensuring Abstractors Find Required Documentation When Available

Despite this infrastructure, some errors are inevitable; therefore, it is essential to audit data regularly. Realizing this imperative, Norton Healthcare developed a two-pronged data audit process. First, a failures-driven audit is conducted. All instances where a National Quality Measure is not met are reviewed by the quality department and then by the cardiovascular department to confirm that the required documentation is not available and that the hospital failed to provide standard of care.

Case Study:

Norton Hardwiring Data Audits

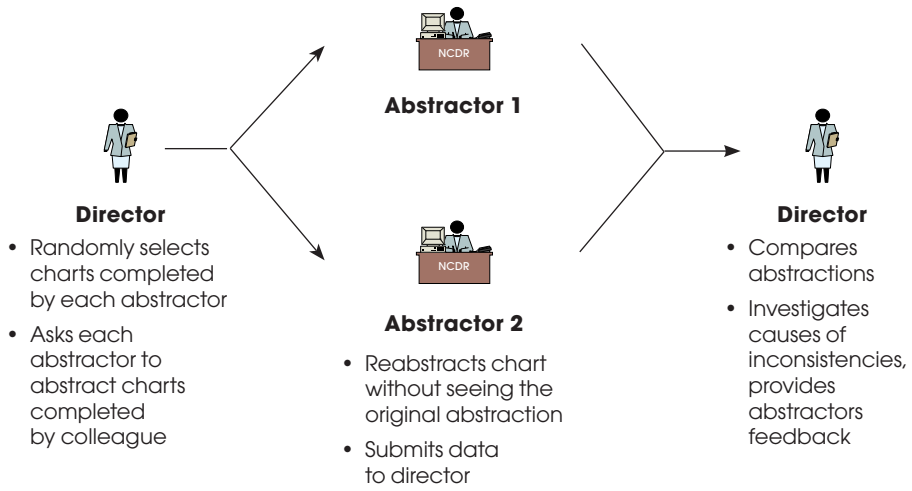
Component 1: Failures-Driven Audits



Proactively Identifying False Positives

The second component, inter-rater reliability test, complements the failures-driven audit by identifying instances when abstractors incorrectly attest that a measure was met. To identify these errors, the director randomly selects previously abstracted charts and asks each abstractor to re-abstract charts initially completed by his or her colleague. The director then compares results and meets with the abstractor to share best practices.

Component 2: Inter-rater Reliability Test



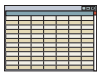
Source: Norton Healthcare, Louisville, KY; Cardiovascular Roundtable interviews and analysis.

Practice #6: MS-DRG-Registry Cross Validation

Case Study:

Ellington[1] Leverages Registry to Audit Coders

1



Create MS-DRG Crosswalk

- Administrator developed MS-DRG crosswalk for 50 diagnosis codes
- Crosswalk includes criteria necessary for patient to be coded to an MS-DRG, enabling administrator to predict MS-DRG using registry data

2

Predict MS-DRGs Using Registry Data

- Administrator created query to predict MS-DRG patient population using registry data
- Runs reports on monthly basis

3

Cross-Check Finance, Registry Report

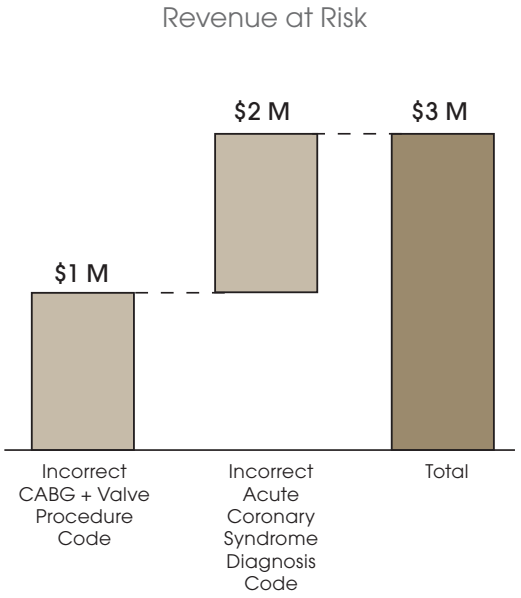
- Administrator compares MS-DRG report from registry database, finance's MS-DRG report to identify inconsistencies
- Reviews all inconsistencies to determine root cause of problem, implements corrective action

Using Registry Database to Predict MS-DRGs

In addition to facilitating problem diagnosis and securing physician buy-in, accurate data can increase revenue by helping to identify coding inaccuracies.

Concerned that procedures were being under-coded, Ellington Hospital, used clinical information available in the hospital's STS registry data to predict MS-DRG assignment for cardiac surgery patients on a monthly basis. The registry predictions were then compared to the finance department's actual MS-DRG assignments, and deviations were investigated.

Realizing Significant Gains



Recapturing Lost Revenue

As a result of performing a MS-DRG-registry cross-validation, Ellington identified two major coding errors, which unresolved would have put $3 M of revenue at risk. Furthermore, the time dedicated to performing the cross-validation is only 10 to 20 minutes a month, making the return on investment well worth the effort.

[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

III. Facilitating Problem Recognition

Practice #7: Customized Dashboard Metric Selection

Practice #8: Principled Performance Targets

Practice #9: Actionable Metric Triggers

Practice #10: Dynamic Dashboard Deployment

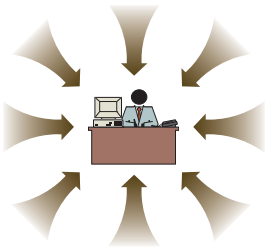
Department Awash with Data

After investing in the infrastructure to accurately and efficiently collect data, hospitals must create an effective dashboard to actively monitor performance. To be clear, building a dashboard does not require the leadership team to determine which metrics to track; this decision is largely dictated by internal and external reporting obligations. Rather, the leadership team must determine which metrics to elevate to the dashboard. Included metrics should reflect areas deemed critical to the success of the cardiovascular enterprise.

Not Seeing the Forest from the Trees

Sample Metrics Tracked by Cardiovascular Department

- Direct costs
- ICD length of stay
- CABG procedure volumes
- Door-to-balloon time
- Adult smoking cessation (AMI)
- Medical errors
- Interventional cath procedure volumes
- Prolonged intubation
- Cath lab throughput
- Surgical site infection rate
- Employee satisfaction
- Regrettable staff turnover

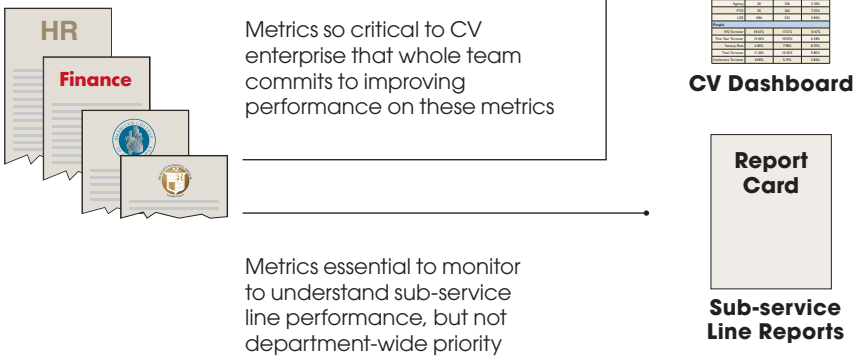


- Market share by procedure
- First year turnover rate
- Aspirin at arrival (AMI)
- Patient satisfaction with pain management
- Budget variation
- CABG + valves length of stay
- Patient satisfaction (inpatient)
- Central line-associated blood stream infections
- CABG length of stay
- Referrals by procedure
- Documentation compliance (HF)
- LVEF[1] assessment (HF)

Failing to Prioritize Metrics

Unfortunately, many programs fail to make this critical distinction and as a result, many dashboards represent a "laundry list" of metrics that risk overwhelming program leaders.

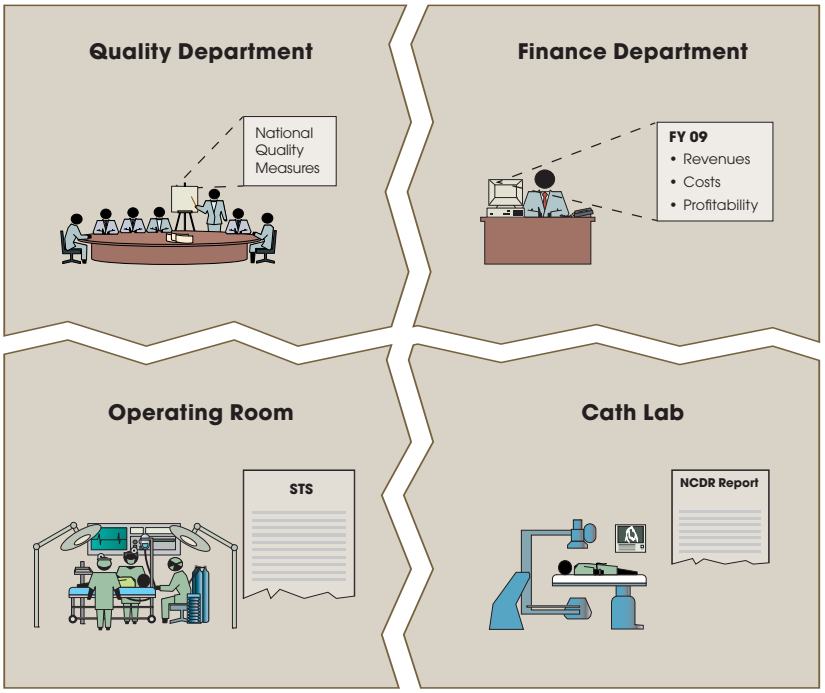
Differentiating Between Dashboards, Report Cards



[1] Left ventricular ejection fraction.

Source: Cardiovascular Roundtable interviews and analysis.

Lacking a Holistic View of Performance



Metric Data Stored in Silos

Beyond the problem of metric overload, programs must also contend with consolidating information stored in silos throughout the hospital to gain a holistic view of department performance. As few IT systems are integrated, dashboards often need to be manually populated, which is time consuming and undermines utility.

Pushing Numbers Not Information

DeJonnette Hospital[1]			
Metric	**Q4**	**YTD**	**Variance**
AMI composite score	97%	98%	3%
Volume of surgical cases	150	450	3%
Door-to-balloon time (minutes)	95	100	5%
Heart failure composite score	85%	82%	2%
Cath lab turnover time (minutes)	45	40	5%
Patient satisfaction	92%	90%	1%
Volume of cath lab procedures	450	1,350	5%
AMI smoking cessation compliance	85%	82%	4%
Length of stay for CABG patients	4.5	5.0	2%
HF discharge compliance rate	87%	86%	0%

Metrics not grouped by type or sub-service line

No metric definition

Benchmarks, targets absent

Previous performance not included

[1] Pseudonym.

Tables Failing to Communicate Information

Further compounding the challenge of inaccessible data are tables that fail to convey information in an intuitive manner. The vast majority of cardiovascular dashboards reviewed by the Roundtable include a table of disparate numbers, fail to show performance over time, and over-rely on the reader to interpret meaning. To be an effective tool, dashboards must display data in a meaningful context for the user by calling out emerging trends, goals, and benchmarks.

Source: Cardiovascular Roundtable interviews and analysis.

Struggling to Meet Targets

Streamlining metric selection, consolidating data, and improving information alone do not guarantee dashboard utility. Unfortunately, hospitals often fail to set realistic performance targets. For example, when performance is below benchmark, many hospitals automatically set goals at the benchmark value without evaluating whether the improvements necessary to meet the benchmark are realistic. Furthermore, institutions rarely have policies in place to signal when corrective action should be taken, making it difficult for staff to differentiate between a nominal slip in performance and a more meaningful decline.

Common Challenges for Elevating Performance

Source: Cardiovascular Roundtable interviews and analysis.

Practice #7: Customized Dashboard Metric Selection

Distilling a "Best of" CV Metrics Pick List

Quality

- Rate of compliance with AMI NQM smoking cessation counseling requirement (AMI-4)
- Rate of compliance with AMI NQM
- Percentage of AMI patients receiving perfect AMI care
- Incidence of primary PCI received within 90 minutes of hospital arrival (AMI-8a)
- Rate of compliance with heart failure (HF) NQM discharge education requirement (HF-1)
- Rate of compliance with HF NQM
- Percentage of patients receiving perfect HF care
- Percentage of surgical patients with controlled blood sugar (SCIP-Inf-4)
- Rate of compliance with SCIP NQM
- Percentage of patients receiving perfect SCIP care
- Incidence of non-obstructive coronary artery disease in diagnostic catheterization patients
- Average length of stay for CABG and valve surgeries
- Average length of stay for PCI
- Average length of stay for HF patients
- Average length of stay for ICD implants
- Complication rate for CABG and valve surgeries
- Complication rate for PCI
- 30-day readmission rate for CABG and valve surgeries
- 30-day readmission rate for PCI
- 30-day readmission rate for HF
- 30-day readmission rate for AMI
- Mortality rate for CABG and valve surgeries
- Mortality rate for PCI
- Mortality rate for HF
- Mortality rate for AMI
- Composite incidence rate of surgery performed on wrong body part, surgery performed on wrong patient, wrong surgical procedure performed on patient
- Rate of compliance with hand hygiene protocols
- Incidence of failures to rescue
- Incidence of medication errors
- Incidence of falls and trauma
- Incidence of preventable hospital-acquired conditions

Finances

- Payer mix
- Average revenue
- Average direct cost per patient
- Average contribution profit
- Budget variance
- Salary expense as a percentage of total operating revenue

Operations

- Volumes
- Percentage of admitted cardiovascular patients originating in ED
- Volume of cases by referring physicians constituting 80 percent of business
- Market share
- Turnover rate for allied health professionals
- Turnover rate for RNs

Service Excellence

- Patient satisfaction
- Physician satisfaction
- Referring-physician satisfaction

To access the full CV Metric Pick List, visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

High-Value Dashboard Metrics

The first step in building an effective dashboard is metric selection. Through interviews with cardiovascular leaders and a thorough analysis of publically reported metrics, the Roundtable has constructed a list of 47 high-value metrics. The indicators are arranged into four categories and are accompanied by a glossary (available online) that outlines the definitions for each metric, ideal reporting frequency, associated calculation, and endorsing agency.

While the full list may be too extensive for most dashboards, the CV Metric Pick List should be used as a starting point for metric selection or as a reference for revisiting the department's current dashboard.

Source: Cardiovascular Roundtable interviews and analysis.

Practice Component 1: Apply Pragmatic Filters

The remainder of this practice outlines five components to assist cardiovascular program leaders in selecting measures that are most appropriate for their institution. The first component is to apply pragmatic filters to any metrics under consideration. All metrics must be meaningful, reliable and easy to collect, otherwise the dashboard may not be updated regularly. In addition, quality metrics should be rooted in evidence-based medicine.

Suggested Considerations for Metric Selection

Metric Filters	Description	Rationale
1 **Meaningfulness**	Selected metrics should align with service line and hospital-wide organizational goals	Metrics misaligned with larger priorities unlikely to receive adequate resources, support; moreover, misalignment may stunt service line growth, development opportunities
2 **Reliability**	Data available from information system should be accurate, clearly defined, measure what is intended	Absence of trustworthy data results in suspicion toward purported performance variance, often yielding inaction
3 **Collection Feasibility**	Data collection process should be manageable given institutional resources	Metrics that require laborious manual abstraction may drain available resources; similarly, electronic sources not built around specific metrics cannot be easily queried for data
4 **Communicability**	Definition, rationale for metric should be easy to understand	Misunderstanding metric definitions, lack of relevance hinders decision-making process
5 **Scientific Support**	Measure should be rooted in evidence-based literature	Questions or controversy over clinical validity of measures results in physician resistance to metric tracking

Composite Scores, Multi-impact Metrics Ideal for Dashboard

Two noteworthy types of metrics that meet the above mentioned criteria are composite scores and multi-impact metrics. A composite score is defined as a score that combines performance on two or more measures into a single metrics and is ideally suited to a dashboard because they provide a rich source of information along several vectors. Similarly, multi-impact metrics can be valuable as they affect performance of other metrics. For example, length of stay has downstream effects on care quality and cost.

Highly Leveragable Dashboard Metrics

	Composite Scores	Multi-Impact Metrics
Definition	Score that combines performance on multiple measures into single metric	Metric that when improved positively impacts performance on other metrics
Example	• AMI perfect care score: percentage of eligible patients receiving all AMI National Quality Measures	• Length of stay • 30-day readmission rate
Rationale	Single metric indicates performance along multiple measures, reducing number of required dashboard metrics	Improvement on these metrics positively impacts quality of care, financial performance; therefore, ideally suited for a dashboard

Source: Cardiovascular Roundtable interviews and analysis.

Focus on What Matters

Historical Performance Gaps

- Do we have a history of suboptimal performance in certain areas?

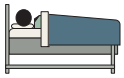
Span of Control

- Does the cardiovascular department have control over metric performance?

Physicians, Staff

- Would understanding performance on certain metrics affect the testing or treatment provided to patients?

Patients



- Would understanding performance on certain metrics impact whether or not patients consider services from that entity?

Payers

- Would understanding performance on certain metrics impact hospital inclusion in payer network?
- Would it affect payer reimbursement?

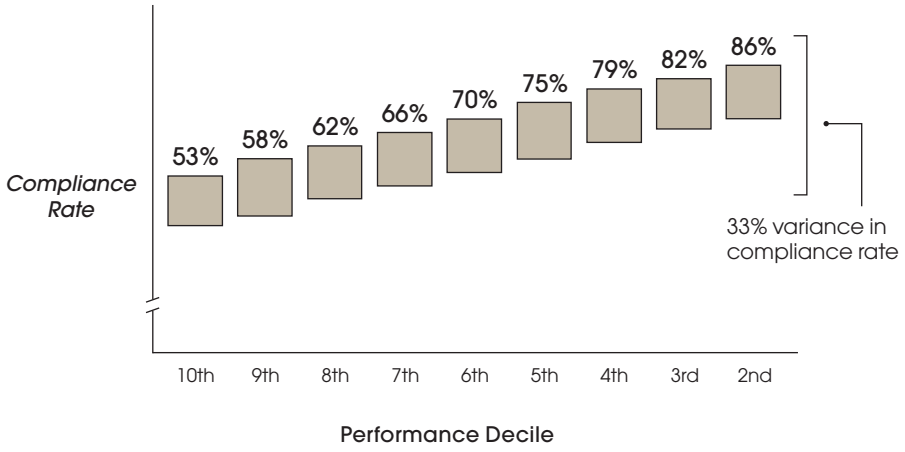
Practice Component 2: Evaluate Impact Opportunity

Once pragmatic filters have been applied, the next step is to identify metrics that will have a significant impact on the department. When evaluating impact opportunity, hospitals should evaluate the department's ability to affect performance (metrics where performance is suboptimal and under the cardiovascular department's control). The cardiovascular leadership team can then further refine metric selection by considering the potential impact that improving the metric would have on physicians, staff, patients, and payers.

Many Caught Off Guard

First-Year Performance in Premier Demo Shows Wide Dispersion

CMS/Premier Demonstration
Year-One Heart Failure Compliance Decile Thresholds



Practice Component 3: Elevate Tomorrow's Metrics Today

The third step in dashboard creation addresses the fact that cardiovascular programs are regularly tasked with reporting new metrics to CMS and other agencies. Typically, when a new metric is introduced, there is a wide dispersion in scores with hospitals in the lower deciles experiencing a great deal of scrutiny as performance is substantially below the average.

To help prevent programs from being caught off guard and from being placed in the lower deciles, it is essential to proactively monitor performance on metrics most likely to be introduced by payers or other regulatory organizations.

Source: CMS, "Premier Hospital Quality Demonstration Project," available at http://www.cms.hhs.gov/HospitalQualityInits/Downloads/HospitalPremierFactSheet200806.pdf, accessed October 18, 2008; Premier Inc., "CMS/Premier Hospital Quality Incentive Demonstration (HQID)," available at: http://www.premierinc.com/quality-safety/tools-services/p4p/hqi/index.jsp, accessed October 23, 2008; Cardiovascular Roundtable interviews and analysis.

Staying One Step Ahead

Realizing this imperative, Alegent Health predicted that stroke metrics were likely to be publically reported and incorporated 11 stroke metrics on its quality dashboard. As a result, all of the hospitals within the system have a composite stroke compliance score of over 95 percent, which ensures that if stroke metrics are introduced, Alegent will be recognized as one of the top performers.

To help members determine which metrics are most likely to be publically reported, the Roundtable has ranked measures according to the probability of their adoption by CMS. Program leaders are encouraged to supplement this list, available on the Roundtable's website, with state-specific metrics that are on the horizon.

Case Study:

Alegent Incorporates Stroke Metrics on Dashboard

Alegent Quality Dashboard Metrics

Quality Measure Set	Number of Metrics
Heart Attack	8
Heart Failure	4
Stroke	**11**
SCIP	9
Pneumonia	9

- DVT[1] prophylaxis received
- Discharged on antithrombotic therapy
- Anticoagulation therapy for atrial fibrillation
- Thrombolytic therapy administered
- Antithrombotic therapy by end of day two
- Discharged on cholesterol reducer
- Dysphagia screening
- Stroke education
- Adult smoking cessation counseling
- Assessed for rehabilitation
- Overall composite score

To access the full CV Metric Rankings, visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Practice Component 4: Over-Represent New Services

The next set of metrics program directors should consider are those that reflect performance on new product line investments. Such new offerings often come with quality and financial expectations, therefore program directors are well-served by closely monitoring progress in these areas.

Keeping a Watchful Eye on Recent Investments

Representative Service Line Investments

Women's Cardiac Center

Atrial Fibrillation

Cardiac CT

Venous Center

Suggested Dashboard Metrics

- Procedure volumes
- Volumes by referring physician
- Procedure outcomes
- Profitability
- Patient Satisfaction

[1] Deep venous thrombosis.

Source: Alegent Health, Omaha, NE; Cardiovascular Roundtable interviews and analysis.

Quality in the Larger Context

Balancing Clinical Care with Other Organizational Priorities

	Indicator	Actual Performance	Goal
Clinical Quality	Door-to-balloon time	92 minutes	85 minutes
	Vascular complication rate	1.6%	1.2%
	Renal failure rate	0.4%	0.4%
	Risk-adjusted mortality rate for PCI	0.9%	3%
	Average length of stay for PCI	2.4 days	2.0 days
	Percentage of surgical patients with blood glucose under control	96%	95%
	Appropriate prophylactic antibiotic selection for surgery patients	97%	98%
	Deep sternal wound infection rate	1.6%	1.4%
Service	Overall patient satisfaction	90%	92%
	Patient satisfaction with pain management	89%	90%
	Overall physician satisfaction	92%	90%
	Employee satisfaction	90%	90%
Human Resources	First-year RN turnover	10%	12%
	Overall RN turnover	6%	10%
	Overall non-RN turnover	8%	10%
	Overall vacancies	2	0
Finance	Budget variance	2%	0%
	Days in accounts receivable	39	41
	Overtime costs as percentage of total labor costs	3.2%	2.8%
	Direct costs per discharge	$14,213	$12,210

Includes key functional categories

Incorporates metrics from multiple sub-service lines

Balanced number of metrics in each category ensures sufficient coverage of priorities

Practice Component 5: Ensure Metric Balance

The final step is to ensure metric balance across strategic categories. Dashboards all too often overemphasize quality measures, in part because quality is generally considered the top priority and programs face pressure from external agencies and public reporting. However, if dashboards only focus on quality, program leaders risk overlooking problems in other key performance areas. Therefore, it is essential to ensure each functional category—quality, service, human resources, and finances—is appropriately represented.

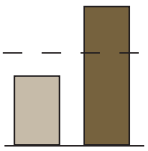
Source: Cardiovascular Roundtable interviews and analysis.

Practice #8: Principled Performance Targets

Distinguishing Goals from Benchmarks

Once a set of customized dashboard metrics have been identified, program leaders must set goals to achieve the desired performance improvement. With the exception of certain clinical metrics, such as infection rates, where implementation of best practices can quickly and dramatically improve performance, benchmarks and goals should not be equated. Recognizing the difference between benchmarks (the best identified performance along a given metric across a group of providers) and performance targets (the specific goals of an organization) is a critical element to setting achievable performance objectives. This is an important distinction, as programs that equate benchmarks with targets often aspire to unreasonable levels of performance, whereas those that differentiate between the two set incremental improvement targets, allowing them to eventually reach the "gold standard" benchmark.

Making a Critical Distinction



Benchmark

Definition: Best identified performance against measure available for comparison (often calculated with a group of peer or like providers)

Purpose: Provides standard of excellence toward which to strive ultimately

Goal

Definition: Fixed or ranged performance objective

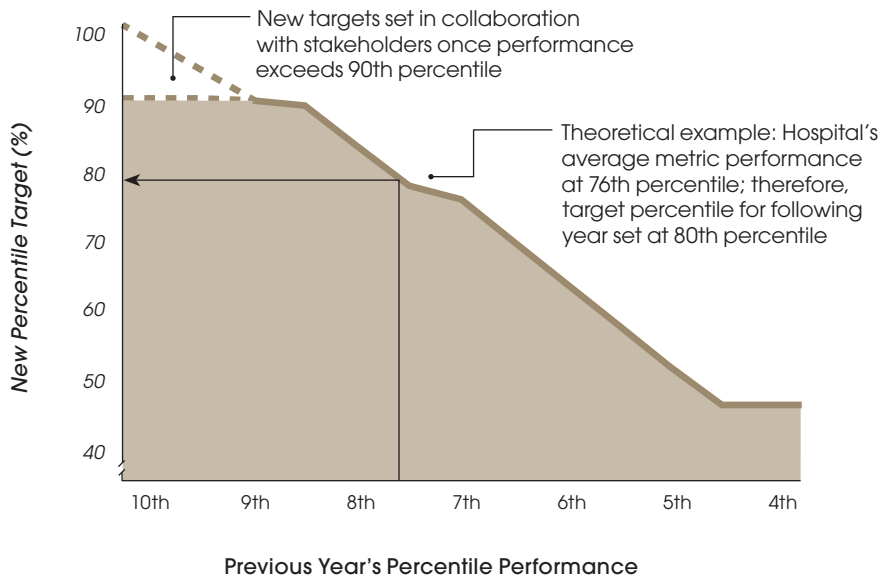
Purpose: Provides attainable goal to drive incremental improvement

Source: Cardiovascular Roundtable interviews and analysis.

Case Study:

SOMC[1] Cross-Referencing Targets, Benchmarks

SOMC Goal-Setting Matrix



Formula

- If percentile of previous year's performance at 90th percentile or above, set target percentile at 90th percentile
- If percentile of previous year's performance between 75th and 89th percentiles, set target percentile 5 percent above previous year's percentile (i.e., 1.05 x previous year's percentile)
- If percentile of previous year's performance less than 75th percentile, set target percentile 10 percent above previous year's percentile (i.e., 1.10 x previous year's percentile)
- If calculated target percentile less than 50th percentile, set target at 50th percentile
- Goals should never decrease from year to year; decreased annual performance should not result in lower goals

Practice Component 1: Employ Quantitative Methods

An effective approach for setting performance targets involves cross-referencing goals against benchmarks. Realizing this imperative, Southern Ohio Medical Center (SOMC) created a formula and associated table that takes into account current performance for a given metric—determined by the percentile—in order to calculate a realistic target for improvement. For instance, if current performance is at the 76th percentile on a given metric, the target is set at the 80th percentile. When programs reach the 90th percentile of performance, new targets are set in collaboration with stakeholders to ensure that the incremental costs associated with improving performance do not outweigh the expected gains.

[1] Southern Ohio Medical Center.

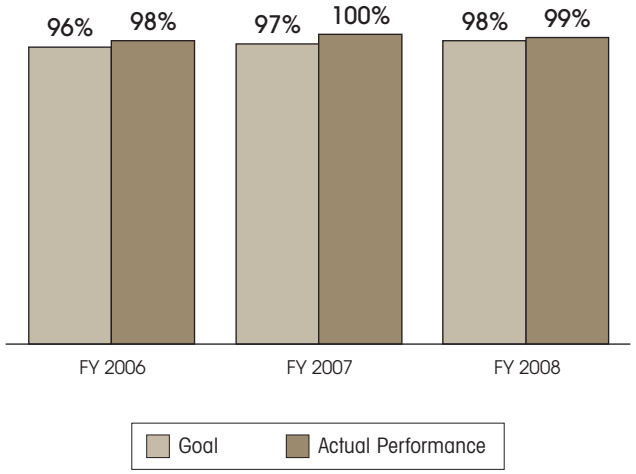
Source: Southern Ohio Medical Center, Portsmouth, OH; Cardiovascular Roundtable interviews and analysis.

Incremental Goals Delivering Exceptional Results

Aided by its transparent and principled methodology for setting incremental goals, Southern Ohio Medical Center has consistently exceeded expectations and has achieved the benchmark performance along a number of critical metrics, such as prescribing Angiotensin-converting enzyme (ACE) inhibitor or Angiotensin II receptor blocker (ARB) to heart failure patients at discharge.

Exceeding Expectations Year After Year

ACE[1] Inhibitor or ARB[2] Prescribed to Heart Failure Patients at Discharge



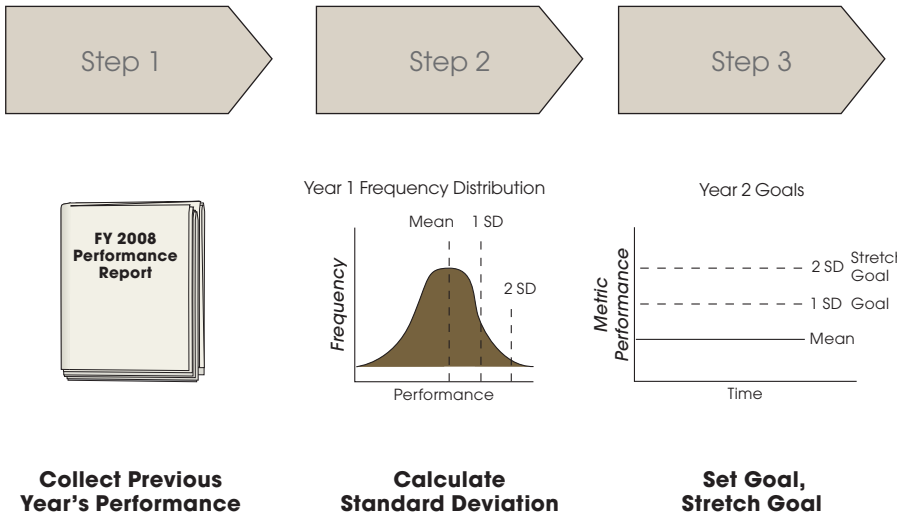
Leveraging Standard Deviations

Another approach for setting goals relies on historic performance. Cardiovascular leaders at Hillington calculated average performance and the associated standard deviation using data from the previous 12 months. The program leadership then set the new performance goal at one standard deviation above the previous year's average performance and set a stretch goal at two standard deviations above the previous year's average performance.

While this approach encourages continuous improvement, it fails to reveal the point at which expected returns no longer justify the incremental expense. Therefore, the Roundtable recommends reserving this approach for metrics without reliable benchmarks.

Hillington[3] Applies Statistical Methods

Leveraging Standard Deviations to Set Goals



[1] Angiotensin-converting enzyme.

[2] Angiotensin II receptor blocker.

[3] Pseudonym.

Source: Southern Ohio Medical Center, Portsmouth, OH; Cardiovascular Roundtable interviews and analysis.

Case Study:

Our Lady of the Lake Engages Key Stakeholders

Setting Door-to-Balloon Time Goals

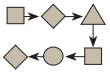
1 Create Team

Director creates door-to-balloon time task force with representatives from ED, cath lab, cardiology practice, nursing

2 Conduct Time Study

Task force tracks STEMI patient throughput to identify bottlenecks

3 Develop Process Flow Map



Team analyzes data, develops process flow map indicating average time for each step

4 Set Goal

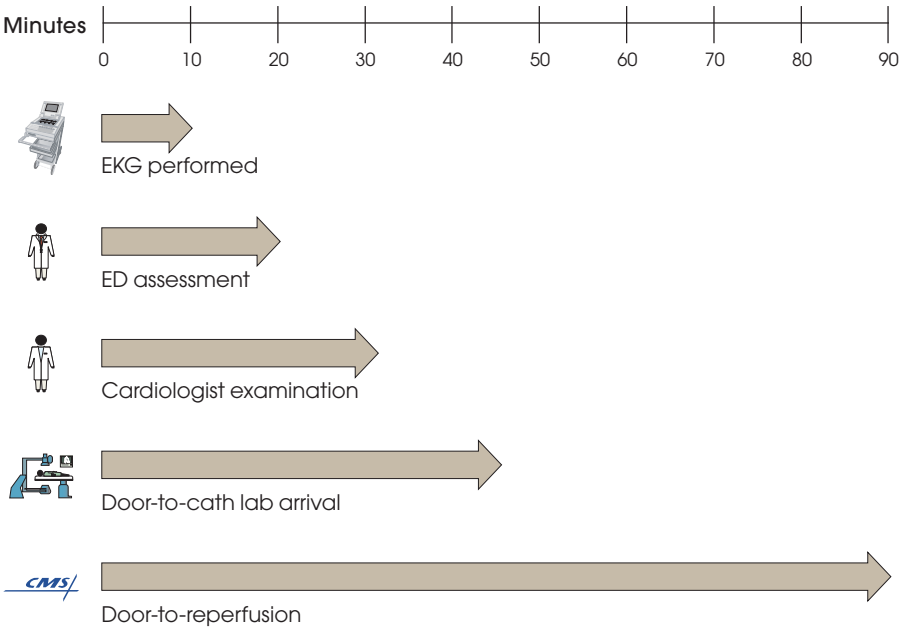
Task force sets interim goals for each step in process, overall goal; stakeholders accountable for their relevant interim goal

Practice Component 2: Set Stakeholder-Specific Goals Collaboratively

The final approach for setting performance targets is best suited for metrics involving multiple stakeholders. Acknowledging the need to secure institution-wide buy-in, executives at Our Lady of the Lake Regional Medical Center developed a multidisciplinary taskforce to improve door-to-balloon time. To identify opportunities for improvement, the taskforce conducted a time study and developed a process flow map. This analysis along with benchmarking data were used to set stakeholder-specific goals.

Breaking Up the Journey

Setting Interim Goals for Door-to-Balloon Time



Holding Staff Accountable

By setting stakeholder-specific goals, the hospital was able to assign accountability to each member of the team. To reinforce the importance of accountability, the service line leader was granted the authority to trigger peer review if a physician consistently failed to examine patients within 30 minutes of arrival to the emergency department.

As a result of this collaborative and structured approach to goal setting, median door-to-balloon time declined from 127 minutes in July 2007 to 74 minutes in October 2008.

Source: Our Lady of the Lake Regional Medical Center, Baton Rouge, LA; Cardiovascular Roundtable interviews and analysis.

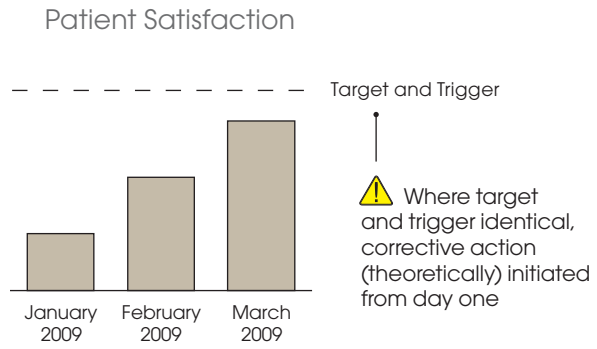
Practice # 9: Actionable Metric Triggers

Failing to Set Principled Action Triggers

Upon determining appropriate targets for selected metrics, the next step in dashboard development is embedding action triggers to ensure that managers respond to problematic performance data in a timely manner. Unfortunately, too often, targets and triggers are used synonymously even though they serve different purposes. Targets specify performance goals while triggers signal the point at which achievement of goals becomes unlikely without corrective action.

If targets and triggers are equated, metrics appear to require corrective action as soon as a new target is set. Such false alarms desensitize staff to triggers, undermining the target's creditability. That said, an exception to this rule exists when 100 percent compliance is required.

Avoiding False Alarms



Select Critical Exceptions

When Only 100 Percent Compliance Will Do

New Employees Attending Orientation

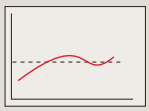
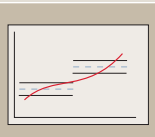
Never Events

Staff Nurses Completing Training on New Protocol

Distinguishing Between Fixed, Relative Triggers

The first step in building principled action triggers is to select one of two types of triggers for each metric. The first type, fixed triggers, are set at a constant threshold level and are often non-negotiable boundaries of performance. In contrast, relative triggers self-adjust in relation to other targets, metrics, or performance trends.

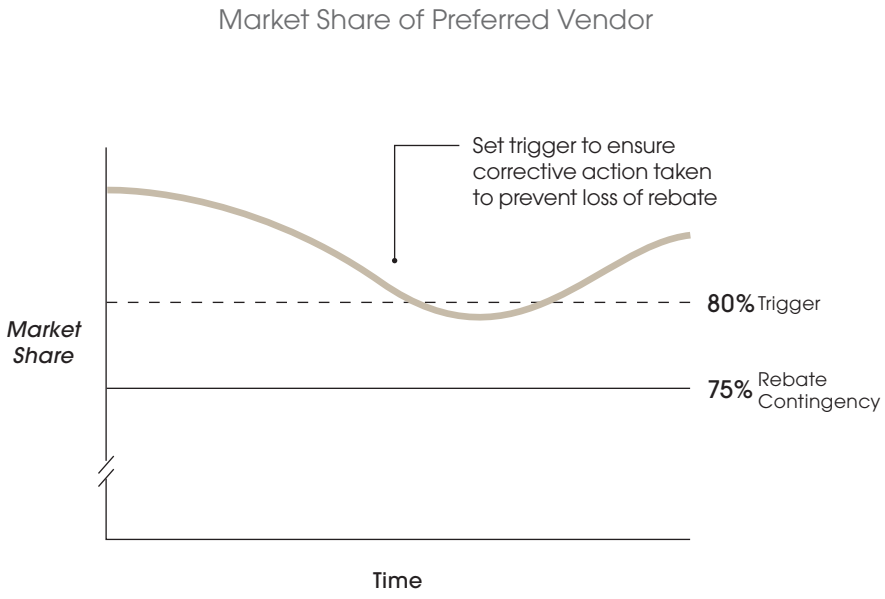
Understanding Trigger Options

Trigger Type	Advantages	Limitation	Sample Indicators
 ***Fixed Trigger*** Constant minimum performance threshold	• Ease of calculation • Communicability	Applicability limited to metrics with non-negotiable targets	• Market share of preferred vendor • Budget variance
 ***Relative Trigger*** Self-adjusting minimum performance threshold	• Applicability • Longevity	Complex to calculate; trigger dependent on historical performance, target	• Patient satisfaction • Compliance with National Quality Measures • Cath lab turnover time

Source: Cardiovascular Roundtable interviews and analysis.

Model 1: Creating Guardrails to Avoid Cliff's Edge

Example: Setting Triggers to Protect Vendor Rebates

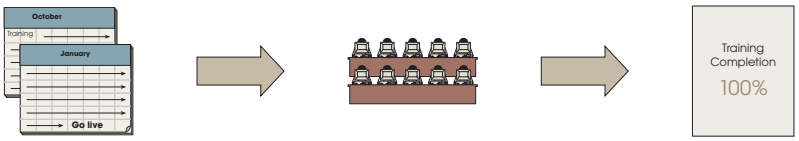


Practice Component 1: Embed Fixed Triggers

Fixed triggers are best suited for measures with truly non-negotiable performance targets, such as utilization of preferred vendor products and project deadlines. The first application for fixed triggers pertains to maintenance of minimum performance levels. By embedding triggers, hospitals can prevent declines in performance beyond which corrective measures are unlikely to prevent missing the goal altogether.

Model 2: Working Toward a Future Mandate

Example: Setting Triggers to Preserve Go-Live Schedule



Training required for all staff in preparation for information systems go-live in four months

Classroom capacity of 10 workstations limits number of participants per session

Monthly completion rate triggers necessary to prevent training efforts from delaying go-live

Meeting Future Goals

The second application for fixed triggers is tracking progress towards future mandates. When such a project-oriented goal is set, triggers embedded at interim checkpoints enable ongoing metric performance monitoring to ensure critical milestones are continually met in order to achieve the ultimate target.

While useful in specific circumstances, programs may over-rely on fixed triggers, given their ease of calculation. As only a small proportion of metrics have non-negotiable targets, fixed triggers are not applicable to the majority of metrics.

Source: Cardiovascular Roundtable interviews and analysis.

Practice Component 2: Calibrate Relative Triggers

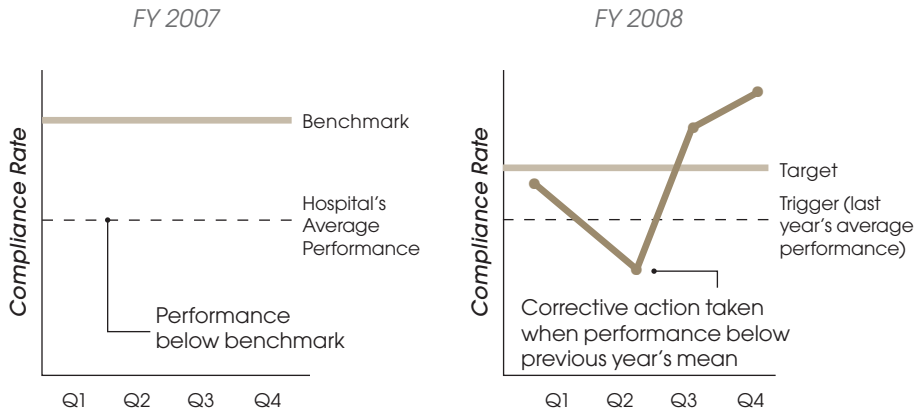
In contrast, relative triggers are particularly useful in circumstances where non-negotiable targets are not required. Relative triggers use current performance relative to the target, past performance, or related metrics to differentiate undulations in performance from more significant trends.

The first example of a relative trigger involves setting the trigger at previous year's average performance, which is ideal when the goal is to significantly improve performance, as scores below the previous year's average are a cause for concern and require corrective action.

Model 3: Positioning for Improvement

Setting Trigger at Last Year's Performance

Example: Heart Failure Discharge Instructions Compliance



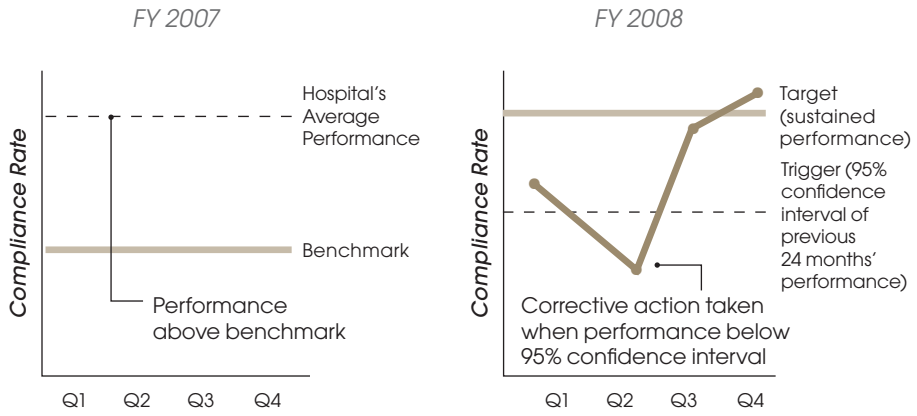
Sustaining Strong Performance

Alternatively, when average performance is equal to or above the benchmark, and the goal is to sustain current performance, program leaders should consider eliminating false alarms by setting a trigger at the 95 percent confidence interval.

Model 4: Aiming to Sustain Strong Performance

Setting Triggers at 95 Percent Confidence Interval

Example: AMI Smoking Cessation Counseling Compliance



Source: Brase C, et al., *Understanding Basic Statistics*, Boston: Houghton Mifflin, 2001: 352, A8; Cardiovascular Roundtable interviews and analysis.

Practice Component 3: Leverage Complex Triggers

Relative action triggers can be further refined by building triggers that cross-calibrate performance across multiple vectors. For example, action triggers may be activated only when both long-term and short-term performance are below target.

Similarly, corrective action may be trigged when performance of two related cardiovascular metrics drop slightly below the target. Cross-calibrating performance along multiple metrics can provide advanced warning of problematic trends that would otherwise be difficult to identify.

Model 5: Assessing Long- and Short-Term Performance

Setting Triggers on Current Month, Year-to-Date Performance

Indicators deviating from target in only one category do not trigger immediate intervention

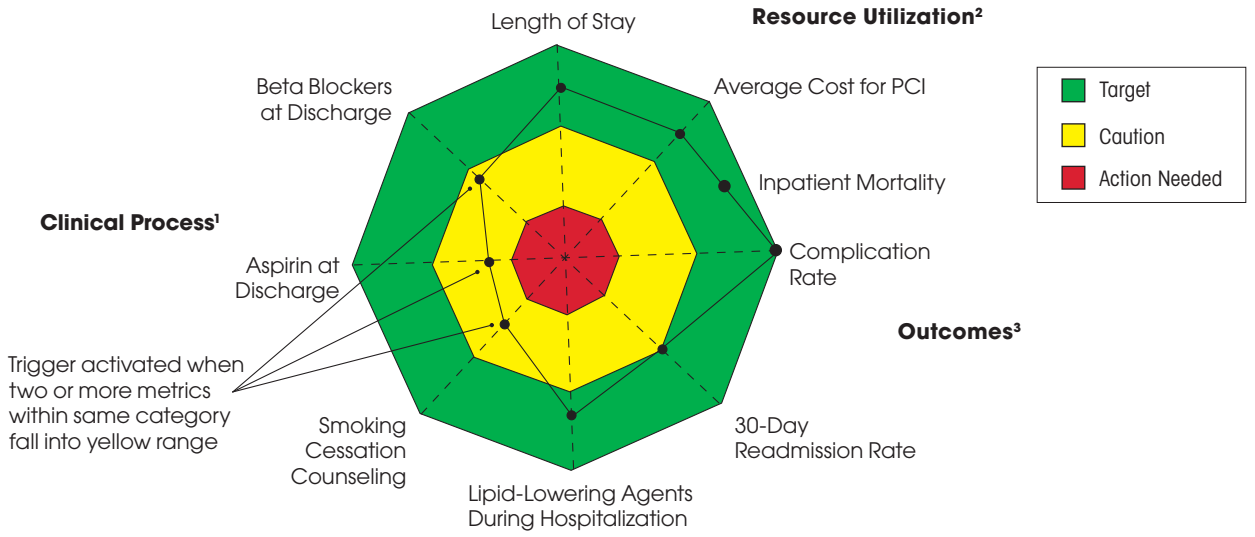
Dashboard February 2008

☐ At or Better Than Target ▒ Below Target—No Immediate Concern ■ Below Target—Immediate Concern

Indicators	FYTD Trend	Favorable Direction	Period Reported	FY 2008 Target	Current Month	Fiscal YTD Actual
Overall Turnover Rate	∿	↓	Feb. 2008	14.5%	☐	▒
RN Vacancy	∿	↓	Feb. 2008	16.1%	☐	☐
OT Cost	∿	↓	Feb. 2008	$16,125	☐	■
Agency Cost	∿	↓	Feb. 2008	$5,269	▒	☐
Pressure Ulcer Prevalence	∿	↓	Feb. 2008	12.0%	■	■

Indicators falling below target in both current month (short term), year to date (long term) trigger intervention

Model 6: Setting Performance Triggers Along Multiple Metrics



[1] Clinical process metrics include beta blockers at discharge, aspirin at discharge, smoking cessation counseling, and lipid-lowering agents during hospitalization.

[2] Resource utilization metrics include length of stay and average cost for PCI.

[3] Outcomes metrics include inpatient mortality, complication rate, and 30-day readmission rate.

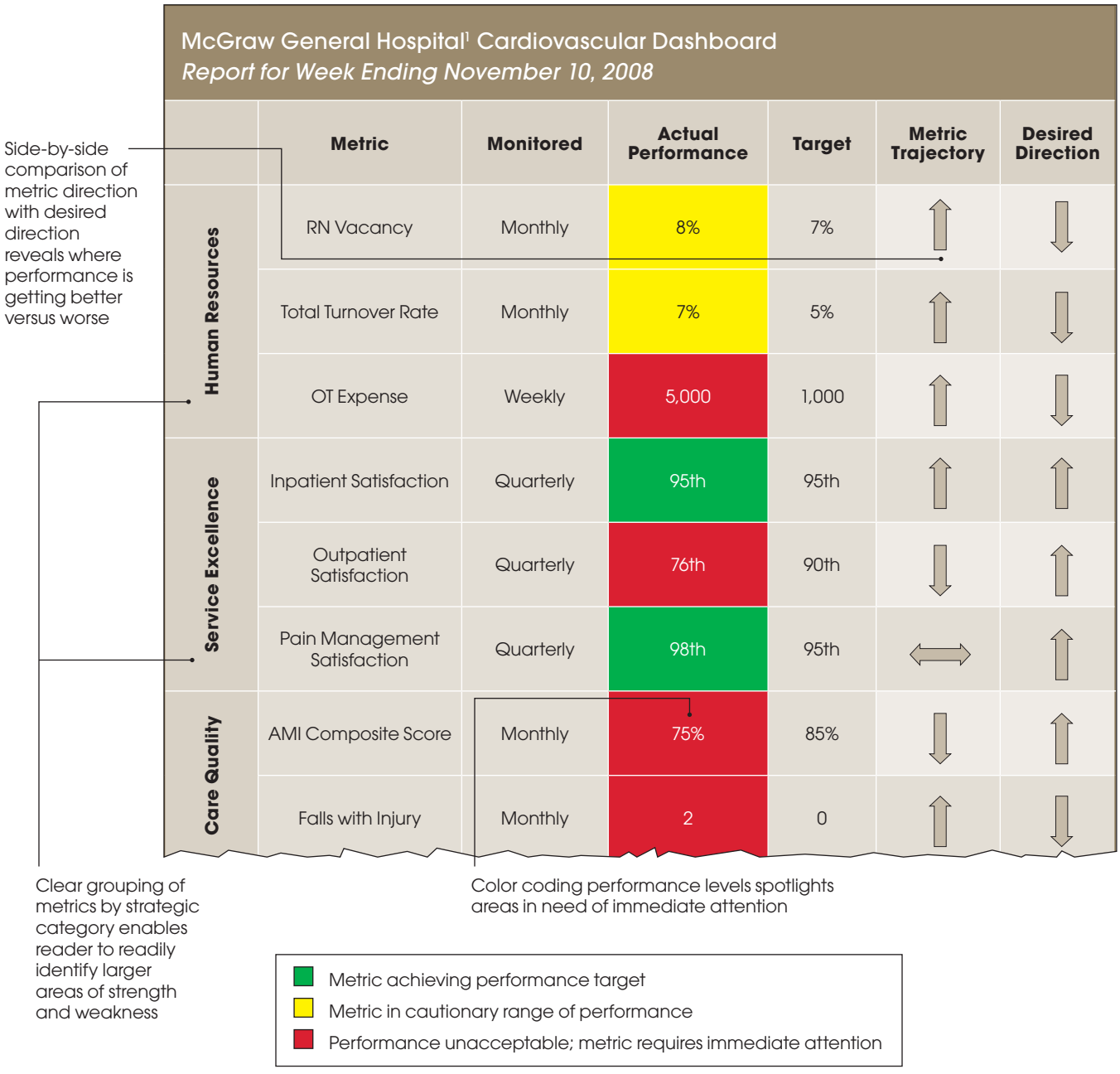
Source: Cardiovascular Roundtable interviews and analysis.

Practice #10: Dynamic Dashboard Deployment

Practice Component 1: Display Information Visually

After selecting metrics, establishing targets, and setting action triggers, the final step to successful dashboard development entails formatting the dashboard to serve as an effective tool for department management and performance improvement. This involves creating a table of selected metrics, whose performance is placed in the context of future goals through elements such as color-coded action triggers. Moreover, including additional elements such as direction of metric performance compared to desired direction helps establish easily identified context for metric performance.

Conveying Metric Performance "at a Glance"



[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

Case Study:

Duke Investing in Dashboard Development

Integrating Data from Multiple Sources

Data Warehouse Extraction

56 percent of data extracted from hospital-wide data warehouse

"Lite Data" Collection

39 percent of data submitted in Excel document to application

Direct Key Entry

5 percent of data entered directly into the application

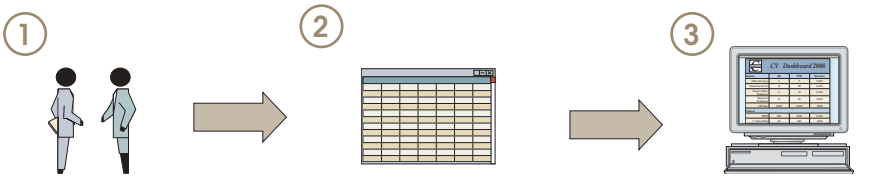
Custom-developed application integrates data from multiple sources to create hospital-wide, department-specific dashboards

Practice Component 2: Streamline Dashboard Population

After designing the layout, the next and perhaps the most challenging step is streamlining dashboard data population. To minimize manual data entry, the management engineering department at Duke University Health System developed a home-grown dashboard that provides multiple options for data population, including automatic extraction from a data warehouse.

Reducing the Burden of Manual Data Entry

"Lite Data" Entry Process



Assign Measure Owner

Staff managing metric on daily basis assigned responsibility for submitting data to application

Develop Standardized Submission Template

Management engineering team, measure owner develop standardized Excel template for monthly data submission

Automate Dashboard Population

Programming logic written, enabling automatic transfer of information from Excel template to dashboard application

Automating Manual Data Entry

If the required information is not available in the data warehouse, a metric owner is assigned and the management engineering team works with the individual to develop a standardized submission form. Programming logic is then written, enabling the Excel spreadsheet to be automatically uploaded into the dashboard tool.

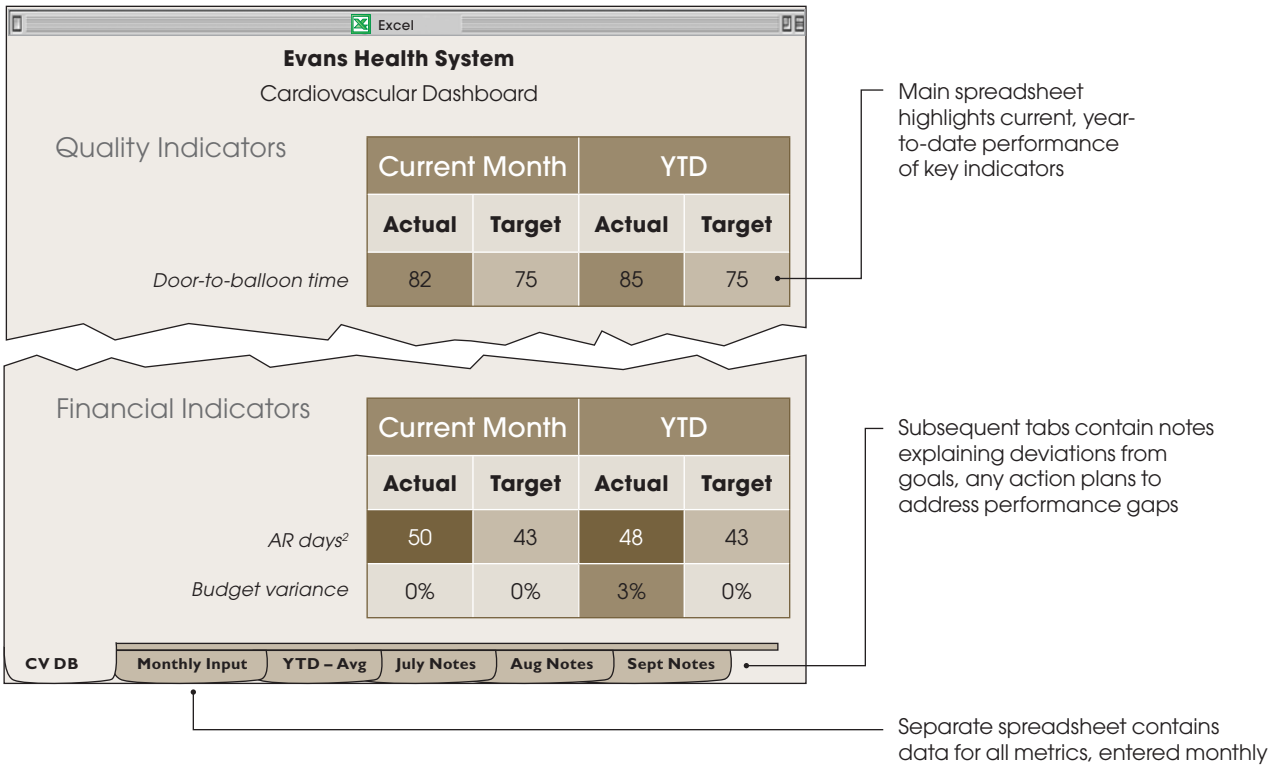
Source: Duke University Health System, Durham, NC; Cardiovascular Roundtable interviews and analysis.

Practice Component 3: Establish Drill-Down Capabilities

The final step to developing an effective dashboard is to provide easy access to relevant data for further analysis of performance gaps by the cardiovascular team. At a minimum, program leaders must leverage spreadsheets within Excel to document the raw data used to calculate the metrics on the dashboard as well as any additional details affecting performance.

A Lower-Cost Alternative

Leveraging Excel Spreadsheets at Evans Health System[1]



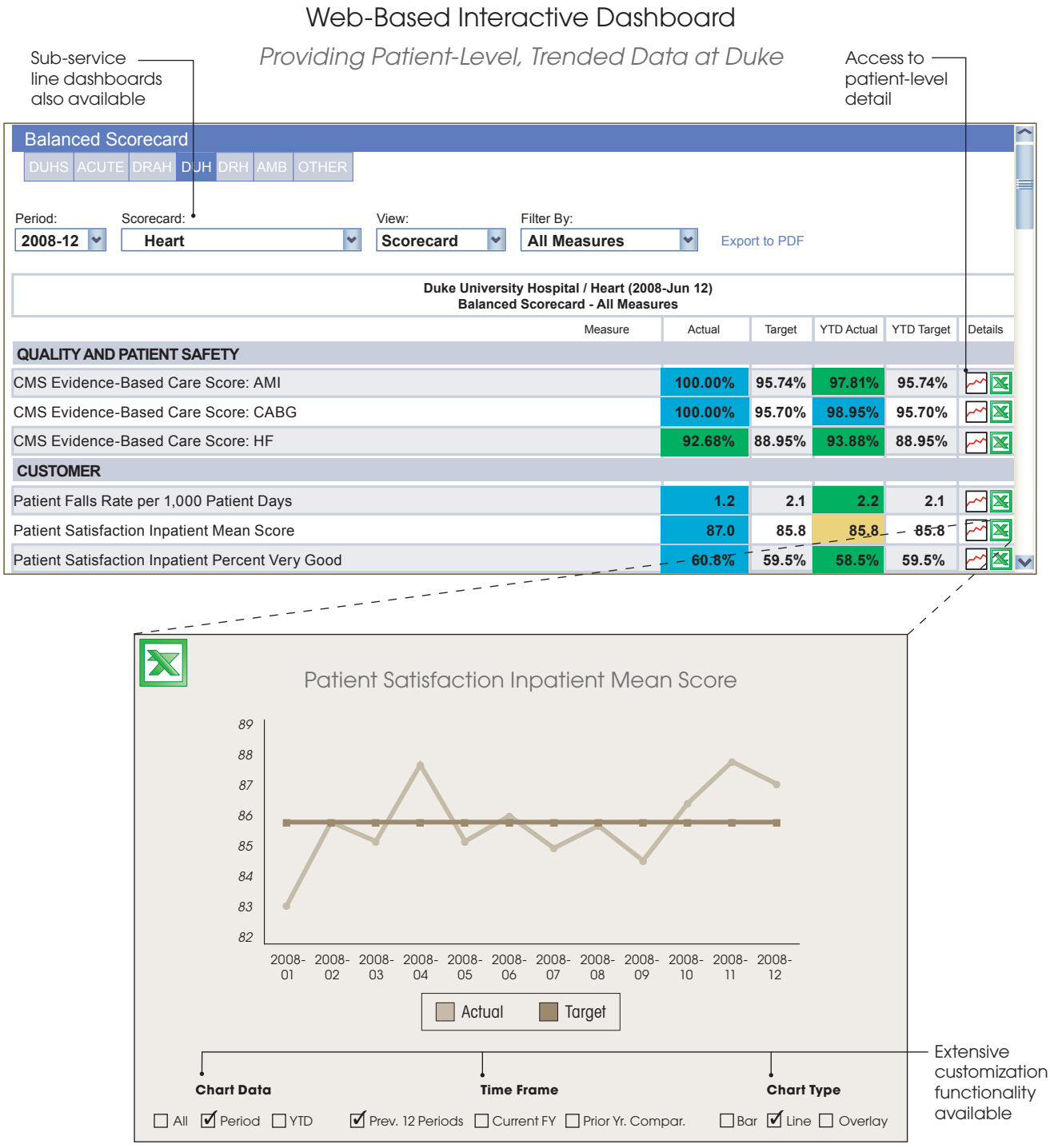
[1] Pseudonym.

[2] Days in accounts receivable.

Source: Cardiovascular Roundtable interviews and analysis.

Web-Based Interactive Dashboard

A preferable, but more resource-intensive approach was adopted by Duke University Health System. The web-based interactive platform developed at Duke is available on the health system's intranet and provides staff access to over 115 dashboards. Moreover, the platform allows staff to trend data and analyze patient-level information, which greatly increases utility.



[1] The data contained on this page are for demonstration purposes only and do not reflect actual performance. The Cardiovascular Roundtable has modified all data presented to protect the competitive position of the institution profiled.

Source: Duke University Health System, Durham, NC; Cardiovascular Roundtable interviews and analysis.

IV. Building a High-Performance Infrastructure

Practice #11: Integrated Quality Governance

Practice #12: One-Stop PI Support

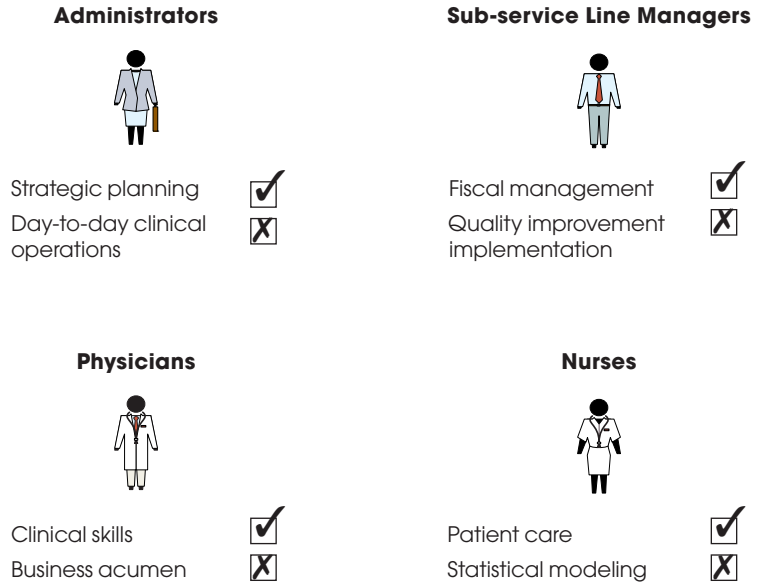
Practice #13: Process Improvement Tools

Lack of Intra-department PI Expertise

Once opportunities for improvement have been identified, programs should invest in process improvement. Unfortunately however, the cardiovascular team often lacks the skills and infrastructure necessary to successfully affect change. Common deficits include unfamiliarity with process improvement tools and methodologies, limited access to timely data, and a lack of data analytics and process improvement training.

Unprepared to Serve

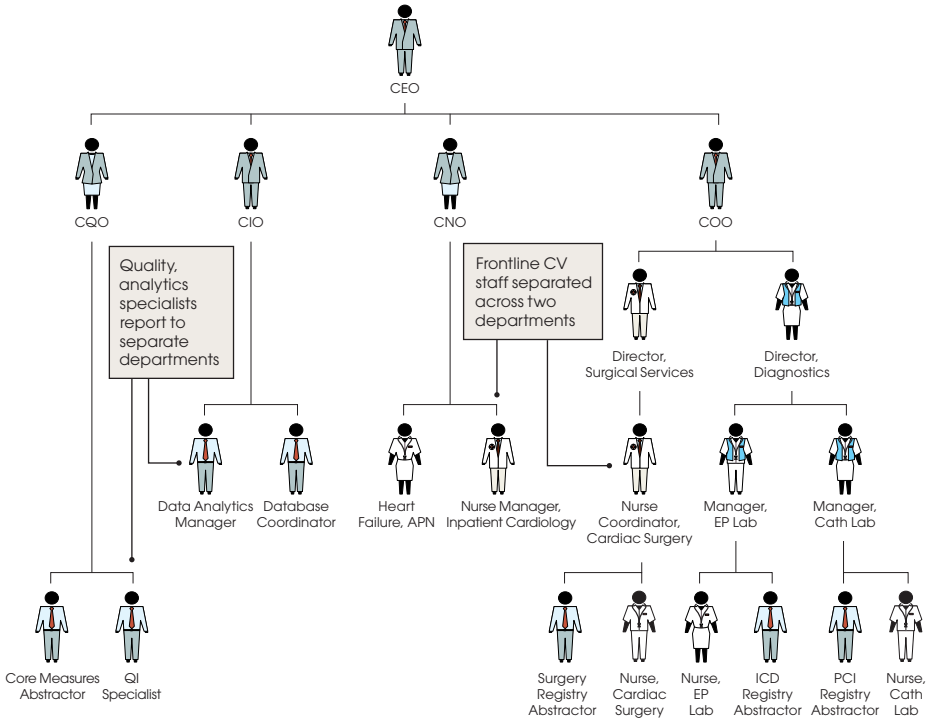
Skills Often Insufficient to Drive Quality Improvement



Limited Coordination Between Departments

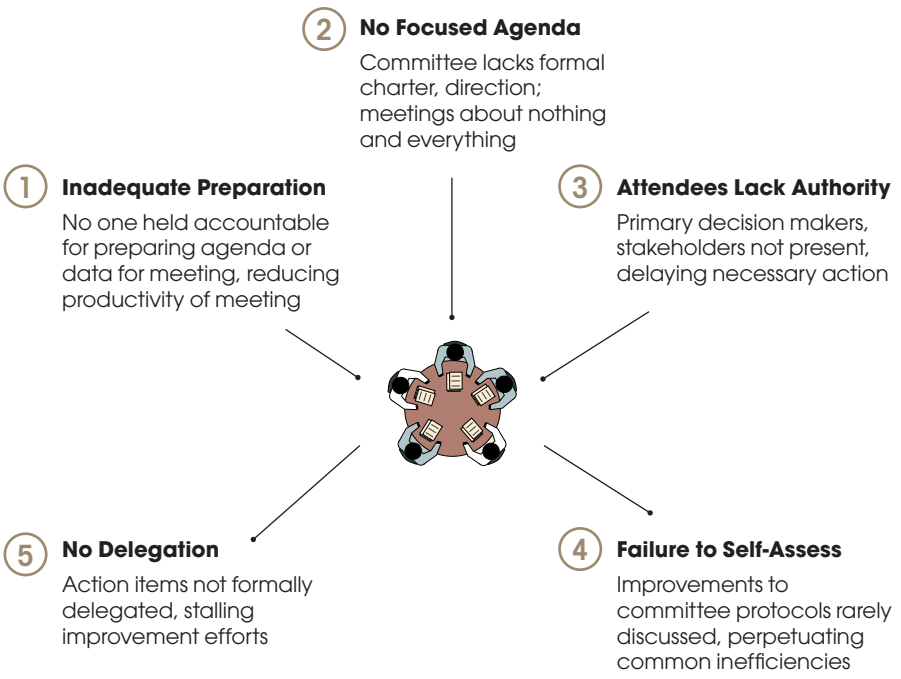
While personnel with analytical skills and process improvement experience are often employed within the hospital, highly fragmented reporting relationships limit access to these experts. For example, a common challenge hospitals experience is that staff responsible for collecting and submitting cardiac National Quality Measures reports to quality not the cardiovascular department; therefore process improvement initiatives focused on National Quality Measures can be difficult to coordinate. Moreover, the cardiovascular clinical team often report to different chief executives further compounding coordination challenges.

Fragmented CV Infrastructure Not Designed to Inflect Change



Source: Cardiovascular Roundtable interviews and analysis.

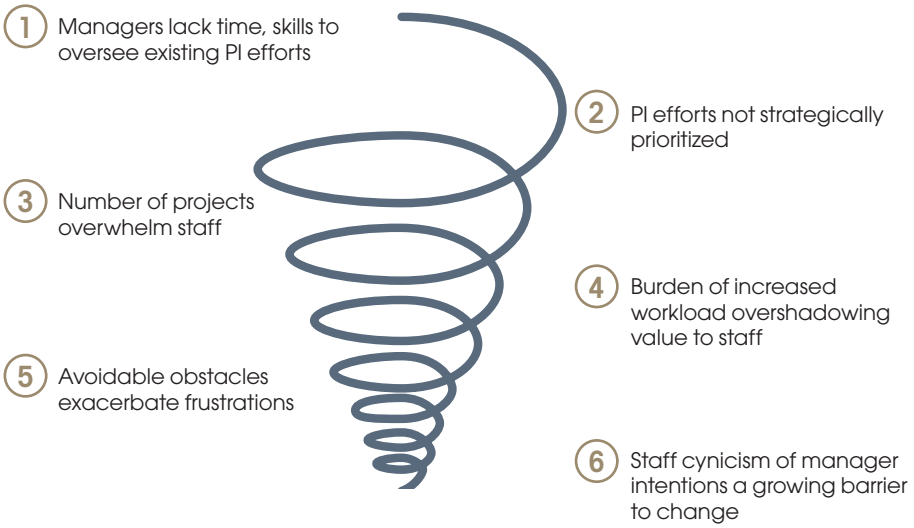
Meeting for Meeting's Sake



Unproductive Committee Meetings

Beyond the challenges associated with coordinating efforts with multiple departments, many institutions struggle to affect change due to unproductive committee meetings. While the vast majority of institutions have created forums designed to improve performance, these meetings are historically underleveraged. Without a clear agenda or adequate preparation, committee meetings are often unproductive, discouraging primary decision makers from volunteering their time to champion improvement efforts.

Cumulative Effects Derailing Efforts at Maupin[1]



Multiple Challenges Forestall Efforts

The cumulative effect of a lack of process improvement expertise, limited coordination between departments, and unproductive committees is highlighted by Maupin Hospital. Program leaders' inability to prioritize efforts coupled with minimal guidance on how to effectively implement process improvement initiatives led to several project failures, which made staff highly resistant to subsequent process improvement initiatives.

[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

Practice #11: Integrated Quality Governance

Practice Component 1: Empowered Committee Structure

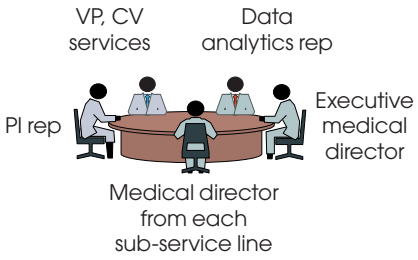
To avoid Maupin's experience, executives must build an integrated quality governance structure, which prioritizes efforts and increases accountability. The first component of an integrated quality governance is an empowered committee structure. South Miami Hospital developed two committees—the CV Executive Committee and the CV Quality Advisory Committee. Both committees include physician representatives from all cardiovascular clinical terrains. This is important because it provides access to clinical experts, ensures physicians' priorities are addressed, and helps secure buy-in from other clinicians. The second critical aspect of South Miami's committee structure is the overlapping nature of committee members. By including the vice-president of cardiovascular services and select physicians on both committees, programs can facilitate communication between the two forums.

Case Study:

South Miami Designs an Effective Quality Administration

CV Executive Committee

CV Quality Advisory Committee



Elements of Effective Committee Design

1. Integrated, multidisciplinary physician leadership prevents biases, increases physician alignment
2. Multi-departmental representation broadens perspective of teams
3. Overlapping members ensure continuity between committees
4. Executive-level participation facilitates decision making

Committees Serve Distinct Roles

When designing governance structures, program leaders should ensure that each committee has clearly delineated roles and responsibilities. The CV Executive Committee at South Miami Hospital is the strategic decision-making body, whereas the CV Quality Advisory Committee acts as the oversight body for outcomes data, process improvement, peer review, and credentialing. Clearly defining committee responsibilities helps focus the committees' efforts and empowers the committees to make decisions.

Clearly Defining Committee Responsibilities

CV Executive Committee Charter

Responsibilities:

- Strategic planning
- Capital budgeting
- Facility planning
- Operational governance

Physician Selection Criteria:

- Commitment to department
- Willingness to devote time to committee, subcommittee responsibilities

Meeting Details:

- Meets monthly
- Chaired by VP, CV services
- Excellent attendance

CV Quality Advisory Committee Charter

Responsibilities:

- Peer review, credentialing, order set creation
- Review CV outcomes data
- Oversight, prioritization of quality improvement initiatives

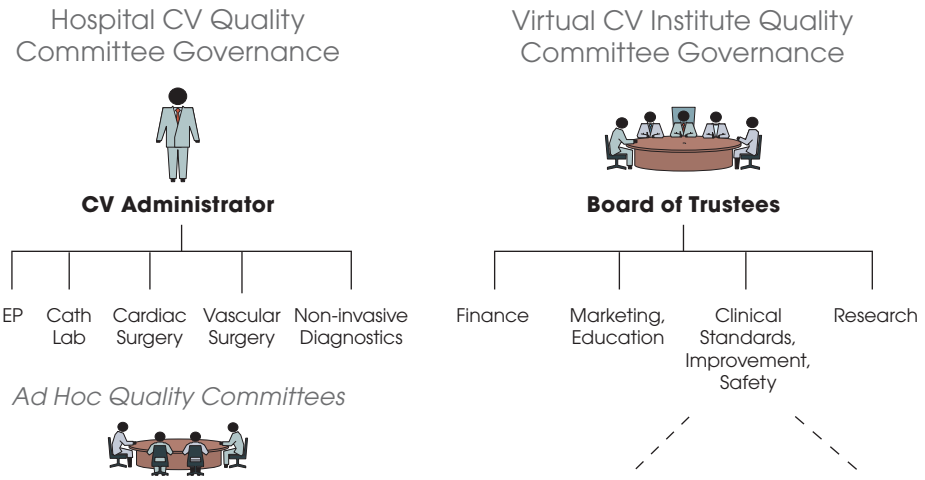
Meeting Details:

- Chaired by medical director
- Meets monthly
- Required attendance
- Any staff member may bring quality concern before committee

Source: South Miami Hospital, South Miami, FL; Cardiovascular Roundtable interviews and analysis.

Case Study:

Florida Hospital Overlapping Committee Oversight

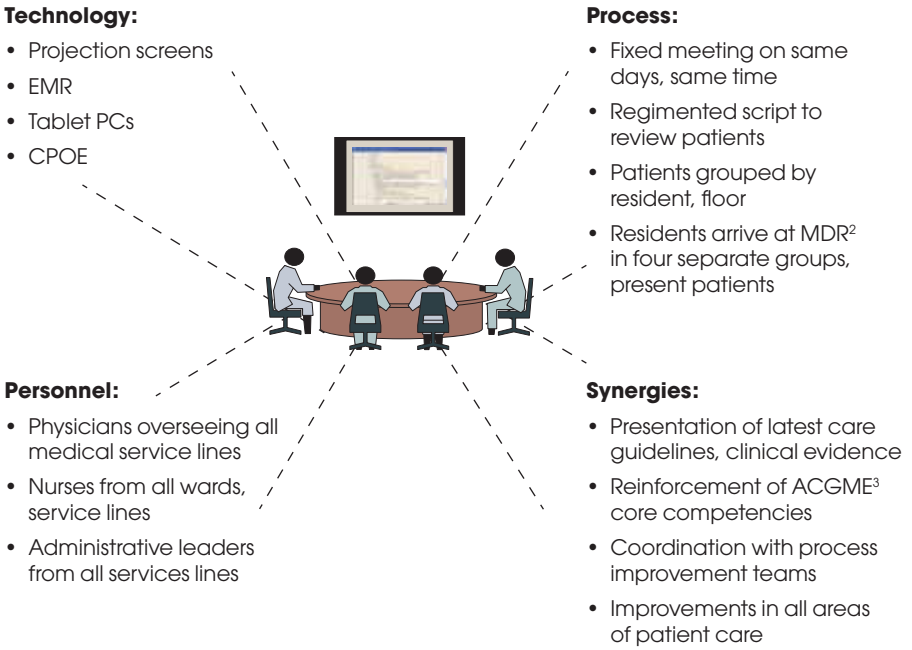


Practice Component 2: Hardwired System Redundancy

In addition to developing an empowered committee structure, programs should hardwire system redundancies. While committees should have distinct roles and responsibilities, holding multiple committees accountable to analyzing high-priority metrics can help improve the identification of problematic trends. With the need for hardwired system redundancy in mind, Florida Hospital assigned responsibility for analyzing National Quality Measure compliance to two independent committees—the Clinical Standards, Improvement, and Safety committee (which is managed by physicians who are members of the Virtual Cardiovascular Institute) and the hospital's sub-service line quality committees.

Case Study:

BMC[1] Leveraging Resources for Efficiency



Practice Component 3: Results-Driven Meeting Protocols

Finally, to improve the effectiveness of committee meetings, hospitals should invest in results-driven meeting protocols. In 2000, Berkshire Medical Center, a 300-bed hospital located in Pittsfield, Massachusetts established a Multidisciplinary Rounds Committee (MDRC) to improve compliance with evidence-based medicine. The MDRC meets three times a week to review non-ICU patients and includes physician representation from all clinical terrains, nurses from each hospital unit, and administrative personnel. By investing in technology, developing highly effective meeting processes, and ensuring key stakeholders are at the meeting, Berkshire can usually review all non-ICU patients within an hour.

[1] Berkshire Medical Center.

[2] Multidisciplinary rounds committee.

[3] Accreditation Council for Graduate Medical Education.

Source: Florida Hospital, Orlando, FL; Ellrodt G, et al.,"Multidisciplinary Rounds (MDR): An Implementation System for Sustained Improvement in the American Heart Association's Get With The Guidelines Program," *Critical Pathways in Cardiology,* 2007, 6: 106–116; Berkshire Medical Center, Pittsfield, MA; Cardiovascular Roundtable interviews and analysis.

Making Every Minute Count

In fact, the highly structured regimen allows the multidisciplinary team to review each patient in approximately 90 seconds. During the meeting, residents enter any recommended changes to orders into the hospital's computerized physician order entry (CPOE) system using a laptop, thus minimizing the need the follow-up. To further increase efficiency, patients are grouped by resident rotation, and residents present their patients in 15-minute intervals. The residents are then excused from discussions unrelated to their patients.

Multidisciplinary Rounds Maximizing Meeting Productivity

Regimented Review of Heart Failure Patient's Care

00h:00m:30s

- Case overview
- Hematology report
- Lab results
- Echo test report
- List of prior diagnoses
- Vaccine review
- Pulse, blood pressure, other nurse notes
- Medications

00h:01m:00s

- Resident indicates recent start of carvedilol
- Pharmacist suggests adding spironolactone
- Chair of medicine suggests CRT-D[1]; asks respiratory therapist about smoking cessation counseling
- Hospitalist notes intention to consult cardiologist about device therapy
- Resident notes patient should be discharged following morning
- Heart failure specialist makes final suggestions to resident, hospitalist

Total Time Elapsed:

00h:01m:30s

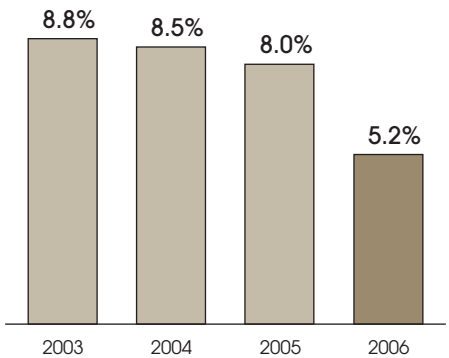
Multidisciplinary Rounds Dramatically Reduce Mortality

As a result of the investment in the MDRC and the hospital's dedication to quality improvement, Berkshire Medical Center has experienced a dramatic reduction in AMI mortality. Between 2000 and 2004 the AMI mortality rate at Berkshire Medical Center decreased by 44 percent compared to the national decline in AMI mortality of only 28 percent over the same period.

Saving Patients' Lives

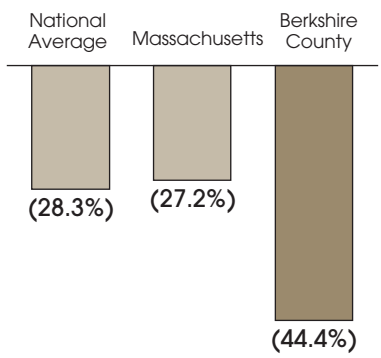
AMI Inpatient Mortality Rate

Berkshire Medical Center



Change in Age-Adjusted Mortality

AMI Patients, 1999–2004



[1] Cardiac resynchronization therapy with ICD implant.

Source: Ellrodt G, et al., "Multidisciplinary Rounds (MDR): An Implementation System for Sustained Improvement in the American Heart Association's Get With The Guidelines Program," *Critical Pathways in Cardiology,* 2007, 6: 106–116; Berkshire Medical Center, Pittsfield, MA; Cardiovascular Roundtable interviews and analysis.

Practice #12: One-Stop PI Support

Three Alternatives for Ensuring Expertise Available

	Option 1: Full-Time CV Project Manager	Option 2: Designated PI Expert Within CV Department	Option 3: Dedicated Personnel from Quality Department
Description	Department hires project manager with PI expertise to support CV-related PI projects	Staff member in CV department with PI experience responsible for helping CV department implement improvements in addition to other responsibilities	Staff member from quality department assigned to CV department, provides support for all CV-related PI projects
Pros	Manager reports to CV department, ensuring priorities and incentives aligned	PI expert has extensive CV expertise	Coordination between quality department and CV department improves
Cons	Expense associated with hiring additional personnel	PI expert easily overwhelmed with additional responsibilities	Quality department representative may lack CV expertise

To access a Project Manager Job Description, please visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Case Study:

Wake Forest Prioritizes Data Analysis

Basic Training

- Nurses instructed on basic functionalities of business intelligence software
- Able to run simple queries of registry data for process improvements, outcomes analyses

Technical Assistance

- Nurses request complex data queries from skilled information system experts
- Two programmers run complex data manipulations, regressions, conditional analyses

Online Reports

- Customized queries added to online report library
- Physicians, nurses can modify date ranges on prior queries through online report library

Practice Component 1: Provide Staff Access to PI Expert

In addition to developing an integrated quality governance structure to coordinate quality improvement efforts, program leaders must ensure the cardiovascular team has the required skill sets and resources to successfully implement quality improvement initiatives. With this in mind, hospitals should provide staff access to a process improvement (PI) expert who is responsible for educating staff on PI methodologies, helping staff manage projects, and assisting with data analysis.

Practice Component 2: Enhance Analytics Capabilities

To reduce the department's reliance on a PI expert and enfranchise staff, Wake Forest University Baptist Medical Center provided registry nurses with basic training on data analysis techniques. Registry nurses are also encouraged to ask programmers for help when complex queries are required. Furthermore, Wake Forest encourages other staff and physicians in the department to adopt a more analytical approach by making all customized queries available on an online data query library.

Source: Wake Forest University Baptist Medical Center, Winston-Salem, NC; Cardiovascular Roundtable interviews and analysis.

Practice Component 3: Develop Data Permission Rules

While there are clear benefits associated with increasing access to data, some physician may fear that non-clinicians will misinterpret physician-level data. To address this concern and to streamline data request processes, Summa Health System developed a four-tiered permission request grid, which assigns varying levels of access by role and clinical experience. For example, the cardiovascular section chief and medical director for example, have access to the complete STS report and can request physician-specific queries. In contrast, case managers only have access to physician-level data with approval from the surgeon.

Case Study:

Summa Ensuring Appropriate Access to Confidential Information

Limiting Access to Outcomes Metrics by Position

Tier 1	*Tier 2*	*Tier 3*	*Tier 4*
Full Disclosure	**Aggregate Data, Personal Performance**	**Aggregate Data, Limited Physician Outcomes**	**Aggregate Data Only**
• Section chief, cardiovascular surgery • Medical director, cardiovascular service line • Director, cardiovascular service line • Administrative director, cardiovascular service line • Systems administrator	• Cardiovascular surgeons	• Case managers, cardiovascular surgery	• Senior hospital management • Vice president of medical affairs • Chief nursing officer • Chair, department of surgery • Unit manager, surgical cardiovascular ICU • Administrative director, surgery services • Director, surgery services • Active cardiology department members

Definitions

Full Disclosure: Access to complete STS quarterly reports, authorization to request physician-specific queries from database

Aggregate Data: Access to executive summary of STS quarterly reports, authorization to request program-level queries from database

Limited Physician Outcomes: Authorization to request queries only for their physicians, with surgeon approval

Source: Summa Health System, Akron, OH; Cardiovascular Roundtable interviews and analysis.

Practice #13: Process Improvement Tools

Success Correlated with Methodology Complexity

Study in Brief

- Survey of 109 Minnesota hospitals conducted by researchers at University of St. Thomas, St. Paul, Minnesota
- Respondents reported types of process improvement programs implemented at hospital
- Rasch Model Analysis used to determine relationship between hospital's ability to implement program, program difficulty
- Results indicate hospital's ability to implement more complex programs becomes easier once less complex programs have been adopted successfully

To access an Overview of Select PI Tools, please visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Evaluating Process Improvement Methodologies

Once institutions have identified PI experts and have trained staff to analyze certain data, the next step is to select the appropriate methodology. As highlighted by a recent study conducted by the University of St. Thomas, the probability of successful implementation of a PI project is inversely correlated with the complexity of the methodology chosen. Furthermore, hospitals are more likely to successfully implement a given methodology if they have successfully implemented a less complex program. These findings suggest that hospitals should adopt a graduated approach to process improvement starting with the simplest initiatives such as benchmarking and utilizing balanced scorecards before attempting to leverage more complex approaches like Lean Management or Six Sigma.

[1] Find, Organize, Clarify, Understand, Select-Plan, Do, Study, Act.

Source: Olson JR, et al., "Examining Quality Improvement Programs: The Case of Minnesota Hospitals," *Health Research Services*, 2008, 43: 1787–1806; Cardiovascular Roundtable interviews and analysis.

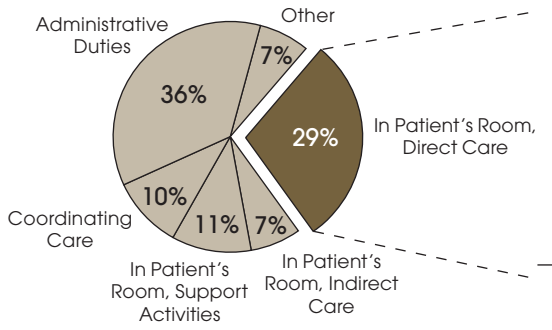
Problem Identification Critical First Step

Regardless of which methodology your department selects, the first critical step to a process improvement initiative is problem identification. As part of a system-wide quality improvement initiative, senior leadership at Alegent Health sponsored efforts to identify processes that negatively impacted patient care. This involved conducting a time study to better understand inpatient workflow. The study showed that nurses spent less than a third of their time providing direct patient care and that the vast majority of patient encounters were less than three minutes.

Case Study:

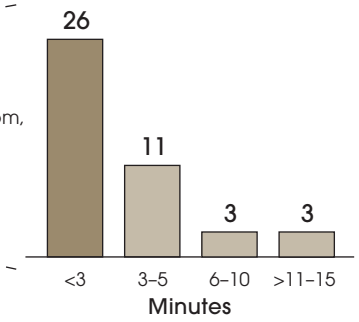
Alegent Hardwiring Quality Improvement

Time Spent per Activity[1]



Duration of Patient Encounters[1]

Patients Under Care per Shift



Examples of Complexity in Delivering Care at Bedside

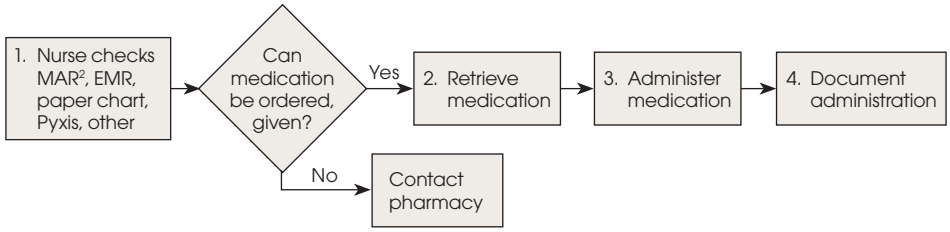
- Medications stored in multiple locations
- Paper-intensive care planning
- Cumbersome organization design, workflow
- Inadequate staffing levels

Flow Map Indicates Key Failures

To increase the time nurses spent with patients and the length of nurse-patient interactions, the quality improvement department worked in collaboration with nurses to develop workflow maps for inpatient processes. By outlining all of the steps, potential failures, and the risks associated with those failures, the quality improvement team was able to identify inefficiencies and opportunities for improvement. After conducting this analysis, Alegent realized that nurses were storing medications in multiple locations in the unit and that addressing the inefficiencies in the medication inventory management process would dramatically increase efficiency and likely improve patient care.

Analyzing Current Processes to Identify Inefficiencies

Non-scheduled, Non-routine Medication Request Process Map



Process Step	Failures	Results
1	1a. Order/MAR misunderstood 1b. Order transcribed onto MAR incorrectly 1c. Order transcribed onto wrong MAR	Overdose, under-dose, allergic response, ADR[3], delay, omission
2	2a. Wrong medication or dose selected 2b. Cannot find medication	Task 1 results, delay, medication borrowed from another patient creating shortage
3	Wrong patient or dose administered	Overdose, under-dose, allergic response, ADR, delay, omission
4	Administration not documented	Inability to assess medications given to patient

[1] The data contained on this page are for demonstration purposes only and do not reflect actual performance. The Cardiovascular Roundtable has modified all data presented to protect the competitive position of the institution profiled.

[2] Medication administration report.

[3] Adverse drug reaction.

Source: Alegent Health, Omaha, NE; Cardiovascular Roundtable interviews and analysis.

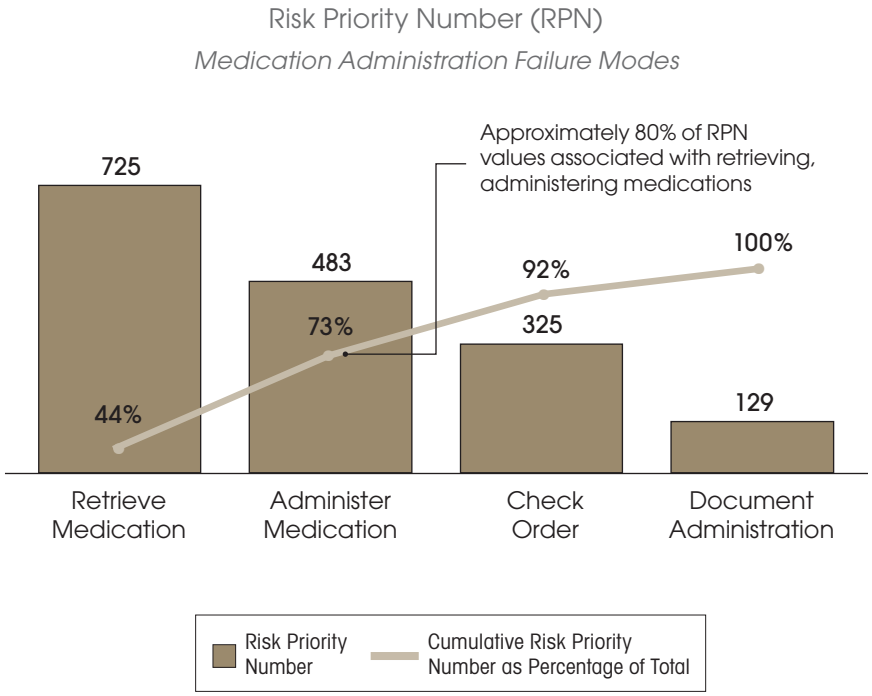
Quantifying Risk Associated with Each Inefficiency[1]

Process Step	Failure Mode	Cause of Failure	Risk Priority Number
1. Check order	1a. Order/MAR[2] misunderstood	Illegible order; use of abbreviations, LASA[3] patient names; knowledge deficit; staff interruptions	99
	1b. Order transcribed onto MAR incorrectly	Same as above; MAR too lengthy; lack of staff support; distractions; failure/absence of double checks	144
	1c. Order transcribed onto wrong MAR	LASA patient names; poor presentation of patient demographics on MAR; order transcribed before patient identifier added	82
2. Retrieve medication	2a. Wrong medication or dose selected	LASA meds stored near each other; drug shortage; knowledge deficit	160
	2b. Cannot find medication	Pharmacy delivery issue; no communication to nurse that med is already delivered; meds not put away in correct patient stall or not at all	218
		Medications already picked up by pharmacy	74

Leveraging FMEA to Assign Risk

Following the identification of failures, Alegent performed a Failures, Modes, and Effects Analysis (FMEA), which involved assigning a risk priority number (RPN) to each failure associated with the inventory management process. A RPN is calculated by rating each failure mode's severity, likelihood of occurrence, and likelihood of detection on a scale from one to ten and then multiplying each of the three ratings together.

Prioritizing Processes by Risk



Pareto Analysis Focuses Efforts

Finally, Alegent performed a Pareto Analysis to help determine which failures were responsible for the majority of the risk. This involved ranking failures according to their RPN and plotting the cumulative RPN percent. As a result of performing a Pareto Analysis, the process improvement team could quickly prioritize PI efforts on the most dangerous failures. For example, 73 percent of risk could be assigned to errors due to retrieving and administering medications and therefore, the quality improvement team focused efforts on addressing these failures first.

[1] The data contained on this page are for demonstration purposes only and do not reflect actual performance. The Cardiovascular Roundtable has modified all data presented to protect the competitive position of the institution profiled.

[2] Medication administration record.

[3] Look alike, sound alike.

Source: Alegent Health, Omaha, NE; Cardiovascular Roundtable interviews and analysis.

Leveraging Analyses to Design Effective Solutions

As a result of the hospital's dedication to quality improvement and data analytics, Alegent designed effective solutions to address the most important sources of inefficiency. Consolidating medications under a centralized electronic medication management system dramatically improved access to medicines. However, Alegent realized that technology alone would not deliver the necessary improvements, so the hospital leadership also invested in training, redesigned the workflow, and tested the new processes in a live care setting before disseminating the changes to the rest of the health system.

Addressing Process Failures

Consolidate Medications → **Retrain Nurses** → **Redesign Workflow**

- Upgraded electronic medication management system
- Centralized storage of ward's medications[1] into medication system

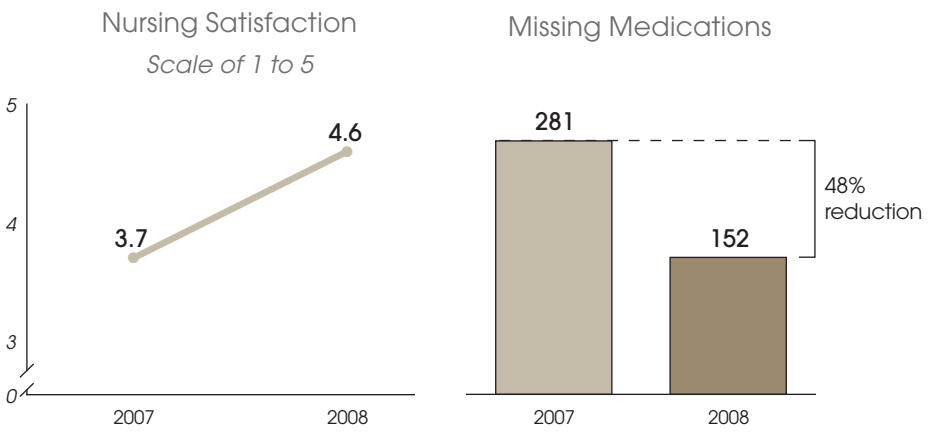
- Provided instruction on system's functionalities
- Training focused on efficiencies, common mistakes

- Collaborated with nurses to create efficient process flow
- Tested workflow in live care setting to verify feasibility

[1] Ointments, eye drops, insulin, medications for highly specific cases kept in pharmacy.

Source: Alegent Health, Omaha, NE; Cardiovascular Roundtable interviews and analysis.

Reaping the Benefits



Improving Satisfaction, Reducing Missing Medications

Alegent's hardwired approach to process improvement proved to be very successful. Nursing satisfaction increased significantly, and the unit experienced a 48 percent reduction in missing medications. Furthermore, some of the nurses' concerns, including fears over lines to access medications and having to walk more, did not materialize.

Source: Alegent Health, Omaha, NE; Cardiovascular Roundtable interviews and analysis.

V. Promoting Accountability

Practice #14: Performance-Based Incentives

Practice #15: Improvement-Focused Repercussions

Practice #16: Tiered Employed Physician Bonus Model

Practice #17: Community Physician Incentives

Practice #18: Outcomes-Based Review Criteria

Improvement Efforts Often Burdensome

Once hospitals have streamlined data abstraction, invested in dashboard development, and developed a quality improvement infrastructure, they must align incentives to ensure that staff leverage the available resources to elevate performance. Unfortunately, as staff and physicians are often overwhelmed with managing daily operations, they are unlikely to invest time in process improvement unless executives communicate the importance of these improvement initiatives by aligning incentives.

Not an Easy Sacrifice

Key Stakeholderes Lack Additional Capacity

Director

- Costs of required resources tightening budgetary constraints
- Expanding PI responsibilities limiting time available for strategic priorities

Physician

- Participation in hospital quality councils reducing patient care time
- Documentation requirements increase, impacting productivity

Frontline Staff

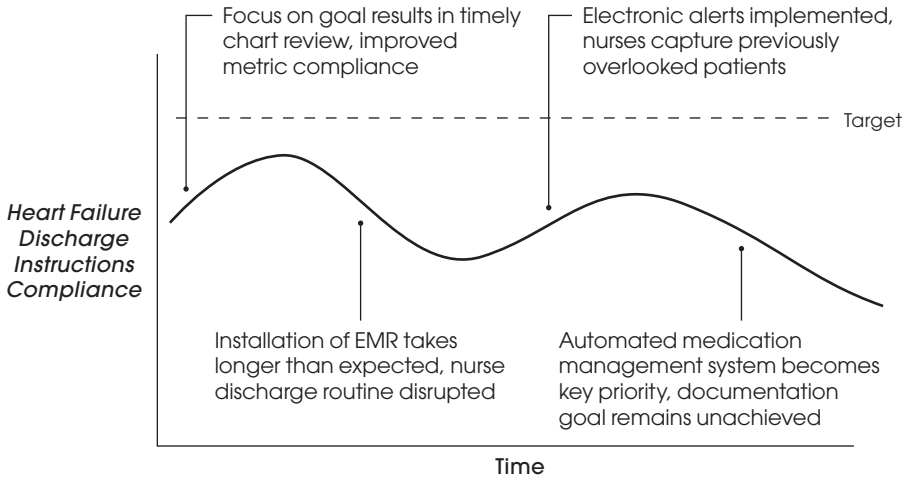
- Additional abstraction responsibilities increasing workload
- Top-down nature of mandates limiting staff engagement

Daily Fires Trump Best Intentions

In truth, even when initial physician and staff buy-in is secured, other more urgent priorities often take precedence, thereby derailing efforts. Staff at Conway Hospital, for example, committed to improve heart failure discharge instruction compliance and experienced significant improvement as a result. However, once the institution's focus and staff priorities migrated towards EMR implementation, the heart failure improvements were not sustained, and Conway failed to meet the performance targets.

Case Study:

Periodic Setbacks Impede QI Efforts at Conway Hospital[1]



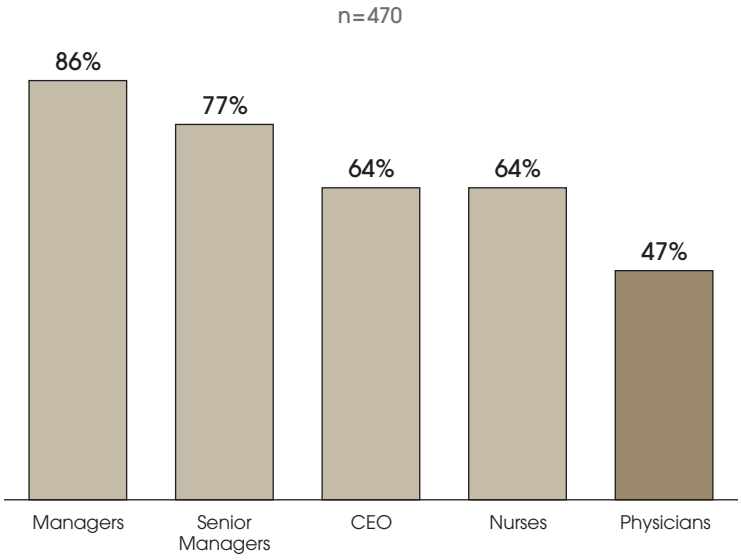
[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

Missing a Key Player

Physicians Last in Line for QI Involvement

Percentage of Respondents Reporting Each Individual as Actively or Very Actively Involved in Quality Improvement

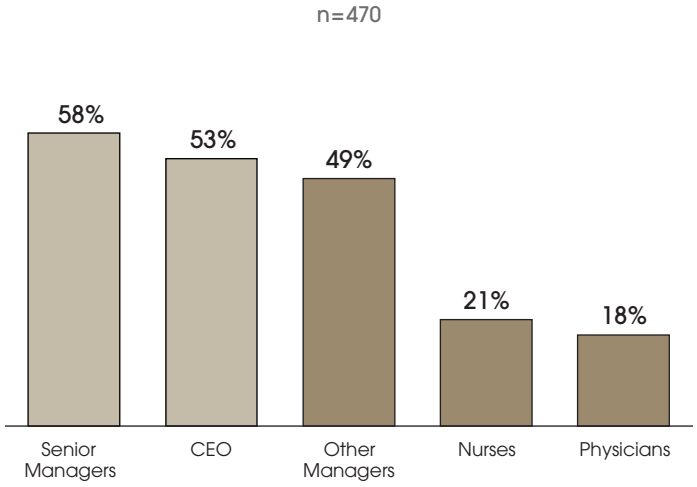


Physicians Last in Line for QI

Further complicating improvements efforts is a lack of physician engagement. A recent study published in *Medical Care Research and Review* indicates that most institutions fail to engage physicians in quality improvement (QI) efforts. The survey showed that less than 50 percent of hospitals indicated that physicians were actively or very actively involved in quality improvement.

Hospital Incentive Structures Falling Short

Hospitals Offering Quality Performance-Based Compensation



Many Lacking Motivation to Participate in QI

While the correlation between performance-based incentives and improved performance is well understood, less than one fifth of hospitals surveyed offer physicians performance-based incentives. Furthermore, when performance-based incentives are offered, they tend to focus on productivity, rather than quality, which can actually increase physicians' resistance to participate in QI initiatives.

Source: Cohen AB, et al., "A Survey of Hospital Quality Improvement Activities," *Medical Care Research and Review*, May 2008, 65: 571–595, available at: http://mcr.sagepub.com/cgi/rapidpdf/1077558708318285v, accessed September 3, 2008; Cardiovascular Roundtable interviews and analysis.

Practice #14: Performance-Based Incentives

Offering Staff Incentives

To motivate key stakeholders (physicians and staff) to be involved in QI, hospitals must develop performance-based incentives that emphasize quality. Acknowledging this imperative, Baptist Memorial Hospital, located in Oxford, Mississippi designed a performance-based incentive structure for all staff. Performance along three categories—outcome scores, patient satisfaction, and personal goals—is used to calculate a total score, which determines each employee's annual salary increase.

Case Study:

Baptist Memorial Designs Results Driven Evaluations

Staff Performance Management Guide

Category	Components	Component Weight	Category Weight
Outcome Scores	• Joint Commission mock survey score • Finance metrics • Quality metrics • Performance of job-specific requirements	Equally weighted	60%
Patient Satisfaction	• Individual display of hospital values	40%	30%
	• Hospital Press-Ganey score[1]	60%	
Personal Goals	• Chosen with department leaders • Variable number chosen, average of 3–4 per employee	Equally weighted	10%

Aligning Priorities at All Levels

An important element of Baptist's incentive structure is the incorporation of hospital, department and individual metrics into the scorecard. For example, each team member is held accountable to the hospital-level Press-Ganey scores and an individual customer satisfaction score, which assesses how effectively each staff member demonstrates the hospital's core values. This balanced approach ensures staff has control over performance and encourages staff to share best practices between departments.

Including Hospital, Department, Individual Metrics

1 Outcome Scores

Quality

- Nine hospital metrics, three department metrics included on scorecard
- 67 percent of quality scorecard weighted by department metrics
- Two department metrics collaboratively selected with frontline staff

Finance

- Two hospital metrics, three department metrics included on scorecard
- 75 percent of finance scorecard weighted by department metrics
- Two department metrics analogues of the hospital's metrics (contribution, operating margin)
- One department metric collaboratively selected with frontline staff

2 Patient Satisfaction

- Overall score weighted 60 percent hospital, 40 percent individual
- Individual score determined by demonstration of four hospital values: service, fairness and respect, teamwork, improvement
- Hospital score determined by Press-Ganey survey's facility score; eligibility for hospital component conditional on attaining 80 percent on individual score

3 Personal Goals

- Clearly defined objectives chosen by individual, director; credit awarded for each accomplished. Example: "By November 1, I will have received my advanced cardiac life support certification"

[1] Contingent on individual's display of hospital values.

Source: Baptist Memorial Hospital, North Mississippi, Oxford, MS; Cardiovascular Roundtable interviews and analysis.

Valuing the Frontline Perspective

Unit-Level Metrics Chosen Collaboratively with Staff

1 Choose Metrics

- Director meets with staff from invasive, non-invasive, ECG units to discuss metric selection
- Each unit selects one quality and one financial indicator for inclusion on annual performance review

2 Set Goals

- Previous year's average performance set as baseline threshold
- Target, stretch goals set by key stakeholders to promote improvement

3 Track Performance

- Staff design data collection tool to monitor progress
- Managers communicate performance monthly

Criteria for Selection

- Below benchmark performance
- Objectively measurable
- Aligned with strategic goals
- Improves patient experience

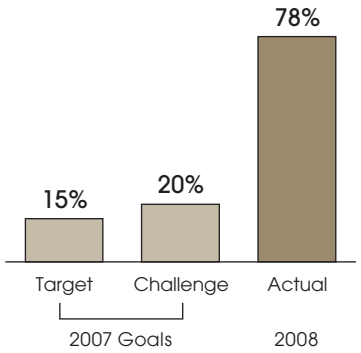
Securing Buy-In Through Staff Engagement

To further improve staff buy-in, program leaders involve staff in selecting department-specific metrics and setting the goals associated with those metrics. The cardiovascular administrator meets with each of the sub-service line directors and selects quality and financial indicators based on clearly outlined criteria. Once the metrics are chosen, the administrator works with each sub-service line to set realistic targets and design data collection tools to track performance.

Alignment Paying Off

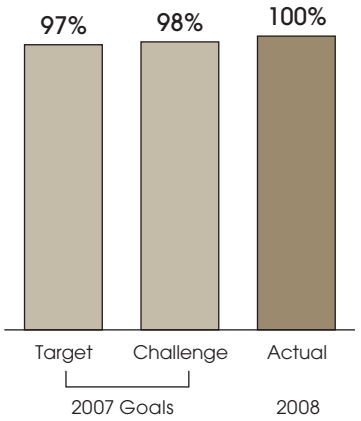
ECG Financial Unit Goal

Percentage Decrease of ECGs Not Meeting Medical Necessity



Non-invasive Unit Quality Goal

LVEF[1] Echocardiograms Properly Documented



Incentives Driving Higher Performance

Baptist Memorial's dramatic improvements provide evidence that performance-based incentives that align all stakeholders can elevate performance. Baptist Memorial far exceeded many of its goals (and even stretch goals) set. For example, the ECG department experienced a 78 percent decline in medically unnecessary procedures, which was significantly higher than the stretch goal of a 20 percent reduction in denials.

[1] Left ventricular ejection fraction.

Source: Baptist Memorial Hospital, North Mississippi, Oxford, MS; Cardiovascular Roundtable interviews and analysis.

Practice #15: Improvement-Focused Repercussions

Hardwiring Processes to Support Managers

A challenge that often arises when performance-based incentives are set is managing staff who fail to meet targets. To address this concern, Corea Hospital hardwired processes to provide under-performing managers with support. If performance on any of the five key metrics is below target, managers meet with their supervisor to develop an action plan to address the shortfall. If the manager still fails to meet the expectations the following month, experts from other areas of the hospital provide assistance. If sub-optimal performance continues into the third month, the manager presents the case to the executive team. Based on the executives' input, the action plan is revised. Finally, if the staff member is still under-performing at the fourth-month review, the supervisor will either seek a better fit for him or her within the organization or begin to out-counsel the employee.

Corea attributes much of their success—improved contribution margins and patient satisfaction scores—to the implementation of this process.

Case Study:

Corea[1] Supporting Off-Target Managers

Red Flag

Manager Score Card		
Metric	Target	Actual
Financial	Within 3%	
Patient Satisfaction	91%	
Turnover	10%	

- Managers responsible for self-reporting five metrics each month
- Score card accessible to direct supervisor, executive VP
- Awards, public recognition given to managers meeting targets

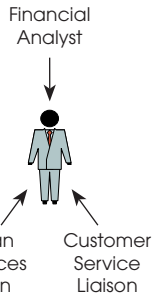
Target Missed

Step 1

- Manager develops action plan with assistance from direct supervisor
- Development needs identified
- Progress meeting held biweekly

Target Missed

Step 2



- Organizational experts invited to assist manager
- Action plan reviewed, revised

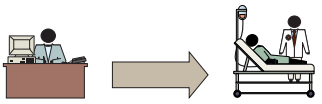
Target Missed

Step 3

- Manager, direct supervisor asked to present progress to entire administrative team
- Executives offer further suggestions, support
- Action plan reviewed, revised

Target Missed

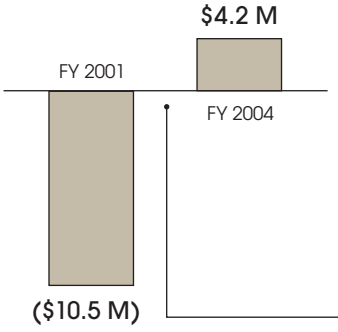
Step 4



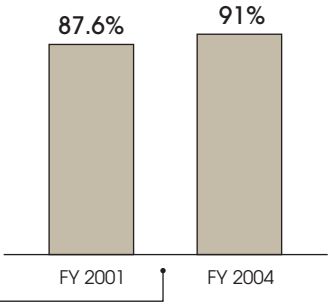
- Organization reassesses manager's fit with position
- Manager may be removed from position; several redeployed to other areas in the organization

Contributing to Organizational Success

Contribution Margin



Patient Satisfaction[2]



Process introduced in FY 2003

[1] Pseudonym.

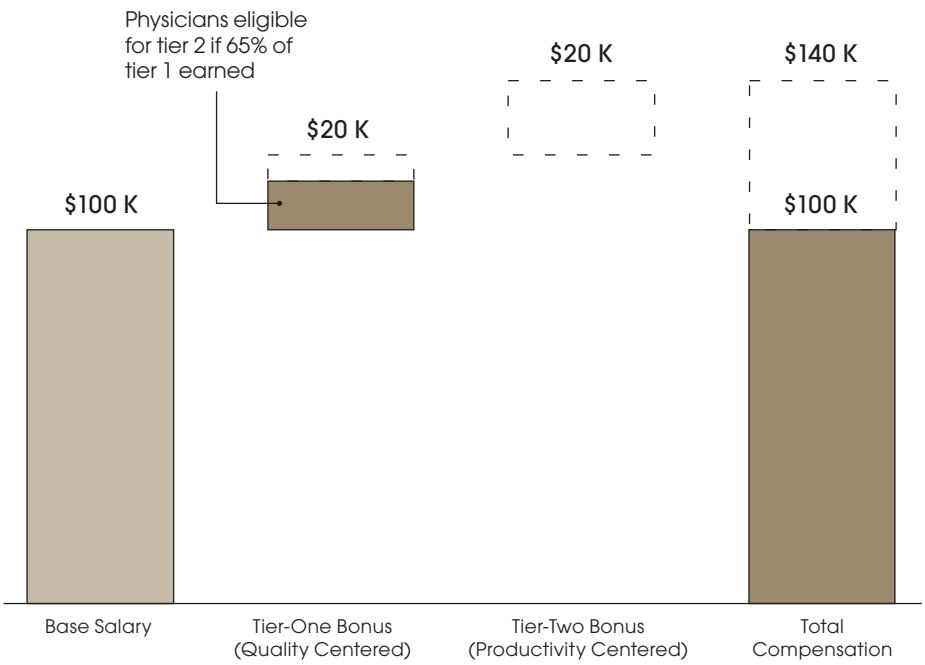
[2] As measured by NRC Picker survey.

Source: Cardiovascular Roundtable interviews and analysis.

Practice #16: Tiered Employed Physician Bonus Model

Case Study:

Davis Health[1] Invests in a Two-Tiered Bonus Structure



Ensuring Productivity Gains Do Not Compromise Quality

Once administrators have aligned staff incentives and provided necessary support to facilitate achievement of goals, the next priority is to align physicians by leveraging quality-based incentives.

To accomplish this objective, Davis Health developed a two-tier bonus structure for employed physicians. Each tier carries a bonus potential of 20 percent; however, physicians are not eligible for the second tier unless they achieve a minimum score of 65 percent on the tier-one report card.

Prioritizing Quality in Tier-One

Tier-One Report Card[1]

Category		Weight
Group Measures		
Quality	Clinical outcome measures, Joint Commission measures	30%
Patient Satisfaction	Patient satisfaction	20%
Resource Management	Development of clinical guidelines and protocols	10%
Productivity	Physician work RVU production per physician	15%
Individual Measures		
Resident Training	Teaching evaluation results	10%
Growth and Development	Community and professional outreach (includes peer-reviewed paper submission and national presentations)	7.5%
Growth and Development	Citizenship (examples: collegiality, teamwork, committee work, attitude, effort)	7.5%
		100%

Aligning Tier-One Metrics with Institutional Priorities

The tier-one report card was designed to align physician incentives with the hospital's long-term priorities. As such, the report card includes a diverse set of metrics covering each of the hospital's core values and is disproportionately weighted towards quality and patient satisfaction. In fact, quality and patient satisfaction metrics account for 50 percent of the total score whereas productivity only accounts for 15 percent of the score.

[1] Pseudonym.

[2] Some tier-one components measured on group basis, some on individual basis.

Source: Cardiovascular Roundtable interviews and analysis.

Tier-Two Compensation Contingent on Meeting Tier-One Threshold

As previously mentioned, physicians are first evaluated on performance against tier-one metrics and only if a threshold score of 65 percent is achieved are physicians eligible for the second bonus pool. For example, if a physician scores 77 percent of the tier-one bonus structure, the physician receives a 15 percent bonus (77 percent of the 20 percent bonus potential) and is eligible for the tier-two bonus pool, which is based solely on productivity. On the other hand, if the physician receives a score of 60 percent for tier-one metrics, the physician only receives a 12 percent bonus (60 percent of the 20 percent bonus) and is not eligible for the second tier bonus.

Overcoming the First Hurdle

Physicians Must Score at Least 65 Percent to Qualify for Tier-Two

If…

Growth & Development	Community & professional outreach (includes peer-reviewed paper submission and national presentations)	6.5%
Growth & Development	Citizenship (examples: collegiality, teamwork, committee work, attitude, effort)	7.0%
Physician Grade		**77%**

…Then Physician eligible for tier-two bonus, based on productivity measured in RVUs

Tier-Two Report Card

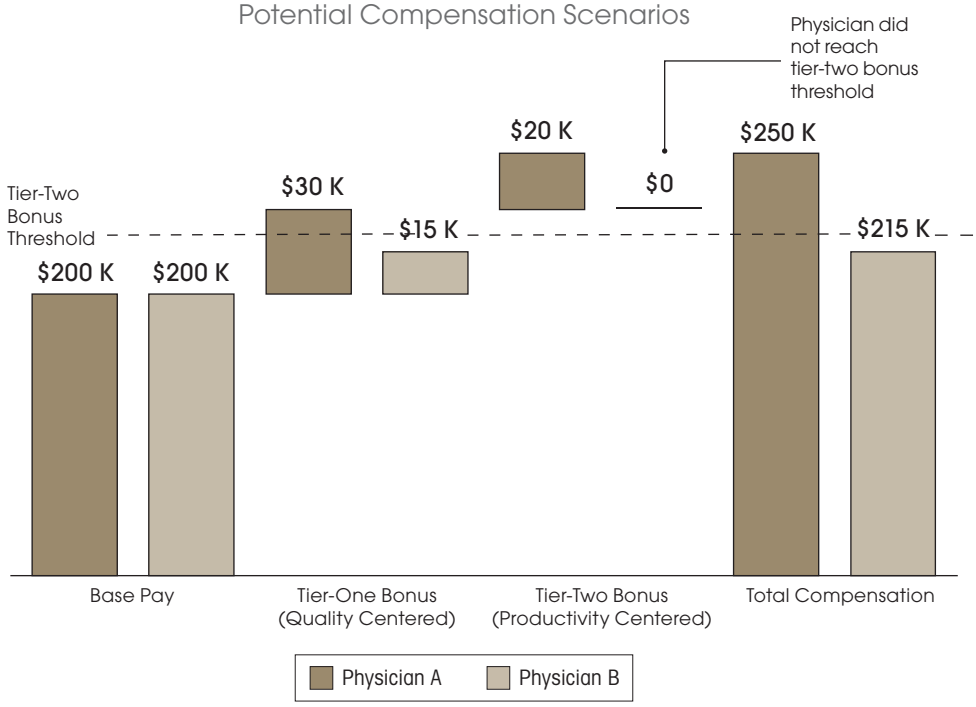
RVUs		Bonus
Actual	904	$2,875
Expected	821	

Producing Strong Incentives for All-Round Performance

A demonstration of how the tiered bonus structure can lead to very different results is outlined on this page. Physician A's tier-one scores qualify him or her for tier-two bonus, whereas Physician B failed to meet tier-one threshold score and is only eligible for the tier-one bonus pool. As a result, Physician A receives an additional $45,000 even though Physician B may have been more productive.

Creating a Substantial Bump in Compensation

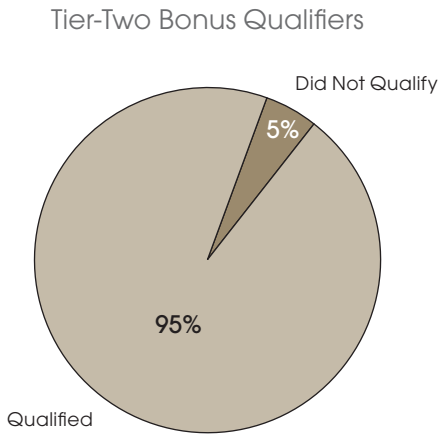
Potential Compensation Scenarios



Source: Cardiovascular Roundtable interviews and analysis.

First-Year Success?

Most Physicians Meeting Threshold for Tier-Two



Implications

- If hospital's goal is to maintain level of quality, year one is a clear success
- If hospital's goal is to increase level of quality, first year results may indicate stringency of quality requirements should increase; recalibration of quality metrics may be necessary

Furthering Institutional Objectives

"At the end of the day, we believe that we're basically putting our money where our mouth is. We're saying that if we can achieve the strategic objectives, the quality objectives, the customer service objectives, those are going to lead to a better financial position for us as opposed to just focusing on production. And that's been a big paradigm shift for us and our physicians."

Vice President
Physician Operations
Davis Health[1]

Design of Compensation Dependent on Institution Goals

An analysis of Davis Health's first-year results shows that 95 percent of Davis Health physicians qualified for the tier-two bonus. This suggests that the goals set were relatively easily achieved. If the strategic intent of the institution was to ensure a quality baseline, then the program was successful by providing enough incentive to discourage lax behavior. If however, the goal was to spur quality improvement, one could argue that the goals set were not aggressive enough, as it is unlikely that 95 percent of physicians would substantially improve performance over a 12-month period. This example highlights the need for institutions to view the designing of a compensation structure as an iterative process subject to fine adjustments based on the institution's priories.

[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

Practice #17: Community Physician Incentives

Paying for Participation and Performance

Private practice physicians represent the second and more challenging group of physicians. To engage these physicians, Scofield designed a community physician incentive plan. Program leaders determined the fair market value of the services they were asking the physicians to provide and divided the payment into an hourly rate and a bonus rate. The hourly rate is self-explanatory—the physicians were compensated for time spent on appropriate hospital projects. In contrast, the bonus rate is less intuitive and is tied to performance. For every hour physicians spend on process improvement, dollars accrue in a bonus pool at the bonus rate. At the end of the fiscal year, bonus pool funds are awarded to the cardiology group based on performance along selected quality metrics and their contribution to special projects.

Case Study:

Scofield[1] Compensating Physicians for PI Efforts, Results

Hours x (Hourly Rate + Bonus Rate) = Payment

- Physicians submit time spent on PI projects
- Director verifies accuracy, appropriateness of submitted times

- Hourly rate paid for time spent on appropriate process improvement projects

- Based on percentage of hourly rate; money accrues in bonus pool
- Funds awarded for meeting targets, completing special projects

- Total money paid to cardiology group at year end
- Total funds available annually capped at $500,000

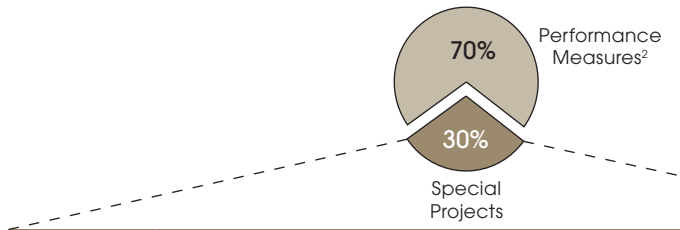
Engaging Physicians in Program Development

70 percent of bonus pool dollars are conditional on performance along outcome and process measures, which include National Quality Measures for AMI and heart failure and patient satisfaction metrics. The remaining 30 percent is distributed evenly among special projects, which have specific goals and mechanisms for measuring success.

To increase accountability for the completion of special projects, each project is assigned a physician lead and service line facilitator. The service line facilitator is a critical factor of success as this individual manages the administrative aspects of the project.

Awarding Bonus Pool Dollars for Special Projects

Bonus Pool Fund Allocation



Special Projects				
Project	Lead Physician	Service Line Facilitator	Project Goal	Success Measurement
Chest pain center development	Cardiologist	Non-invasive unit manager	Improve rapid identification of AMI patients, disposition to improve ED throughput	Identify, implement patient throughput process
Decrease post-cardiac surgery AF rates	Cardiothoracic surgeon	Cardiac surgery manager	Identify opportunities, engage stakeholders, identify, implement best practices, establish targets	Establish targets, begin improving AF rates
Develop CVIS[3] vascular module	Vascular surgeon	Vascular services manager	Assist module design, build stakeholder consensus, implement module	Design, gather physician consensus, implement module

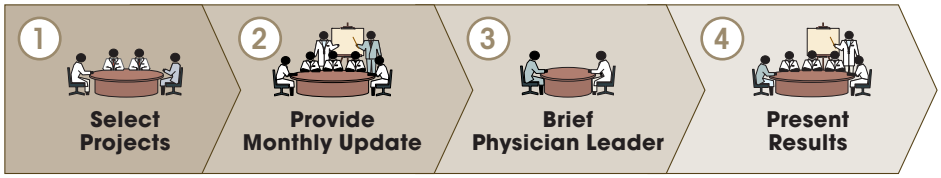
[1] Pseudonym.

[2] Metrics include heart failure, acute myocardial infarction, surgical and patient satisfaction goals.

[3] Cardiovascular information system.

Source: Cardiovascular Roundtable interviews and analysis.

Adopting a Transparent, Collaborative Approach



- Director meets with physicians to determine special projects for following year
- Service line facilitator, lead physician assigned to provide leadership, resources

- Director reports progress to physicians at monthly service line management meetings
- Group determines steps necessary to continue progress, improve direction

- Executive medical director meets with cardiology director at year end
- Root causes of missed goals, incomplete projects thoroughly assessed

- Executive medical director communicates performance to physicians
- Money earned paid to group's leader to distribute among physicians

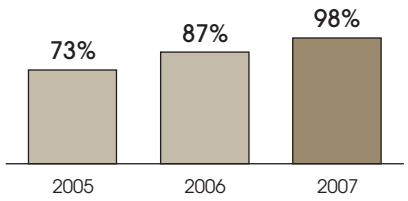
Engaging Physicians Every Step of the Way

Scofield further increased buy-in by involving physicians in project selection and the goal setting process. Once the metrics are selected, the director of the cardiovascular department provides physicians with a monthly report outlining progress. At the end of the fiscal year, the cardiovascular director meets with the executive medical director of the cardiology group to review results and confirm accuracy. The executive director of the cardiology group is then responsible for presenting the results to the other physicians in the group.

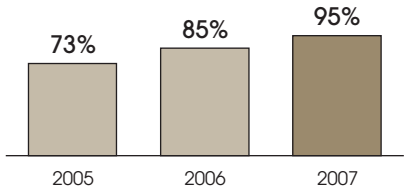
Scofield's leadership team asserts that asking the executive director of the cardiology group to present the results reduced physician resistance as the cardiologists know that the executive director has the interests of the group in mind.

Improving Overall Performance

AMI Patients Given ACE[1] Inhibitor, ARB[2] for LVSD[3]



Surgery Patients' Prophylactic Antibiotics Stopped Within 48 Hours After Surgery



Completed Special Projects

- ☑ Provided cardiac implant presentations to PCPs to help identify patients at risk for sudden cardiac arrest
- ☑ Addressed physician documentation opportunities to maximize coding and compliance requirements for chest pain, heart failure
- ☑ Established, implemented house-wide protocols to improve heart failure LOS, readmission rates

Physician Incentives Improving Quality

By engaging independent physicians in process improvement initiatives, Scofield experienced a 30 percent increase in AMI patients receiving an ACE inhibitor or ARB for LVSD. Furthermore, a number of special projects were completed, which improved quality and helped grow the service line.

[1] Angiotensin-converting enzyme.

[2] Angiotensin receptor blocker.

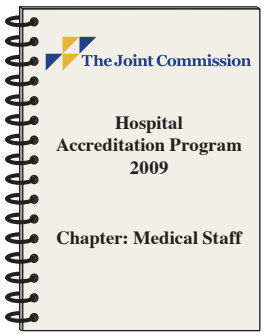
[3] Left ventricular systolic dysfunction.

Source: Cardiovascular Roundtable interviews and analysis.

Joint Commission Emphasizing Credentialing

The final aspect of physician accountability relates to the credentialing process. The Joint Commission requires two types of evaluations. The first is focused reviews, which include credentialing. These evaluations are expected to be evidence based and formally integrated into the health care setting. The second type, ongoing evaluations, complements focused reviews by evaluating physician performance on a regular basis using reliable outcome data.

New Credentialing Guidelines Require More Frequent, Comprehensive Reviews



New Expectations

- Privileging, re-privileging based on assessment of performance against multiple clinical, professional competencies
- Creation of standardized processes that permit continuous evaluation of all practitioner performance
- Development of separate standardized protocols that flag concerns over physician competency to perform specific or newly-acquired privileges

Key Implications

- Growing reliance on evidence-based medicine
- Increasing importance of timely, accurate data collection
- Rising pressure to identify statistically valid, physician-dependent measures
- Expanding complexity of physician outcomes assessment

Traditional Evaluation Process Inadequate

The Joint Commission's emphasis on credentialing guidelines will force many institutions to revisit their current processes. More specifically, many institutions' current review processes are infrequent, fail to provide a comprehensive overview of physician performance as they only focus on major complications, and are considered by physicians to be subjective and punitive.

Physician Review Pitfalls

	Challenge	Imperative
Frequency	Infrequent analysis of physician-level outcomes data limits hospital's, physicians' ability to judge performance	Ongoing review of physician-level data increases visibility over quality of care
Scope	Peer review's primary focus on major clinical complications, mortality fails to identify less severe deviations from standard of care	Assessment of professional, clinical indicators provides comprehensive understanding of performance
Physician Perspective	Subjectivity, potential conflicts of interest limit educational value	Educational, supportive environment facilitates physicians' ability to enhance clinical decision making

Source: The Joint Commission, "Hospital Accreditation Program: Medical Staff," available at: http://www.jointcommission.org/AccreditationPrograms/Hospitals, accessed September 26, 2008; Cardiovascular Roundtable interviews and analysis.

Practice #18: Outcomes-Based Review Criteria

Case Study:

South Miami Collaboratively Selecting Metrics

Metric Approval Process

1

Medical Directors Solicit Physician Input

- Sub-service line medical directors discussed plan to review individual-level outcomes more frequently with physicians
- Sought guidance on suitable metrics, appropriate triggers for six cardiovascular sub-specialties

2

Department Leaders Draft List

- Cardiovascular medical, administrative leaders synthesized physicians' input with clinical literature, data
- Acceptable rates of complications, hospital rules for appropriate care, actions warranting automatic review compiled for each sub-specialty

3

Executive Medical Director Notifies Physician Staff

- Physicians mailed draft list of measures for performance evaluation, given opportunity to suggest changes
- Suggestions reviewed by department leadership, draft metric list updated accordingly

4

Final Metrics Formalized into Review

- Hospital's medical and executive leadership approved physician suggestions, finalized metrics
- Individual-level outcomes assessed at monthly CV quality advisory committee's review, affecting credentialing and peer review

Integrating Outcomes Data into Physician Reviews

To help avoid the challenges faced by other hospitals, South Miami Hospital developed outcomes-based review criteria, which involved a four-step process. First, the medical directors for each sub-service line solicited physician input on which metrics to select. The medical directors then met with the department leaders, and the leadership team synthesized physician input and evidence-based literature to create a list of metrics for each sub-service line. Next, the executive medical director sent the metrics and a letter inviting comments to physicians with privileges within each of the sub-service lines. Finally, physician feedback was evaluated, and a list of finalized metrics was approved by the hospital's medical and executive teams.

Source: South Miami Hospital, Miami, FL; Cardiovascular Roundtable interviews and analysis.

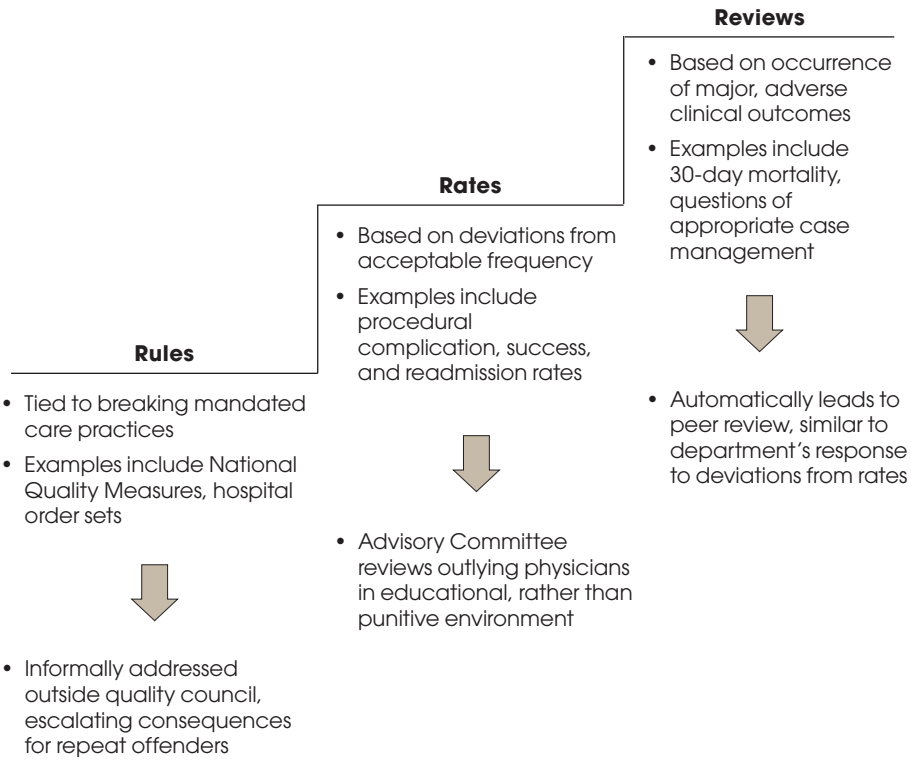
Aligning Response with Severity

Each metric was assigned to one of three categories based on its relative importance. The first category is Rules, which is associated with mandated care practices such as National Quality Measures and hospital order sets and are usually addressed informally.

The second category is Rates and is based on acceptable frequencies of complications—these include certain procedural complications and readmission rates. Falling outside the acceptable range results in an evaluation by the Advisory Committee, which assists the physician in improving outcomes.

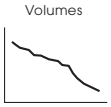
Finally, Reviews are based on the occurrence of a serious adverse outcome like mortality. These events result in automatic review; however the emphasis of the review is to educate the physician and learn from the incident rather than penalize the physician.

Setting Review Triggers



Source: South Miami Hospital, Miami, FL; Cardiovascular Roundtable interviews and analysis.

Advice on Including Procedure Volumes in Credentialing

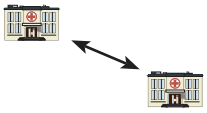


Set Realistic Goals

Compare historic volume trends at national, local, and physician levels with predicted volumes

Assess Impact on Quality

Consult physician leadership, clinical literature to determine implications of volume thresholds on outcomes



Be Flexible

Allow physicians to include procedures performed at other hospitals during review

To access Specialist Physician Review Metrics, please visit the online appendix for this study at the Cardiovascular Roundtable's publication archive at www.advisory.com/cr.

Use Volume Targets Cautiously

A common trend identified in researching cardiovascular outcomes improvement practices was the use of volume thresholds for physician credentialing. As volumes can fluctuate dramatically, the Roundtable advises hospitals to use these targets cautiously. In setting thresholds, administrators should take national and regional trends into account to ensure the goals are realistic. In addition, allowing physicians to include procedures performed at other hospitals increases the probability of physicians meeting the targets and helps secure physician buy-in.

Source: South Miami Hospital, South Miami, FL; Cardiovascular Roundtable interviews and analysis.

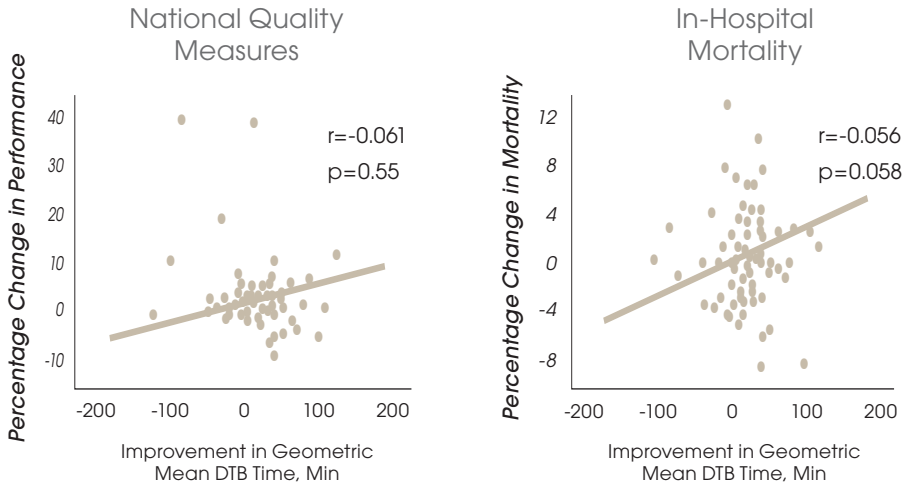
VI. Coda: Creating a Culture of Continuous Improvement

Failing to Adopt a Holistic Approach to Performance

In order to avoid public scrutiny, the majority of process improvement efforts are guided by the desire to improve metrics that are publically reported. Unfortunately however, focusing on a specific process metric often fails to result in concomitant improvements in other metrics. For example, a recent study published by the *Archives of Internal Medicine* showed that improvements in door-to-balloon time were not correlated with improvements in other acute myocardial infarction process measures or in-hospital mortality.

Door-to-Balloon Time Improvements Unrelated to Performance Along Other Measures

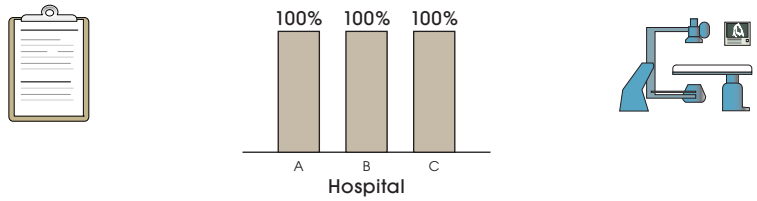
Correlation Between Door-to-Balloon Time Improvements and Other Measures



Identifying Common Pitfalls

Furthermore, focusing exclusively on publically reported metrics is associated with a number of risks. First, if physicians experience pressure to elevate metrics they do not think are valid, they may either over-document risk factors or avoid high-risk procedures in order to improve performance along the metric. Second, as many hospitals migrate towards 100 percent compliance along select process measures, cardiovascular leaders lose their ability to use quality to differentiate their program from competitors. Finally, program leaders may risk overlooking other opportunities for improvement that are not tied directly to publically reported metrics.

Consequences of Exclusively Focusing on Publicly Reported Metrics



Manipulation of Metric

Lack of buy-in, pressure to excel on publically reported metrics may result in over-documentation or even case avoidance

Inability to Differentiate

All hospitals migrate toward 100 percent compliance, limiting ability to use metric performance in marketing efforts

Overlooked Opportunities

Hospitals fail to identify opportunities for improvement unrelated to publicly reported metrics that add value, inexpensive to implement

Source: Wang TY, et al., "The Dissociation Between Door-to-Balloon Time Improvement and Improvements in Other Acute Myocardial Infarction Care Processes and Patient Outcomes," *Archives of Internal Medicine*, 2009, 169(15): 1411–1419; Cardiovascular Roundtable interviews and analysis.

Lesson 1: Prioritize Value Above All Else

Case Study:
Geisinger's Approach to Innovation

Asking the Question

"What realistic care model will most reliably deliver the maximum health care value?"

Stage 1: Project Selection Criteria

- Largest impact by patient population or resource consumption
- Observed outcomes farthest from expected performance
- Greatest degree of unjustified variation
- Interest from clinical champions or consumers
- Presence of evidence-based best practices, readily available outcomes metrics

Stage 2: Clinical Business Case Development

- Prior to any new care-model design, team develops clinical business case
- Clinical business case outlines expected financial, quality gains along with associated process, outcomes measures

Stage 3: Process Redesign

- Team seeks to use or refine features, techniques, or components of previously successful process redesigns, providing opportunity to benefit from preceding efforts
- Evaluates impact, gleans lessons learned helping to make subsequent process redesigns cheaper, faster, and easier

Basing Decisions on Value Creation

Given these risks, hospitals should base decisions on the ability to create value for the key stakeholders (physicians, patients, and staff). Acknowledging this imperative, Geisinger Health System integrates an evaluation of value creation into each stage of the decision-making process. Specifically, the criteria used to select projects were developed to quantify the incremental value each potential project would provide.

Recent Initiatives Implemented at Geisinger

	Example 1: ProvenCare	Example 2: Chronic Care Optimization
Goal	Provide surgical patients consistent evidence-based care	Develop systematic approach to coordinated evidence-based care for patients with chronic diseases
Initiatives Implemented	• Translated 20 AHA/ACC CABG guidelines into 40 evidence-based practices • Packaged price for each episode of care • Extended offering to PCI procedures, hip replacements, and cataract surgery	• Developed nursing tools to capture, summarize information before patient enters exam room • Identified patient's care plan needs electronically, incorporated into physician order sets • Designed condition-specific "snapshot reports" aggregating all relevant clinical information on single screen
Results	**Any CABG Complications** 39% (Before) 30% (After)	**Diabetes Perfect Care Score[1]** 2.4% (Before) 6.5% (After)

Transforming Care Delivery

By prioritizing value creation, Geisinger designed and implemented initiatives that have dramatically improved quality and care delivery. For example, the first initiative, ProvenCare, offers patients a global price for surgical care and has been credited with improved compliance with evidence-based care and a corresponding reduction in CABG complications. A second initiative provides clinicians tools and incentives to optimize chronic disease management, which has helped improve the system's diabetes perfect care score.

[1] Diabetes perfect care score includes the following nine diabetes measures: pneumococcal vaccination, influenza vaccination, HbA1c <7, blood pressure <130/80, LDL <100, documentation of smoking status, mincroalbuminuria measured in the past year, A1c measured in the past year, LDL measured in the past year.

Source: Weber V, et al., "Employing the Electronic Health Record to Improve Diabetes Care: A Multifaceted Intervention in an Integrated Delivery System," *Journal of General Internal Medicine,* 2008, 23: 379–382; Paulus RA, et al., "Continuous Innovation in Health Care: Implications of The Geisinger Experience," *Health Affairs,* 2008, 27: 1235–1245; Abelson R, "In Bid for Better Care, Surgery with a Warranty," *New York Times,* May 17, 2007, available at: http://www.nytimes.com, accessed October 23, 2008; Casale AS, et al., "'ProvenCare': A Provider-Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care," *Annals of Surgery,* 2007, 246: 613–623; Cardiovascular Roundtable interviews and analysis.

Lesson 2: Focus on Quality, Finances Will Follow

The Next-Generation Registry

In addition to improving outcomes, value-focused quality improvement initiatives can improve profitability. To determine the incremental cost associated with cardiac surgery complications, The Virginia Cardiac Surgery Quality Initiative (VCSQI) combines clinical STS data with UB92 claims data and provides members with analytical tools to analyze the relationship.

VCSQI[1] Drawing Insight by Combining Financial, Clinical Data

Data Collection Process

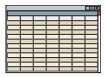
Data Harvest

- Members map STS data to UB92 records, submit data to VCSQI biannually
- Members also provide cost-to-charge ratios for 21 categories of charges
- VCSQI calculates "normalized charges" using cost-to-charge ratios, UB92 data

Analytical Tools

Dashboard Library

- Numerous dashboards available including cost and charge distribution by risk factor



Scenario-Based Financial Models

- Two models estimate how improved quality impacts reimbursement and costs
- Reimbursement gains calculated at hospital level using pay-for-performance contract of major payer
- Cost reduction by post-operative complications or mortality determined using "normalized charges"

Registry in Brief

Virginia Cardiac Surgery Quality Initiative

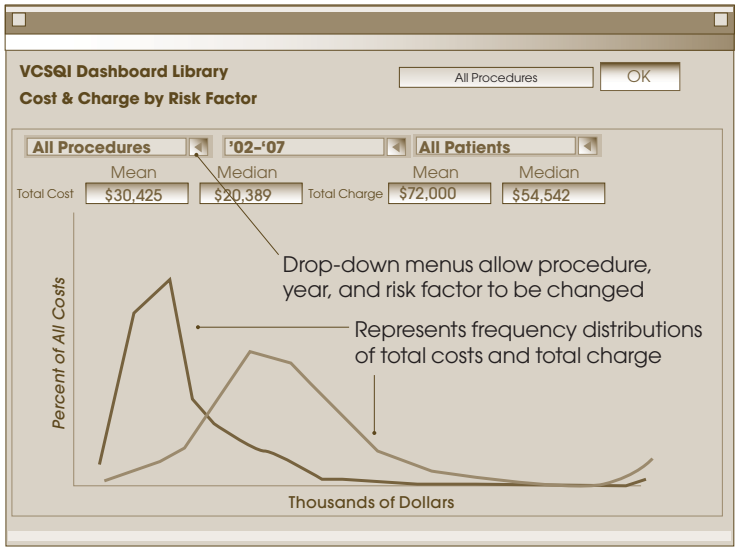
- Voluntary consortium of 17 hospitals, 13 cardiac surgery practices
- Members perform over 99 percent of Virginia's open-heart procedures
- Consortium's goal to improve clinical quality achieved by leveraging unique database linking clinical and financial outcomes
- Accomplishments include developing protocol to reduce incidence of post-operative atrial fibrillation in 2005, designing quality dashboards tied to pay-for-performance program, and gain-sharing models aligning incentives for physicians, hospitals, and payers

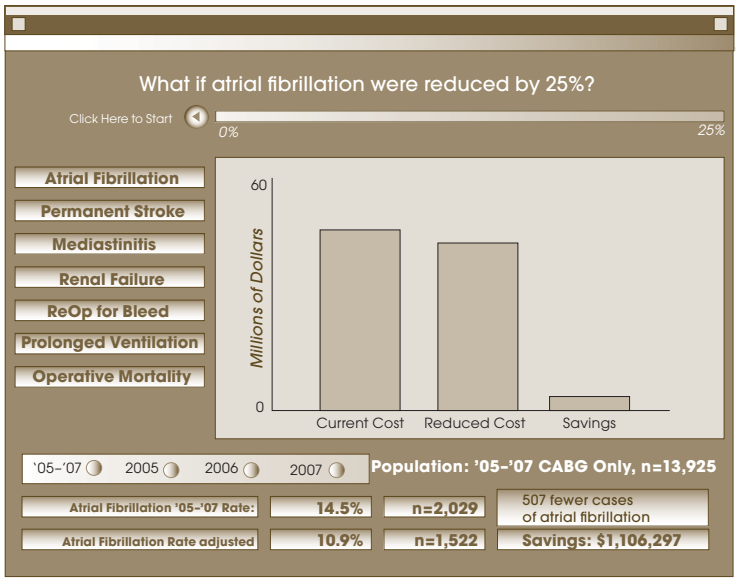
[1] Virginia Cardiac Surgery Quality Initiative.

Source: Virginia Cardiac Surgery Quality Initiative, VA; Cardiovascular Roundtable interviews and analysis.

Estimating Potential Savings

Interactive Tools Developed by VCSQI





Quantifying Cost Reduction from Improved Outcomes

Specifically, the VCSQI has developed an interactive web-based dashboard that estimates the costs and charges associated with adverse events and complications related to cardiac surgery. The tool provides a significant degree of flexibility and allows members to select specific procedures, patient populations and date ranges. In addition, the organization has developed a second tool that estimates the potential savings associated with certain reductions in cardiac surgery complications.

Note: The data contained on this page are for demonstration purposes only and do not reflect actual performance.

Source: Virginia Cardiac Surgery Quality Initiative, VA; Cardiovascular Roundtable interviews and analysis.

Lesson 3: Elevate Quality and Grow Business Simultaneously

Quality Helping to Increase Volume

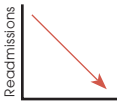
Beyond reducing costs, judiciously selected quality improvement efforts can help grow volumes. Shorter Hospital redesigned its heart failure program with the hope of reducing readmission rates, improving the continuum of care, and increasing appropriate EP referrals. To accomplish these goals, program leaders developed processes to ensure that follow-up visits for heart failure patients were scheduled prior to patient discharge and collaborated with nursing from an affiliated clinic to develop customized 90-day care plans for each patient. As a result, Shorter Hospital has the lowest readmission rates in the hospital system and has experienced an increase in EP referrals.

Case Study:

Shorter Hospital[1] Improving Heat Failure Care, Elevating EP Volumes

Goals of Heart Failure Program

Increase EP Volumes



Reduce Readmissions

Provide Comprehensive Care

Patient Care Experience

- Follow-up appointment with heart failure nurse scheduled while patient is still in the hospital
- Nurse develops 90-day care plan in collaboration with patient; evaluates appropriateness for implants based on heart failure guidelines

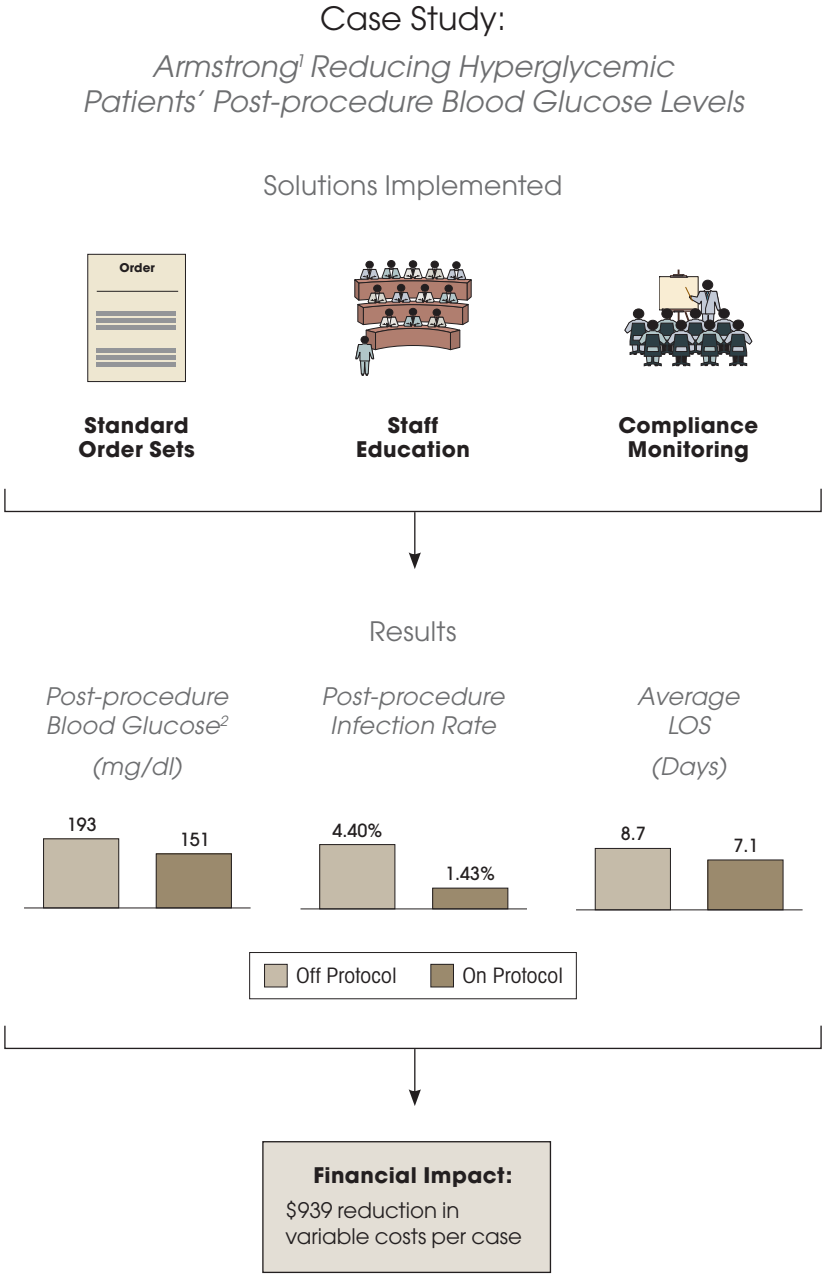
Program Evaluation

- Multidisciplinary team—including medical director of heart failure program, EP physicians, heart failure nurse, director of CV—meets weekly
- Analyze patient compliance with care plans, readmission rates, and EP volumes

[1] Pseudonym.

Source: Cardiovascular Roundtable interviews and analysis.

Lesson 4: Leverage Available Resources Today



Small Investments Driving Significant Gains

While process improvement initiatives offer a number of benefits, many institutions delay implementation due to a lack of resources. However, as demonstrated by Armstrong Hospital, dramatic improvements can be attained with relatively moderate investments. As such, the Roundtable encourages members to identify initiatives that can be implemented with the available resources rather than deferring efforts until the optimal infrastructure is in place.

[1] Pseudonym.

[2] Blood glucose level 24–48 hours after surgery.

Source: Cardiovascular Roundtable interviews and analysis.