



**HOSPITAL QUALITY: INGREDIENTS FOR SUCCESS—
A CASE STUDY OF
BETH ISRAEL DEACONESS MEDICAL CENTER**

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ABSTRACT: As part of their study on quality improvement initiatives in U.S. hospitals, researchers at the Economic and Social Research Institute and The Severyn Group conducted in-depth site visits at four top-performing hospitals from around the country to identify the factors that drive and challenge these institutions in their realization of quality goals. Beth Israel Deaconess Medical Center (BIDMC), located in the heart of Boston's academic medical area, was one of the hospitals selected for the study. The hospital has a long history of serving its community and has struggled through some difficult times due to a merger and financial troubles. This environment, according to the researchers, has fostered a staff committed to change and innovation and is one of BIDMC's factors of success. The hospital's success also is due to state-of-the-art information and decision-support systems that have been customized to meet the institution's culture and needs.

[Click here](#) to see the overview report.

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ABOUT THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE

The Economic and Social Research Institute (ESRI) is a nonprofit, nonpartisan organization that conducts research and policy analysis in health care and in the reform of social services. ESRI specializes in studies aimed at improving the way health care services are organized and delivered, making quality health care accessible and affordable, and enhancing the effectiveness of social programs. For more information, see <http://www.esresearch.org>.

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ABOUT THE SEVERYN GROUP

The Severyn Group, Inc., specializes in conducting qualitative and quantitative research, and writing and producing publications on a wide range of health care management issues. In addition to printed materials, The Severyn Group has created Web site content and electronic presentations for training and education purposes. Severyn's clients include a broad spectrum of organizations that represent virtually all aspects of health care, including financing, management, delivery, and performance measurement.

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HOSPITAL QUALITY: INGREDIENTS FOR SUCCESS— A CASE STUDY OF BETH ISRAEL DEACONESS MEDICAL CENTER

SUMMARY

Beth Israel Deaconess Medical Center (BIDMC), located in the heart of Boston's academic medical area, is a 589-bed hospital noted for its high quality research, teaching, and patient care. While cost pressures stemming from a recent financial crisis and local competition drive the hospital's efforts to improve efficiency, these initiatives are augmented by and integrated with a drive toward improved quality of care.

A key factor that distinguishes BIDMC from other hospitals is a commitment to change and innovation among employees who survived and persevered through financial troubles and other stresses related to a past merger. This commitment to change is coupled with the knowledge and skills of a talented cadre of physicians, nurses, pharmacists, and other staff who cull and use evidence-based standards, pore over and analyze data on practice patterns and outcomes, and devise workable plans to improve quality indicators. BIDMC's success can also be attributed in part to state-of-the-art information and decision support systems that are home-grown to best meet the institution's culture and needs.

It appears that BIDMC's excellent performance and emphasis on quality improvement (QI) is due to a combination of organizational factors, internal processes, and practical tools. The key organizational factors include the following:

- The effective use of multidisciplinary teams to study quality problems, drill down deeply to identify root causes, and develop a solid plan to correct the problems;
- An advanced IT system that supports this key problem-solving function;
- A long history and strong culture of serving the community and emphasizing patient care;
- A strong commitment to and involvement in quality issues from the top, at both the CEO and Board levels;
- The adoption of the Institute of Medicines' (IOM's) six domains of quality (safety, timeliness, effectiveness, efficiency, equity, patient centeredness) as a central framework for pursuing quality, with specific reporting requirements related to these measures;
- Relationships with a premier medical school and research departments that attract highly motivated, top-notch physicians;

- Preference for internal development of best practices, and
- A high-level, physician-led Health Care Quality department dedicated to improving performance.

BIDMC's effective QI process is based on the following:

- Centralized data analysis combined with decentralized development and implementation of action plans;
- A multistep, collaborative QI process that utilizes internal data and evidence-based practice guidelines, emphasizes volume to outcome relationships, and has a strong participatory nature;
- Use of multidisciplinary teams to identify solutions;
- A good understanding of what motivates staff;
- A heavy use of objective data comparing physicians to their institutional peers, as well as to the norm for the region;
- A focus on standardization to improve efficiency and safety.

Another key factor that distinguishes BIDMC from other hospitals is its state-of-the-art information systems that are largely made in-house and can be customized and harnessed to drive performance measurement and improvement in ways that off-the-shelf information systems cannot. Quality and QI at BIDMC have been enhanced through investments in clinically driven information systems and decision support that include:

- A Provider Order Entry (POE) system based on evidence (medical journal literature) and experience at BIDMC;
- Dashboards and reports in certain units to enhance safety and patient flow.

Competition with surrounding institutions and premier hospitals nationwide drive BIDMC's focus on QI as well. Other external factors, such as pressure from the business community, insurers, and regulators, did not appear to play a significant role at the time of this evaluation, though this has been changing recently.

BIDMC has faced, and is trying to address, the following challenges related to nourishing a culture of QI:

- Financial turmoil, which forced the administration to focus on short term survival efforts;
- Attitudes that can impede QI, such as resistance to self-measurement, fear of admitting errors, and rejection of externally-imposed rules;
- Lack of financial incentives to improve efficiency or quality;
- Getting best practices adopted by rank-and-file physicians;
- Lack of teamwork training in physician education;
- Significant technical infrastructure requirements.

Identifying the key factors and successes, as well as the ongoing challenges, facing BIDMC in its efforts to promote quality and QI yields important lessons for other health care institutions.

BACKGROUND

Hospital Description

This 589-bed hospital is located in the heart of Boston's academic medical area. Located one block from Harvard Medical School, BIDMC is one of several well-known medical institutions in Boston. BIDMC is the result of a merger in 1996 between Beth Israel Hospital and New England Deaconess hospitals. The merger signified a very difficult time for the institution, and during the following years the administration had to focus on bridging two cultures and addressing a dire financial situation (discussed further below). Nevertheless, many people noted that the clinical staff remained dedicated to quality patient care.

A new CEO in 2002 and an administration intent on turning the financial picture around have created the leadership required to raise both the bottom line and morale among doctors, nurses, and managers. While cost pressures and competition continue to drive efforts to improve efficiency, these initiatives are augmented by and integrated with an institutional drive toward improved quality of care. This includes the ongoing tracking of various performance indicators, the identification and use of benchmarks and best practices, and the development of new initiatives to improve BIDMC's performance scores.

The Local Market

BIDMC is currently the principal member of the CareGroup health system. Other members are BIDMC Medical Center-Needham, Mount Auburn Hospital, and New

England Baptist Hospital. Together, they represented 7.4 percent of the state's market share in 2001.¹ CareGroup's primary competitor is Partners health system, composed locally of Massachusetts General, Brigham & Women's, Faulker, and Newton Wellesley hospitals. Partners held 16.5 percent of the state's market share in 2001. Other smaller but formidable competitors include Tufts–New England Medical Center, Boston University Medical Center, and Caritas Health Network.

Evidence of Strong Performance

BIDMC ranked 11th among nearly 2,700 hospitals in an analysis of quality and efficiency prepared for ESRI by CareScience, Inc., a Philadelphia-based research organization. The CareScience database covers 18 states that report data for all payers and contains close to 20 million inpatient records from 1999. (A minimum threshold of 100 beds was used to form the sample). For each hospital, quality scores are calculated by ICD9-code (56 disease categories are used), and incorporate risk-adjusted adverse outcomes rates for mortality, morbidity, and complications. Length of stay (LOS) is used as a proxy for cost or efficiency; hospitals are presumed to spend more on patients who stay longer. While there are some clear limitations to using this variable, the strength is that LOS is recorded very accurately for each patient. Hospitals that score in the top two quintiles on both cost and quality are considered to have achieved "Select Practice" within that specific disease category. BIDMC attained 27 Select Practice designations (the maximum in the sample was 34), indicating that it performed very well across a large number of diseases.²

BIDMC also scored well according to quality criteria developed by Dr. Brian Jarman, a health services researcher at the Imperial College School of Medicine in the U.K. Dr. Jarman estimated case-mix adjusted death rates for over 1,700 U.S. hospitals, based on the period of 1997 to 2000. Using Dr. Jarman's criteria, BIDMC placed second among the 30 hospitals deemed Top Performers by CareSciences. In addition, BIDMC was selected for Solucient's 100 Top Hospital list four times over the 1994 to 1997 period.

These quality-related designations are primarily based on a period before BIDMC established many of the specific quality-of-care mechanisms we describe in this case study. However, experts and stakeholders attest to the fact that throughout the 1990s and early 2000s, BIDMC placed a strong emphasis on patient care, good nursing, and serving the community. We posit that such a foundation helped the hospital weather the financial crisis and provided the necessary environment for many of the quality improvement features seen today.

EXTERNAL PRESSURES DRIVING QI FOCUS

Competition in a Quality-Driven Market

BIDMC is part of a research-oriented, highly competitive academic medical center market. Competition seems to be a driving force and BIDMC has what many describe as an “Avis” complex. That is, owing to the fact that many individuals in the community look to Partners first and consider BIDMC a second choice, BIDMC must work harder.

BIDMC leaders indicated that a key challenge now is to increase volume and market share. The hospital has made some progress on the reimbursement front, negotiating somewhat more favorable rates with private purchasers and obtaining some relief in the public sector as a result of Congressional actions to correct a portion of earlier Medicare budget cuts. They see the biggest opportunity in marketing more aggressively to physicians in the community, so that more will admit patients to BIDMC. Techniques include newsletters for physicians, updated referral guides, Web site improvement, corporate capabilities brochures, and radio ads.

“The culture of quality is so ingrained in Boston that you don’t need to keep reminding people.”

—A BIDMC physician

Limited Role of Purchasers

The purchaser community has only recently begun to be a significant factor in driving quality or QI at BIDMC. Employers and health plans or carriers are just starting to use payment incentives to encourage quality improvement at BIDMC. Payers are now providing consumers with report cards for inpatient and outpatient care, but BIDMC administrators say that while the hospital tracks these closely in order to be familiar with them, QI priorities are not selected on the basis of these report cards.

When the Leapfrog group released its three quality standards for hospitals—computerized physician order entry (CPOE), volume thresholds, critical care unit staffing³—BIDMC’s chairman of the board asked whether the criteria were valid indicators of quality. He added that if the criteria were valid, that BIDMC should adhere to them. BIDMC had already either met these standards or was planning to move toward meeting them, but the release of the Leapfrog standards accelerated the process. BIDMC has by now voluntarily exceeded the Leapfrog standards, without direct pressure from any purchaser group.

INTERNAL FACTORS: ORGANIZATIONAL & STRUCTURAL FORCES

Culture and Leadership

The goal of serving the community's and patients' needs is incorporated into the culture of BIDMC. In 1896, as part of their missionary charter, Methodist deaconesses founded Deaconess Hospital to care for the city's residents. In 1916, Beth Israel Hospital was established by the Boston Jewish community to meet the needs of the growing immigrant population. While BIDMC places much emphasis on its research and teaching roles, it nevertheless has always had a strong sense of serving the community.

The Merger

The 1996 merger has been described as a defining moment for BIDMC. The financial crisis that erupted after the merger largely derailed the administration from its quality focus, as it was forced to devote its resources primarily to financial imperatives. Large financial losses and administrative turmoil and turnover marked a time of low morale among staff and created concerns that BIDMC would not survive. It was an intense time for all hospital personnel and the institution lost many talented people.

Yet throughout this period, there was continued commitment to quality at the clinical level. In fact, the financial turmoil and the stresses of the merger seemed to lead to a voluntary selection process among the employee base. Those who remain may be particularly committed, passionate, hard working, and comfortable with change. This means that acceptance of new initiatives or small tests of change may be easier at BIDMC than at other institutions.

Further, it is likely that the merger affected the way the institution conceptualized and operationalized QI. Specifically, the need to bridge the two very different cultures of Beth Israel and New England Deaconess resulted in an emphasis on standardization and simplification of processes, which continue to be driving forces behind BIDMC's QI program today.

In more recent years, there appears to be a renewed commitment to and involvement in quality issues from the top, at both the CEO and Board levels. There is a sense of good alignment among a strong CEO, COO, and chiefs. And since 2002, the Board has tried to enhance the profile of quality, making it one of four key priorities in the annual operating plan, along with capacity, volume, and financial performance. The administration must now report on these areas at monthly Board meetings. Quality measures are framed in relation to the six domains identified by the IOM: effective, efficient, patient centered, timely, safe, and equitable. The Board has a Patient Care

Assessment Committee and a Clinical Quality Review Subcommittee that review various indicators of the six quality domains on a quarterly basis. In response to the increasing focus on safety as part of QI, the hospital held a special session at which Donald Berwick, M.D., President and CEO of the Institute of Healthcare Improvement (IHI) helped senior leaders and trustees develop an institutional strategy for patient safety.

There is a belief among some senior hospital administrators that high quality is truly linked to lower cost in the long run. That is, there is no conflict between quality and cost. As one leader of BIDMC stated, “When you try only to protect the bottom line, you’ll fail.”

Emphasis on Participation and Internal Best Practices

BIDMC is devoted to identifying best practices internally, after examining and considering best practices nationwide. It has applied Berwick’s IHI model to non-clinical areas as well as to clinical ones. For example, it has established systems to measure and improve bed turnover time and transport response time. It has been a challenge to push low-wage employees (e.g., patient transporters) to use the new procedures, and some who were resistant were let go, but improvements have been documented.

Every hospital struggles with maintaining relationships among the medical staff, administration, and Board that are productive and not adversarial, and problems at BIDMC were particularly severe after the merger. Similar tension may occur between research missions and improving the bottom line. Yet it appears that progress has been made in nurturing a QI focus across BIDMC despite this ongoing challenge. For example, the hospital is in the process of developing a strategic plan that includes a major quality component. The administration is using a complex participatory method, facilitated by a consulting firm, rather than a top-down approach, to develop the plan. Reflecting the organizational, cultural preference of developing internally rather than buying externally, the consulting firm was told not to develop its own plan for the hospital. Instead, its charge was to listen in on the process and help weave the hospital staff’s own ideas into a coherent plan. BIDMC established an internal planning process that began with identifying crucial strategic goals and challenges. In addition to getting input from physician leaders and sharing drafts with the clinical department chiefs at an early stage, this process has relied on the chiefs to actively engage staff physicians. This is intended to enhance buy-in among the staff as well as to draw out good ideas.

Ability to Train and Attract Top Physicians

It is well known that BIDMC maintains a high quality physician staff. The Harvard system brings driven, top-notch physicians. But even the best medical schools may not adequately

emphasize teamwork and QI concepts. In response, BIDMC has developed a residency elective in QI that introduces medical residents to QI philosophy and techniques. Each resident who participates (the program is elective, not required) completes a QI project. (See Figure 1.) As of March 2003, 19 residents had completed the experience. Most described it as their first exposure to QI, and reported an improved understanding of quality in health care and a better understanding of QI at BIDMC. They also reported that they have gone on to teach their peers what they learned in the program. BIDMC is now working to develop the curriculum into a more comprehensive QI and patient safety program.

Figure 1. QI Residency Curriculum

In 2000, BIDMC designed and implemented a QI elective for internal medicine residents. The program's goals are:

- To increase understanding of QI concepts among residents; and
- To allow application through investigation of a medication safety incident and a QI project.

Residents may choose to participate for three weeks and are assigned to a faculty member who serves as a resource and mentor. Residents attend regularly scheduled tutorials with faculty members and receive supplemental readings on QI tools and processes, healthcare as a system, and medication safety systems.

They participate in a three-part practicum:

1. Attend department QI committee and hospital patient safety meetings;
2. Develop and execute a QI project within the department;
3. Investigate a medication error that has occurred on the inpatient service.

Examples of QI projects include a study of dye-induced renal failure that led to changes in how all radiology exams are ordered and a study of telemetry use that led to a decrease from 35 percent to 13 percent in inappropriate use. Residents interview participants, review the record, and complete a root cause analysis, which they ultimately present to a hospital QI committee. Part of the process involves practicing how to interact with colleagues in a non-judgmental manner and becoming more familiar with an interdisciplinary approach to quality healthcare.

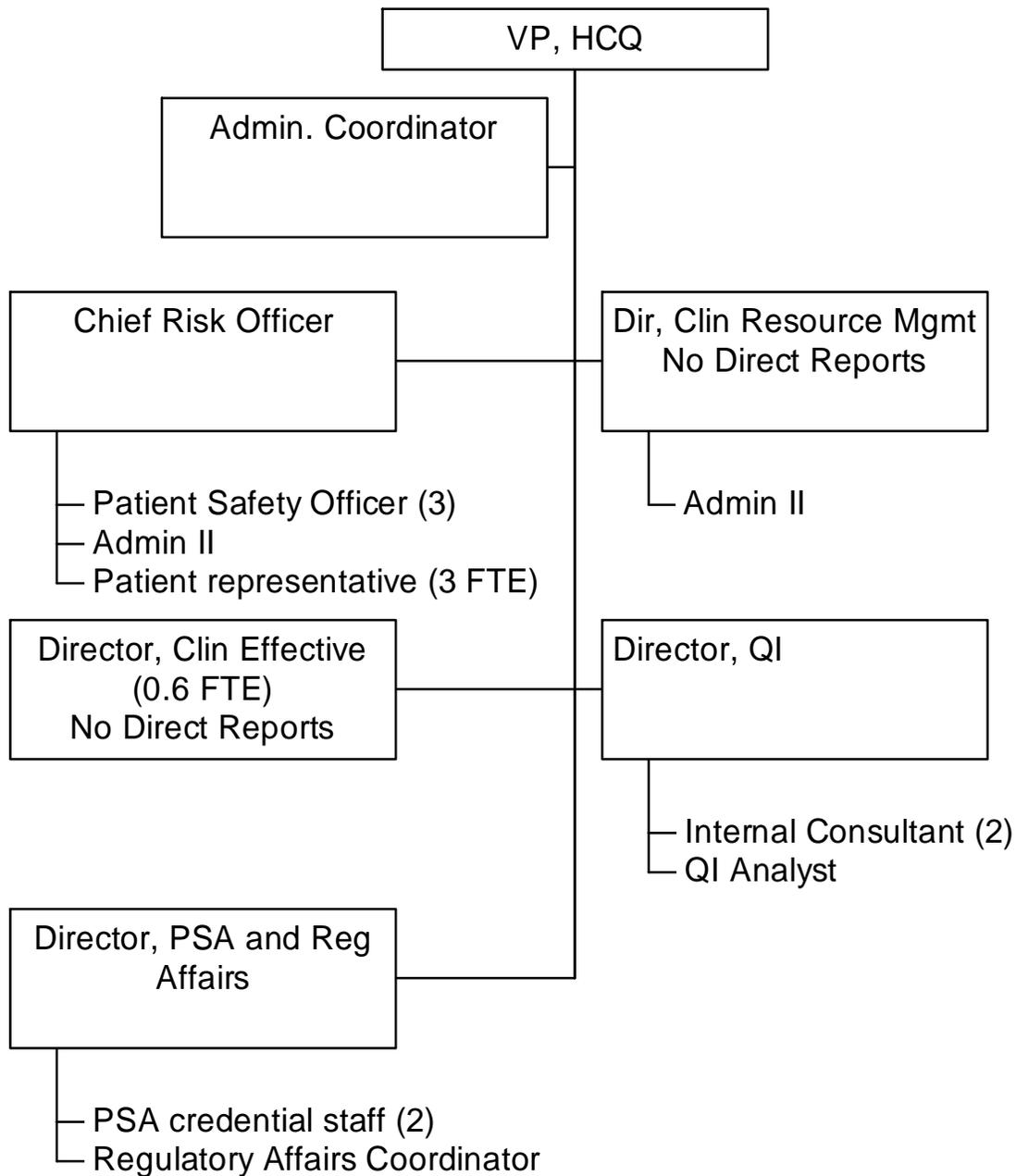
Source: BIDMC Progress Report: Development of a House Officer Rotation in Quality Improvement March, 2003.

Structure and Staffing of Health Care Quality Department

BIDMC's Health Care Quality (HCQ) Department has a prominent place on the institution's organizational chart. The director of the department is a vice president, who reports directly to the executive vice president/chief operating officer. Thus, the director of the HCQ department attends senior staff meetings and has much visibility.

The credentials of HCQ leaders also contribute to the success of the department. Both the vice president of HCQ and HCQ’s director of Clinical Resource Management (CRM) are physicians. Their clinical experience as physicians appears to enhance their credibility among hospital staff. It also enables them to understand “where the docs are coming from.” Figure 2 displays the organizational structure of the HCQ Department.

Figure 2. BIDMC Health Care Quality Department Organizational Chart



The director of CRM is a clinician who functions as an internal consultant and is deployed to manage projects wherever there is a CRM opportunity. This may relate to anything from standardization of supplies to improving coding to analyzing utilization of therapeutics to addressing LOS. The person in this role is a physician with a unique skill set that encompasses clinical knowledge; knowledge of hospital reimbursement, coding, and contracting; and project management. She partners most often with chiefs or administrative directors over certain areas.

The Risk Management Unit is part of the HCQ department and is available to provide proactive guidance to BIDMC employees and physicians on any aspect of patient safety or risk management. QI also includes the Professional Staff Affairs office at BIDMC, which manages peer review aspects of credentialing and maintains data regarding physician privileges and physician performance.

TOOLS AND PROCESSES THAT DRIVE QUALITY AND QI

Effective QI Process

The HCQ department is highly selective in launching centrally-managed QI projects. The process is data driven, using both internal and external data on patient outcomes, mortality, costs, infection rates, delays or speed of processes, LOS, and other indicators. Some data is localized (e.g., cardiac surgery data is collected by that division) and some is centralized (e.g., administrative data). BIDMC has the capability to merge data from local and central sources to get performance measures (e.g., LOS among patients having certain results at cardiac surgery might involving merging the two datasets).

While project support in the form of data analysis and presentation is frequently centralized, implementation of action plans is decentralized according to the clinical area affected. Each clinical department has a physician director for QI, and these individuals interact regularly among themselves and with the department of HCQ. These quality directors meet monthly to review adverse events and discuss QI initiatives. Thus, a process that has been traditionally “siloes” within hospital departments has become interdisciplinary.

Multistep Collaborative Process

The process of completing continuous Plan-Do-Study-Act cycles is the main concept proliferated throughout BIDMC to achieve a simplified, standardized and accelerated improvement process. The process has a number of steps, utilizes internal data and evidence-based practice guidelines, emphasizes volume to outcome relationships, and has a strong participatory nature.

HCQ staff considers both performance data and operational priorities to identify specific service lines or support processes requiring special focus. Whenever available, national performance benchmarks, recommendations, and evidence-based treatment standards are reviewed. Then, HCQ staff helps form a team with expertise and authority within the area of focus and presents the data, allowing the team members to question and debate the objective information. Facilitated by HCQ staff, the team makes recommendations and implements an action plan, including goals and timelines. Often, the QI process results in BIDMC staff members developing their own guidelines. HCQ staff may offer expertise and facilitation, but leave the action plan development and implementation to those individuals directly responsible. This fosters ownership and buy-in. This process is illustrated by a very successful cardiac surgery performance improvement initiative that began in the late 1990s (See Figure 3).

After the intervention takes place, HCQ continues to monitor progress, which may relate to a clinical outcome or other measure of institutional effectiveness. For example, in the coronary artery bypass graft (CABG) case noted in Figure 3, the team observed that the greater use of endoscopic leg vein harvest increased cost by \$550 per case, but led to a sharp decline in leg infection rates. HCQ stresses the importance of showing hospital staff successful interventions, and then building on those successes. Importantly, the clinical chiefs are on board with this QI process, and frequently play a leadership role in getting improved practices adopted by physicians and nurses on their teams.

Figure 3. Cardiac Surgery Performance Improvement Initiative

After the BIDMC merger in 1996, there was much rearranging and turmoil among clinical teams. Evaluation of CABGs revealed erosion of performance-related mortality and sternal infection rates as compared to benchmarks. There was high variation in practices, supplies, and OR times and there were delays caused by inefficiencies in communication. In response, BIDMC decided it must rebuild a CT surgery team, and enhance CABG patient care along the following dimensions:

- Effectiveness: decrease in mortality
- Safety: decrease in infections
- Timeliness: decline in cath-CABG delays
- Efficiency: improved resource utilization
- Patient Centeredness: improved patient satisfaction

An in-house, multidisciplinary team was assembled and met regularly to structure the components of an ideal episode of care, decide what was realistic, and make it happen. This task involved building a real-time management database for tracking relevant measures. Based on research and experience, and working with the Northern New England Cardiovascular Disease Study Group, a number of guidelines and actions steps were developed and implemented:

Pre-op:

1. If mortality risk exceeded 10 percent, seek a second opinion from a cardiac surgeon colleague
2. Continue aspirin therapy through start of surgery
3. Standardize scrub night before surgery
4. Standardize prep and drape just prior to surgery

Operating Room:

1. Reduce cardiopulmonary bypass time (surgeons scrub together, observe practice, and standardize practice to reduce variation)
2. Use internal mammary artery for bypass in non-emergent cases
3. Increase use of endoscopic leg vein harvest

Post-op:

1. Increase intensity of care following surgery through such means as protocols listing triggers for notifying attending physician and consulting intensivist physicians for prolonged stays, on-site nurse practitioners, and physician assistants in the Cardiac Surgery Recovery Unit.
2. Tight glucose monitoring for patients who also have diabetes.

In addition, the surgeons agreed to standardize intraoperative devices (e.g., valves) and supplies to be able to standardize practice in the OR, improve safety and decrease unnecessary cost by consolidating to one or two supply vendors. Improvements were made in nearly all the targeted dimensions. The process for fixing CABG procedures became the model for improvements in other areas as well.

Multidisciplinary Teams

Teamwork is incorporated in many ways at BIDMC. The care of patients, particularly those with complex conditions, is reviewed by a multidisciplinary team, composed of a case manager, clinical pharmacist, nutritionist, therapists, physicians, and social workers, if necessary. Care is coordinated and information is shared. Hospital officials stressed that there is a strong sense of respect among all team members.

Further, teams play a key role in the QI process. BIDMC uses teams to pull apart the data from information bases on outcomes and cost and use it as a platform to identify root causes of subpar performance. This is followed by corrective actions to change practice patterns. Figure 3 illustrates how this process works. What distinguishes BIDMC from many other hospitals is the way it examines a medical procedure or intervention from the time a patient comes in the door to the time during which the patient is recovering. The hospital identifies potential sources of a problem at each stage—when the patients are in the ER (if they enter that way), the preparation for a test or procedure, the procedure itself, and the recovery. Thus, in the Cardiac Surgery Performance Improvement initiative, BIDMC discovered opportunities to decrease infection at multiple junctures in the patients' care, including improving the way patients were prepped for CABG the night before surgery, as well as just before surgery (prep and drape), during surgery (e.g., vein harvest, the length of time the heart was bypassed during surgery), and after surgery (glucose control). The team members then looped back to work with the various physicians and nurses to standardize each of these steps, establishing best practices (e.g., the surgeons with longer bypass times would scrub with and learn from the others who were achieving shorter bypass times).

Another example of successful team process is BIDMC's approach to heart failure. Since heart failure is among the most common conditions among the inpatient medical population, the HCQ group collaborated with the Department of Medicine to establish a multidisciplinary team, including primary care physicians, cardiologists, nurses, and pharmacists, who worked together to identify opportunities to improve performance. Using small working groups and with the help of decision support representatives, the team identified gaps in patient care, including a need for better tools to teach patients. This led to new teaching packets for patients and a class for patients with heart failure that will serve as a model for classes in other medical units. The packets include such information as dietary recommendations and symptoms that should prompt a call to a physician. A similar learning packet for diabetes includes teaching patients how to use glucometers and mix insulin. These teaching packets are translated into six languages.

A similar process was used to improve the OR service. A committee including the chief of surgery, chief of anesthesiology, director of the OR, and managers of various departments was established to address QI opportunities relating to operative processes. Identified priorities were assigned to smaller task groups composed of physicians, nursing staff, and representatives from various disciplines (pharmacy, social work, case manager, information systems finance). BIDMC is forming similar groups for other services lines.

Multidisciplinary teams have also been active in trying to reduce problems at the patient bedside that lengthen hospital stays and, in some cases, increase risks to patients. For example, a team was formed to improve the timeliness with which patients on ventilators for respiratory support are assessed for the readiness to breathe independently. Improvement in this area would reduce the time that patients were required to stay in the ICU. The team focused on a guideline that set a standard for daily assessment of breathing using a measure called the Rapid Shallow Breathing Index.

Multidisciplinary teams at BIDMC have also been active in trying to understand and reduce medication errors and to better manage pharmaceuticals to improve health outcomes in the hospital. Analysis of dosing led teams to develop various interventions including adjustments for weight and renal function, which were then incorporated into the CPOE system. Cost effectiveness was assessed when two drug regimens had the same efficacy but different costs. Toward that end, oral medications that have the same effect as intravenous methods were the route of choice in patients who were able to eat. Similarly, once-daily dosing was selected over multiple doses, when outcomes were equivalent. Additionally, drug waste of a very high-cost drug infusion was decreased by preparing an initial small dose for the first hour while the patient's response was assessed. The remainder of the drug was only prepared when it was clear that the full course would be administered.

BIDMC's new Level 1 Trauma Center ED also exemplifies BIDMC's use of multidisciplinary teams. The current ED is the result of a two-year planning process led by a multidisciplinary Design Planning Committee composed of physicians, nurses, and representatives from lab, radiology and other areas that have direct interaction with the ED and a direct stake in its successful functioning. (See Figure 4.) The transformation in the functioning of the ED ranged from replacing a cumbersome pager system with a more efficient and rapid-response cell phone system to designing ways to get lab results electronically fed into dashboards in the ER. The wait time for patients was greatly reduced, thereby hastening their admission or release.

Figure 4. Designing an Effective and Efficient ED

Before opening its new Level 1 Trauma Center ED in 2001, BIDMC underwent a two-year planning process. A multidisciplinary Design Planning Committee, including physicians, nurses, and representatives from lab, radiology, and other areas, was formulated to direct the process. Consultants were brought in to study patient flow and make recommendations. Starting with an average stay of eight hours per patient, the committee broke this time frame into eight one-hour segments. The next step was to find ways to remove barriers and bottlenecks within each segment. This would help guide patients more quickly into either an admission to the hospital, transfer to the observation unit, or discharge.

Some of the key design features of the ED are the following:

Physical Design:

- Double circle design, with placement of most acute patients close to nurse stations
- Placement of trauma rooms together and close to elevator
- Physical proximity of ED to labs and other key services
- Placement of radiology contiguous with ED to avoid elevator trips
- Ability to convert between behavioral and regular rooms

Wireless, Paperless System:

- Bedside registration with information directly entered into computers
- Provision of cell phones to ED providers for quick, direct communications (replacing the three-step pager system)
- Color-coded, electronic dashboard display chart, with queuing reminders
- Computerized patient records with details of orders, tests, results, X-rays, EKGs, etc.

The result was a state-of-the-art ED that has led to improved patient flow, reduced delays, and enhanced satisfaction among both staff and patients. The eight-hour average LOS in the ER was cut by one-half to four hours. Clinical management improved, in terms of faster triage (use of bedside registration that reduces waiting time) and more effective and efficient patient tracking (electronic dashboards and electronic patient records). While there have not been measurable changes in clinical outcomes, the ER manager asserts that design and process improvements likely helped reduce errors.

Motivation of Staff

HCQ personnel stress the importance of identifying what motivates staff to take QI action. For example, clinical staff is more receptive when the benefits to patient care or cost saving implications from an intervention can be illustrated. Due to tight financial conditions, the hospital is increasingly incorporating cost as a driving factor in decisions. Also, the competitive nature of physicians in a premier academic medical center facilitates QI at BIDMC. The medical staff members are very sensitive to reports that they do not measure up to regional or national benchmarks on particular procedures. This translates

into a willingness to examine and modify practices when they are convinced, through objective data, that their performance is sub-optimal (e.g., the cardiac surgery performance, Figure 3).

Heavy Use of Performance Information

QI at BIDMC is driven by clinical data. HCQ staff describes keys to using data. This includes finding indicators that show differences among practitioners, or between BIDMC experience and benchmarks, then tying interventions (developed through the multidisciplinary QI process) to goals that can be measured and evaluated. For example, in cardiac surgery, surgeons receive objective data comparing physicians to their institutional peers, as well as to the norm for the Northern New England region. Primary care providers are given monthly digital report cards with confidential information on how their utilization-related performance (e.g., hospital days, pharmacy costs) stacks up against various benchmarks.

BIDMC is skeptical, however, of adapting external clinical pathways in a standard format, without addressing unique features of the institution and its population. The staff members may use outside pathways as a starting point, but prefer to modify them based on their own experiences.

Relying on hospital data requires very careful coding, with good training and random sampling for quality assurance. There are on-site diagnosis-related group (DRG) validators who monitor coding of patient records.

Focus on Standardization to Improve Efficiency and Safety

A major emphasis of HCQ is on standardization of procedures, equipment, supplies, and pharmaceuticals, based on both cost and effectiveness. They have adopted IHI's model, which strives for a low level of variability. Reducing the variance in procedures and techniques is assumed to bring lower cost and greater safety for both patients and staff.

BIDMC actively encourages physicians to achieve consensus on the selection of medical equipment and devices used for each procedure to minimize variation. Standardization of medical devices and equipment, where feasible, is expected to lower

“People don’t look at [standardized pathways], don’t follow them; we prefer to use data to look at the root cause of a problem. We ask, ‘What are specific ways to make incremental changes to improve performance?’ Then we find measurable things so we can then look to see whether the interventions made a difference.”

—A leader in the hospital’s initiatives to improve quality

costs as the hospital is better able to negotiate volume discounts. For example, orthopedic surgeons and neurosurgeons discovered they were using seven to eight different sets for spinal surgery. These sets varied in price from \$2,500 to \$9,000. This has been reduced to two sets per surgery, with savings realized from bulk purchasing. Most important, the chiefs of the two departments enforce the limitation on the variance: if surgeons bring in equipment that was not selected, their operating room time is blocked. An additional benefit from this standardization should involve improved safety, although this is harder to document. For example, since nurses frequently move around the hospital, less variation across departments in equipment and supplies means fewer chances they will confuse one device for another. This translates into fewer mistakes and delays.

Efforts to standardize often originate within the CRM area of the HCQ department. The process is similar to other QI initiatives (i.e., identify the problem, pull together a team, present the data, allow debate, facilitate action plan development, monitor results). Judicious use of resources is addressed and adjudicated in subcommittees of the Medical Executive Committee, which meet regularly (Figure 5).

Figure 5. Meeting Schedule for Clinical Resource Management

Area	Committee	Meetings
Medications	Pharmacy and Therapeutics Committee	Monthly, 90 min
Lab and radiologic tests	Core Clinical Services Committee	Six times/year, 90 min
Med surg and critical care supplies	Critical Care Committee	Monthly, 60 min
OR supplies	OR Supply Committee	Monthly, 60 min
New procedures or device	Clinical Resource Management Committee	Twice monthly, 60 min

Investment in Clinically-Driven Information Systems and Decision Support

In-house Development

A characteristic that distinguishes BIDMC from other hospitals is its state-of-the-art information systems (ISs) that are made in-house. These systems allow analysis of performance and innovative implementation of projects. Because most of the ISs were developed in-house, they can be customized and harnessed to drive performance measurement and improvement in ways that other off-the-shelf systems do not permit.

The CIO who directs and designs most of the ISs at BIDMC (along with the rest of the CareGroup health system) is a physician and an IT expert. This helps create

credibility among other physicians and ensures that the system is geared toward the needs of clinicians. In fact, it was noted that a key to the IS's success is that it is built with a clinical focus as opposed to simply a financial one.

BIDMC started to develop a Web-based IS in 1998. This has grown into a system in which patient administrative activity (both inpatient activity and physician, office-based activity among BIDMC's network of physicians), test results (e.g. X-rays), orders, and educational resources, are integrated and accessible to clinicians. In fact, the degree of integration is viewed by both hospital officials and external entities as being ahead of the curve. Only progress notes exist on paper; everything else is in real-time, electronic mode. That is, the results of various tests and procedures are fed into the IS in time for doctors and nurses to use them in treating patients during their stays.

Building the current IS configuration in-house was efficient for BIDMC. According to the CIO, IS accounts for only 1.9 percent of the operating budget compared with about 3 percent at most hospitals. But in-house IS requires expert technicians on staff, as well as major ongoing innovation to keep up with, or stay ahead of, external systems. CareGroup's IT involves a staff of 200 people delivering technology to 3,000 physicians, 12,000 employees, and one million patients per year. CareGroup was designated the top organization in healthcare IT in America by Information Week 500 in 2001 and 2002, and received the "most wired" and "innovator" awards from the American Hospital Association.

Provider Order Entry

The Provider Order Entry (POE) system incorporates flags to intercept errors. It was developed by 35 physicians practicing at BIDMC, based on medical evidence and experience at BIDMC. Updated monthly, this system offers automatic orders, and catches potential adverse effects, adverse interactions, and drug duplication. Physicians are able to override the system, but they are ultimately accountable for their actions. BIDMC studied the problems that Cedars Sinai in Los Angeles had with its POE system. According to an IT specialist, these problems included the hospital administration "foisting 400 guidelines onto physicians." The CareGroup avoided similar problems through an approach using substantial physician involvement and by emphasizing ease of use and speed. It incorporated only the most critical rules and brought certain physicians in early to help build the system. These early adopters then sold their colleagues on the program. Figure 6 describes the POE order sets currently in use, in development, and in queue.

Figure 6. BIDMC's Provider Order Entry (POE) System

BIDMC's POE currently uses five types of order sets:*

Admission orders

- General admission
- Psychiatry

Post-op orders

- General
- Hepatobiliary
- Cardiac surgery
- Interventional cardiology–CMI

Transfer orders

- General transfer
- Cardiac surgery

Procedure orders

- Cardiac surgery pre-op
- Cardiology post-diagnostic cath and pre-procedure
- Chemoembolization post-procedure and pre-procedure
- Electrophysiology post ICD/pacemaker, post-cardioversion, and post-electro. study/post-ablation
- Interventional pulmonary post-procedure

Medications

- Transplant
- Interventional radiology
- Acute coronary syndrome
- CHF

The following order sets are in development as of spring 2003:

- Transplants
- Interventional radiology
- Acute coronary syndrome
- CHF

Additional order sets in queue as of summer 2003 were:

- Cardiac procedures–IABP
- Ortho
- Gastric bypass
- GYN surgery

* Order sets are a set of physician orders designed around a specific type of admission.

Dashboard and Reports

Various dashboards and reports play an important role in organizing data. The new emergency unit at BIDMC presents patient information on a dashboard that summarizes the status of a patient's evaluation, results of lab and x-ray tests (or an indication that such test results are pending), and medication schedules. Some information is updated every minute and other information is updated every hour. All clinical staff members have access to the dashboard.

The 3,000 primary care physicians in CareGroup's provider service network have access to digital report cards in which their risk-adjusted utilization of services are compared to other physicians in their medical group, to others in the BIDMC network, to the CareGroup, and the region.

Figure 7 displays the critical care dashboard. It is reviewed quarterly and contains data assembled from multiple sources, allowing full pictures of care of patients in ICUs. The dashboard is reviewed in the hospital's Critical Care Committee, a multidisciplinary group that interprets the information and determines necessary action steps, such as further investigation into specific procedures or providers if the data is outside of established benchmarks.

BIDMC's IS includes an Executive Information System that tracks financial information and a Performance Manager, which gives senior hospital administrators access to a multitude of reports and surveys, including those related to LOS, mortality, and patient satisfaction. Selective access can be given to personnel who may benefit from information, after the individual receives the appropriate authorization. These systems help management identify outliers and then address the problems by bringing them to the attention of the appropriate clinicians. BIDMC is working toward incorporating additional measures that are already being tracked but not yet incorporated to the Web-based IS platform, such as readmission rates and returns to OR.

Figure 7. ICU Dashboard

BIDMC CRITICAL CARE FY03 Dashboard		4Q03	3Q03, etc.	1Q02	Benchmark	Metric Definition/Source
THROUGHPUT	ICU Patient Days (Total)					Total ICU Days - Excludes CRC, PLCU, TCU, Newborns
	PACU Days					Subset of Total ICU Days
	ICU Total # Cases					Casemix ***
	PACU # Cases					Subset of Total # of Cases w/ overnight stay in PACU
	Average Length of Stay in ICU					Total ICU Days/Total Cases
	% Patients with ICU LOS > Total 14 days					Casemix ***
	ADC for LOS > 14 Days					Decision Support
	Total ICU Call Out Days					# of Patients Called out but not transferred by midnight same day. Nursing-Clinical Advisor Midnight Report
	Non-Interqual Critical Care Criteria Patients					# of ICU patient days not meeting Interqual ICU Level of Care Criteria - Case Management (tracking began 5/03)
	% Mortality - In Hospital					% of Patients who had ≥ 1 ICU Day who expired while in the hospital
HEMOSTASIS	DVT Prophylaxis - Anticoagulant Use					Per Inclusion List MS Meds / Pharmacy while in the ICU (see attached listing)
	DVT Prophylaxis - Sleeves/Stockings					POE report and/or CareView Extract for Stockings or Boots / Care View for Sleeves/ Stockings
	Total % Patients "GI Protected"					Combined GI Prophylaxis Med Use and those patients on TPN (see attached listing)
	GI Prophylaxis - GI Med Use					Per Inclusion List MS Meds / Pharmacy while in the ICU
	% Pts on TPN					Per Inclusion List MS Meds / Pharmacy while in the ICU

Extract Report in the Queue w/ POE Project List/ CareView Extract

BIDMC CRITICAL CARE FY03 Dashboard		4Q03	3Q03, etc.	1Q02	Benchmark	Metric Definition/Source
SEDATION	Sedative Use					Per Inclusion List MS Meds / Pharmacy while in the ICU (see attached listing)
	Daily "Wake Up"					"Snapshot" ¹ —Documented "Wake Up Done" on those Patients w/Sedative Infusions - excl.TSICU,CSRU, SICU Q'03 data from CDA/ISM Critical Care Web Reporting for all Critical Care Patients
PULMONARY	Vent Days - Total #					
	% Vent Days					Total Vent Days / Total Patient Days
	RSBI Documented					"Snapshot" ¹ —Daily RSBI documented/Vent Days - excl.TSICU,CSRU, SICU Q'03 data from CDA/ISM Critical Care Web Reporting for all Critical Care Patients
	HOB @ 30 ⁰					"Snapshot" ¹ —Documentation @ least x1/day - excludes TSICU, CSRU, SICU Q'03 data from CDA/ISM Critical Care Web Reporting for all Critical Care Patients
	Central Line Days					
	In process via Critical Care Web /CDA/ ISM CareVue Data Reporting - M. Cho, MD & D. Delaney, MD					
LINES / INFECTIONS	Infection - Central Lines					Infection Control Data Base NNIS (Historical) ³
	MICUA CC7C					5.9
	MICUB CC7B					5.9
	TSICU CC6C					7.9
	MICU/SICU Finard 4					5.3
	CSRU CC5B					2.9
	SICU CC6D					4.7
	CCU CC6B					4.4

BIDMC CRITICAL CARE FY03 Dashboard		4Q03	3Q03, etc.	1Q02	Benchmark	Metric Definition/Source
GLUCOSE CONTROL	Glucose Control in CSRU					Looking at 1 st 48 hours in CSRU - % of time Glucose <130
PATIENT CENTERED	Health Care Proxy Y/N					CareView
	Family Meeting Y/N					Documented within 72 hours of Admission CareView
	Overall Quality of Care in the ICU (% Responding "Excellent")					Professional Research Consultants

¹ "Snapshot" - Data collected through manual review of Careview/ MAR/ Medical Record/POE x2-3/week on MICU A/B, Finard4, CCU. Effective 3/1/03, TSICU/SICU added to population

CareVue ISM Reporting Data for 3Q'03 - All Critical Care Units for RSBI Rates, HOB and Daily "Wake Ups"

² NNIS Benchmarks for FY03 Data Comparison

³ NNIS Benchmarks (Historical) for FY02 Data Comparison

*** Index population: inpatients with any ICU days excludes TCU and newborns; Total Charges > 0

CHALLENGES IN PROMOTING QUALITY AND QI

Financial Turmoil

The financial picture was of such great concern during the late 1990s and up until approximately 2001 that BIDMC's strategic plan was focused on survival. The institution did not have the luxury of taking a long-term view, and the focus of the administration was on reducing financial losses rather than QI efforts independent of the financial mission. However, the financial situation has begun to turn around. The hospital's bond rating was recently upgraded and the hospital has shown profitability over the first five months of fiscal year 2004. As a result, BIDMC has begun to develop a longer-term strategic plan that includes quality-related goals.

Changes in Attitude and Culture

Hubris Regarding Self-measurement

Due to BIDMC's reputation as a Harvard Medical School hospital, some physicians are resistant to having their practice patterns and health outcomes measured and questioned. Similarly, it has been a challenge convincing physicians that change is good, that QI is an ongoing process, and that it is important to think creatively.

BIDMC's QI department has addressed these challenges in two ways that have been somewhat successful. First, it adopted the "Crossing the Quality Chasm" report's six simple, sensible measures of performance, and has incorporated them into the mantra of the institution through constant education. The measures are: safety, timeliness, effectiveness, efficiency, equity, and patient centeredness. They are included in many of BIDMC's materials and are discussed at meetings, which creates an ongoing presence. Second, QI admittedly "bombards people with data," but does not force it upon them. The QI staff presents information about comparative performance, but allows debate regarding the validity of the data. Once the clinicians trust the data, they become competitive and want to outdo their peers.

Fear of Admitting Errors

It is difficult to change a culture in which people are afraid of admitting mistakes (sometimes due to real fears of litigation) to a culture in which it is safe to report errors and admit that there is room to improve. Hospital administrators acknowledge, for example, that adverse drug incidents are likely underreported because staff is afraid or too busy to report them. The HCQ staff says that showing evidence of actual improvements when interventions are made has helped people move—albeit slowly—away from this defensive attitude.

Resistance to Externally-Imposed Rules

A highly-reputable physician staff is also susceptible to a feeling that “no one else can do it as well as we can.” Physicians resist accepting protocols they do not design themselves. In response, BIDMC allowed its physicians to develop their own guidelines, rather than importing those developed elsewhere. The process of closely examining their own procedures and devising protocols based on what works best has improved outcomes and has encouraged ownership and buy-in. For example, BIDMC’s protocols for post-op cardiac patients, including listing triggers for notifying attending physician and consulting “intensivist” physicians for prolonged stays, have contributed toward improved mortality and infection rates.

Misaligned Incentives

Most internal medicine physicians at BIDMC are salaried, with no financial incentives to improve efficiency or quality. There have been some thoughts of taking steps toward tying bonuses to performance, but this has not gone very far and is not likely to change in the foreseeable future. Surgeons are paid according to procedures and volume, but with no adjustments for outcomes or other quality-related indicators. The hospital has begun giving bonuses to cardiac surgery nurses who have attained skills in five prescribed procedures, but replicating this approach in other areas of the hospital may antagonize some nurses. Given the nursing shortage, it is unlikely that such incentives will be extended.

Another challenge involves getting insurers and employers to value and pay for high quality, and to understand the long-term savings potential of QI. Though there is beginning to be some experimentation with performance-based reimbursement between insurers and hospitals in the greater Boston market, the reimbursement system generally rewards short-term performance, not the 10-year horizon required for re-engineering and improving processes. Particularly given current financial pressures, one administrator stated, “We don’t have the luxury of thinking long term.”

Trickle Down of Priorities

While the participation of academic chiefs in the strategic planning process and in committee meetings helps to get them on board with QI efforts, passing those priorities down to the rank and file is an ongoing challenge. As mentioned earlier, people in the Harvard system are generally driven and value quality, but are not always willing to undergo self-examination and make changes to entrenched practices.

Team Training

The model of physician education does not emphasize teamwork or a broad systems view. BIDMC administrators note the need to teach QI concepts and the team approach (including viewing patients as part of the team) beginning in medical school. BIDMC's residency curriculum attempts to introduce these concepts to medical residents, though the three-week rotation is an elective and available only to internal medicine residents at this time.

Technical Requirements

The technical infrastructure requirements of running BIDMC's state-of-the-art, integrated IS are enormous. Two hundred staff members are dedicated to IS. Yet, the hospital devotes a smaller portion of its overall budget to IS than do most hospitals. Building and maintaining the back office necessary to sustain data requirements while budgets are being cut is a major challenge.

LESSONS FOR OTHER HOSPITALS

1. Put in place the pieces for a QI culture.

There was much agreement that certain pieces need to be in place in order to establish a QI culture. They include:

A Mandate from the Top Administrators

The CEO must view quality and QI as priorities and must send that message throughout the institution. The COO and other administrative leaders must be well-aligned with the mission and key personnel (e.g., medical chiefs) must have a proclivity for it or at least be open to the idea. The hospital's top leadership must be accessible to hospital personnel.

Board Support and Direction

The Board must be educated (e.g., BIDMC brought in Donald Berwick, M.D.) to create an awareness of QI issues and potential. Then, the Board must expect QI.

“If the Board isn't asking the questions, and being sure they are asking the right questions, the administration doesn't pay enough attention, and this continues down the ranks.”

—A BIDMC administrator

2. Let data speak for itself.

As one QI leader put it, “Information is very empowering. Get it out and get out of the way.” Data take a long time to develop, but are necessary for identifying and measuring the extent of problems. Resist workers who say, “I just know when there are problems.” Problems must be measured, even if the data are not perfect. Then provide the information to the people who can fix the problems. Also, use data to

show areas that are improving. A QI director points out, “When they get to use the data to show they’re doing a good job, they’ll buy in.”

3. Partner with nursing.

It is important to make sure the head of nursing is on board with QI and can get line nurses motivated and involved. Nurses must be partners in the process, requiring that the administration be open to their concerns. For example, QI should not involve extra work on top of nurses’ usual demands, but rather be incorporated into the work schedules. Nurses also need to feel empowered to participate in groups and to speak up and offer their suggestions in front of physicians and other clinicians.

4. Select and nurture strong clinical leaders.

Excellence in a particular unit or clinical area is attributed to leaders with direction, long-term vision, expectations of excellence, and the credentials to back it up. They know what must be done and how to implement it, and will pick or change a team if the process is not working. They must know how to recruit high-quality staff and run a department with open communication and transparency. The unit should emphasize standardization of procedures and supplies.

5. Use QI to facilitate, not mandate, change.

It was often noted that physicians tend to bristle if they are told how to manage their business. QI staff needs to take a soft, but firm, approach that involves giving the physicians information and evidence, and letting them be involved in developing the action plan and implementation, albeit with concrete timetables and goals to foster accountability. QI staff members need to do their homework ahead of time, present data and evidence clearly, allow debate about validity of data, and offer possible interventions that are easy and operational. Then, they should allow the clinicians to ask questions, discuss options, and develop a plan. It is also helpful to have a physician at the table representing QI in order to bring other physicians to the table and to get them to take the process seriously.

6. Establish an integrated electronic information system that is friendly and useful.

The home-grown IS at BIDMC works well for the institution, but other hospitals may not have the same kind of expertise in-house. For these other institutions, an off-the-shelf system that can be purchased and molded to fit the hospitals’ needs and circumstances could also work. Either way, it seems critical to develop an IS that meets certain criteria. It should include the following features:

- Build value for the physicians (e.g., start with reporting clinical results, add rules to protect physicians from making errors, make orders a faster, more efficient process).
- Never underestimate the challenge of change. Do not think that putting something on the Web means solving the problem. It may make things convenient, but there are many steps needed to get people to use the system and pay attention to it. One must build in education, foster participation, communication, and engage the clinicians.
- It's a mistake to focus on technology. First, figure out the strategy. Be selective, make sure everything adds value. The "right" programs are different for each organization.
- Get clinical guidance and input for everything.
- Build a solid infrastructure first that can handle data requirements.
- Remember that integration and flexibility are key.
- Be diligent regarding security of privacy, access, finances. As one IS expert noted, "You don't get a second chance."

CONCLUSION

BIDMC has many challenges ahead of it, primarily related to improving its financial stability. Along with other hospitals, it also has the ongoing challenge to maintain and improve the quality of care it delivers. For the latter goal, BIDMC appears to be in a good position. Superior medical schools feed in top-notch physicians. From its founding, BIDMC has established a culture that emphasizes good patient care and service to the community. It has a top administration and Board that is dedicated to quality improvement and to trying to instill QI values throughout the institution (e.g., through its stated mission, goals, strategic plan, investment in the QI department, and IS system.) Its HCQ department has a prominent role in the organization, with physician leaders who are well-respected and bring other clinicians to the table. BIDMC has established a QI process that is data-driven and uses multidisciplinary groups to study and solve problems. And BIDMC has a home-grown IS that is user friendly, highly integrated, and has a vast multitude of applications (e.g., POE, electronic records and test results, literature syntheses, management reports).

Though there are occasional barriers and resistance to QI, BIDMC as an institution is increasingly trying to make it an integral part of its operations. The hospital system's leaders understand that to survive in a highly competitive market, it must continually strive to be better.

RELATED PUBLICATIONS

In the list below, items that begin with a publication number can be found on The Commonwealth Fund's website at www.cmwf.org. Other items are available from the authors and/or publishers.

#754 *Beyond Return on Investment: A Framework for Establishing a Business Case for Quality* (forthcoming). Michael Bailit and Mary Beth Dyer.

#751 *Achieving a New Standard in Primary Care for Low-Income Populations: Case Studies of Redesign and Change Through a Learning Collaborative* (forthcoming). Pamela Gordon and Matthew Chin.

#731 *Recommendations for Improving the Quality of Physician Directory Information on the Internet* (forthcoming). Linda Shelton, Laura Aiuppa, and Phyllis Torda, National Committee for Quality Assurance.

#767 *Exploring the Business Case for Improving the Quality of Health Care for Children* (July/August 2004). Charles Homer et al. *Health Affairs*, vol. 23, no. 4. *In the Literature* summary forthcoming; full article available at <http://content.healthaffairs.org/cgi/content/full/23/4/159>.

#768 *Overcoming Barriers to Adopting and Implementing Computerized Physician Order Entry Systems in U.S. Hospitals* (July/August 2004). Eric G. Poon, David Blumenthal, Tonushree Jaggi, Melissa M. Honour, David W. Bates and Rainu Kaushal. *Health Affairs*, vol. 23, no. 4. *In the Literature* summary forthcoming; full article available at <http://content.healthaffairs.org/cgi/content/full/23/4/184>.

#700 *Quality of Health Care for Children and Adolescents: A Chartbook* (April 2004). Sheila Leatherman and Douglas McCarthy. The researchers use 40 charts and analyses to outline the current state of children's health care, arguing that the health care system has devoted far less attention to measuring the quality of care for children and adolescents than it has for adults. Download the chartbook at

http://www.cmwf.org/publications/publications_show.htm?doc_id=233882

#702 *Use of High-Cost Operative Procedures by Medicare Beneficiaries Enrolled in For-Profit and Not-for-Profit Health Plans* (January 8, 2004). Eric C. Schneider, Alan M. Zaslavsky, and Arnold M. Epstein. *New England Journal of Medicine*, vol. 350, no. 2. *In the Literature* summary available at http://www.cmwf.org/publications/publications_show.htm?doc_id=221468

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#699 *Malpractice Reform Must Include Steps to Prevent Medical Injury* (January 6, 2004). Stephen C. Schoenbaum and Randall R. Bovbjerg. *Annals of Internal Medicine*, vol. 140, no. 1. In the Literature summary available at

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#686 *Obtaining Greater Value from Health Care: The Roles of the U.S. Government* (November/December 2003). Stephen C. Schoenbaum, Anne-Marie J. Audet, and Karen Davis. *Health Affairs*, vol. 22, no. 6. In the Literature summary available at

http://www.cmwf.org/publications/publications_show.htm?doc_id=221475; full article available at <http://www.healthaffairs.org/CMWF/Schoenbaum.pdf>.

#636 *Value-Based Purchasing: A Review of the Literature* (May 2003). Vittorio Maio, Neil I. Goldfarb, Chureen Carter, and David B. Nash. From their review of the literature, the authors conclude that value-based purchasing will only be effective when financial incentives are realigned with the goals of high-quality care and performance measures address purchasers' particular concerns.

#635 *How Does Quality Enter into Health Insurance Purchasing Decisions?* (May 2003). Neil I. Goldfarb, Vittorio Maio, Chureen Carter, Laura Pizzi, and David B. Nash. According to the authors, public and private purchasers may be able to hold physicians and insurers accountable for the quality and safety of the health care they provide. Yet, there is little evidence that current value-based purchasing activities—collecting information on the quality of care or selective contracting with high-quality providers—are having an impact.

#614 *The Business Case for Tobacco Cessation Programs: A Case Study of Group Health Cooperative in Seattle* (April 2003). Artemis March, The Quantum Lens. This case study looks at the business case for a smoking cessation program that was implemented through the Group Health Cooperative (GHC), a health system and health plan based in Seattle.

#613 *The Business Case for Pharmaceutical Management: A Case Study of Henry Ford Health System* (April 2003). Helen Smits, Barbara Zarowitz, Vinod K. Sahney, and Lucy Savitz. This case study explores the business case for two innovations in pharmacy management at the Henry Ford Health System, based in Detroit, Michigan. In an attempt to shorten hospitalization for deep vein thrombosis, Henry Ford experimented with the use of an expensive new drug, low molecular weight heparin. The study also examines a lipid clinic that was created at Henry Ford to maximize the benefit of powerful new cholesterol-lowering drugs.

#612 *The Business Case for a Corporate Wellness Program: A Case Study of General Motors and the United Auto Workers Union* (April 2003). Elizabeth A. McGlynn, Timothy McDonald, Laura Champagne, Bruce Bradley, and Wesley Walker. In 1996, General Motors and the United Auto Workers Union launched a comprehensive preventive health program for employees, LifeSteps, which involves education, health appraisals, counseling, and other interventions. This case study looks at the business case for this type of corporate wellness program.

#611 *The Business Case for Drop-In Group Medical Appointments: A Case Study Luther Midelfort Mayo System* (April 2003). Jon B. Christianson and Louise H. Warrick, Institute for Healthcare Improvement. Drop-in Group Medical Appointments (DIGMAs) are visits with a physician that take place in a supportive group setting, and that can increase access to physicians, improve patient satisfaction, and increase physician productivity. This case study examines the business case for DIGMAs as they were implemented in the Luther Midelfort Mayo System, based in Eau Claire, Wisconsin.

#610 *The Business Case for Diabetes Disease Management at Two Managed Care Organizations: A Case Study of HealthPartners and Independent Health Association* (April 2003). Nancy Dean Beaulieu, David M. Cutler, Katherine E. Ho, Dennis Horrigan, and George Isham. This case study looks at the business case for a diabetes disease management program at HealthPartners, an HMO in Minneapolis, Minnesota, and Independent Health Association, an HMO in Buffalo, New York. Both disease management programs emphasize patient and physician education, adherence to clinical guidelines, and nurse case management.

#609 *The Business Case for Clinical Pathways and Outcomes Management: A Case Study of Children's Hospital and Health Center of San Diego* (April 2003). Artemis March, The Quantum Lens. This case study describes the implementation of an outcomes center and data-based decision-making at Children's Hospital and Health Center of San Diego during the mid-1990s. It examines the business case for the core initiative: the development of a computerized physician order entry system.

The Business Case for Quality: Case Studies and An Analysis (March/April 2003). Sheila Leatherman, Donald Berwick, Debra Iles, Lawrence S. Lewin, Frank Davidoff, Thomas Nolan, and Maureen Bisognano. *Health Affairs*, vol. 22, no. 2. Available online at <http://content.healthaffairs.org/cgi/reprint/22/2/17.pdf>.

#606 *Health Plan Quality Data: The Importance of Public Reporting* (January 2003). Joseph W. Thompson, Sathiska D. Pinidiya, Kevin W. Ryan, Elizabeth D. McKinley, Shannon Alston, James E. Bost, Jessica Briefer French, and Pippa Simpson. *American Journal of Preventive Medicine*, vol. 24, no. 1 (*In the Literature* summary). The authors present evidence that health plan performance is highly associated with whether a plan publicly releases its performance information. The finding makes a compelling argument for the support of policies that mandate reporting of quality-of-care measures.

#578 *Exploring Consumer Perspectives on Good Physician Care: A Summary of Focus Group Results* (January 2003). Donna Pillittere, Mary Beth Bigley, Judith Hibbard, and Greg Pawlson. Part of a multifaceted Commonwealth Fund-supported study, "Developing Patient-Centered Measures of Physician Quality," the authors report that consumers can understand and will value information about effectiveness and patient safety (as well as patient-centeredness) if they are presented with information in a consumer-friendly framework.

#563 *Escape Fire: Lessons for the Future of Health Care* (November 2002). Donald M. Berwick. In this monograph, Dr. Berwick outlines the problems with the health care system—medical errors, confusing and inconsistent information, and a lack of personal attention and continuity in care—and then sketches an ambitious program for reform.

#534 *Room for Improvement: Patients Report on the Quality of Their Health Care* (April 2002). Karen Davis, Stephen C. Schoenbaum, Karen Scott Collins, Katie Tenney, Dora L. Hughes, and Anne-Marie J. Audet. Based on the Commonwealth Fund 2001 Health Care Quality Survey, this report finds that many Americans fail to get preventive health services at recommended intervals or receive substandard care for chronic conditions, which can translate into needless suffering, reduced quality of life, and higher long-term health care costs.

NOTES

¹ Includes adult, non-neonatology discharges (BIDMC).

² See the [overview report](#) for more detailed explanation of selection methodology.

³ ICU physicians and nurses trained in critical care, or someone specially trained is within five minutes.