Case Study

High-Performing Health Care Organization • March 2009

Baylor Health Care System: High-Performance Integrated Health Care

Tom Emswiler and Len M. Nichols
New America Foundation

Vital Signs

Location: Dallas/Fort Worth area, Texas

Type: Nonprofit integrated delivery system. BHCS owns a 450-physician medical group subsidiary and is affiliated with 3,000 independent physicians who deliver care at 15 Baylor-owned, leased, or affiliated hospitals and six "short-stay" hospitals.

✧   ✧   ✧   ✧   ✧

ABSTRACT: Baylor Health Care System is a nonprofit integrated delivery system based in the Dallas/Fort Worth area. Baylor comprises a network of hospitals, primary care and specialty care centers, rehabilitation clinics, senior health centers, and affiliated ambulatory surgery centers. Founded over a century ago, it has grown from a one-building hospital to a 3,000-bed integrated system that uses electronic health records and numerous quality improvement tools. Baylor owns a 450-physician medical group subsidiary and is affiliated with 3,000 independent physicians who deliver care at 15 Baylor-owned, leased, or affiliated hospitals and six "short-stay" hospitals. Baylor uses training programs, as well as physicians, to encourage systemwide initiatives and cement the quality mission across the system. The system has successfully implemented electronic health records, decreased mortality rates, and standardized care.

INTRODUCTION

This case study describes the many successful quality innovations implemented by Baylor Health Care System (BHCS), how the organization accomplished them, and the lessons learned. As a result of BHCS's Board of Trustees and affiliated physicians' motivation to fulfill this mission, BHCS's patients receive significantly more preventive services, the hospital mortality rate has dropped substantially over the last few years, and the delivery of care is far more standardized than in the past.

We begin our observations with an organizational and historical overview of the BHCS system and its vision to improve the delivery of care. Second, we examine BHCS's quality infrastructure. Third, we explore BHCS's elaborate training programs and its Physician Champions, doctors who are paid to encourage their colleagues to adopt positive changes in methods. Fourth, we assess a few examples of BHCS's quality innovations. Finally, we review the lessons of BHCS's campaign to improve the delivery of care.

ORGANIZATIONAL OVERVIEW

BHCS is a nonprofit integrated delivery system based in the Dallas/Fort Worth area of Texas. BHCS comprises a network of hospitals, primary care and specialty care centers, rehabilitation clinics, senior health centers, and affiliated ambulatory surgery centers. Founded over a century ago, it has grown from a one-building hospital to a 3,000-bed integrated system that uses electronic health records (EHRs) and numerous quality improvement tools.[1]

The 450-physician HealthTexas Provider Network (HTPN) is the medical group subsidiary of BHCS. In addition to HTPN, 3,000 independent, affiliated physicians deliver care at 15 BHCS-owned, leased, or affiliated hospitals and six "short-stay" hospitals.
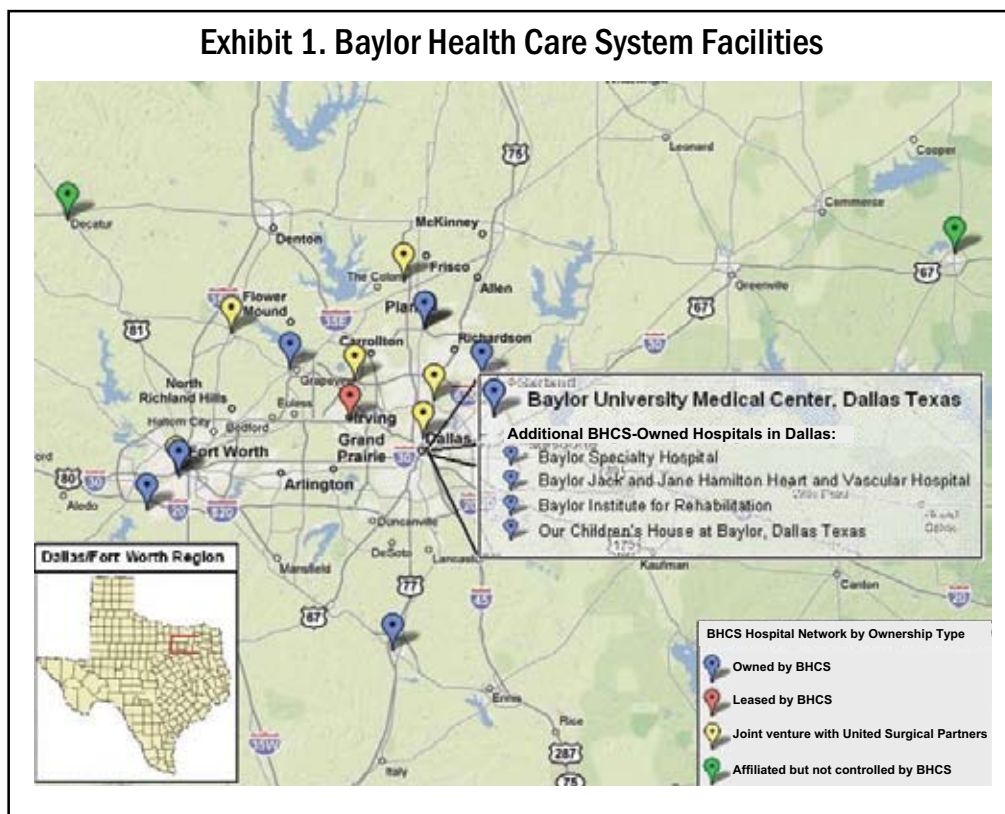
BHCS also publishes its own quarterly peer-reviewed medical journal, *Baylor University Medical Center (BUMC) Proceedings*, which serves to communicate "information about the research and clinical activities, philosophy, and history of Baylor Health Care System."[2]

HISTORICAL OVERVIEW

In 1994, anticipating a future dominated by managed care, BHCS began moving from a multihospital system to an integrated delivery system. Despite hurdles that included a lack of a systemwide organizational culture and strategic vision, BHCS's System Integration Action Team drove the successful integration of its clinical and nonclinical processes.[3] This major organizational change allowed BHCS to change the way health care was delivered at its facilities.

Highly esteemed integrated systems like the Mayo Clinic are sometimes derided by health reform

Exhibit 1. Baylor Health Care System Facilities

Baylor University Medical Center, Dallas Texas

Additional BHCS-Owned Hospitals in Dallas:
- Baylor Specialty Hospital
- Baylor Jack and Jane Hamilton Heart and Vascular Hospital
- Baylor Institute for Rehabilitation
- Our Children's House at Baylor, Dallas Texas

Dallas/Fort Worth Region

BHCS Hospital Network by Ownership Type
- Owned by BHCS
- Leased by BHCS
- Joint venture with United Surgical Partners
- Affiliated but not controlled by BHCS

pessimists as laudable organizations that exist purely because they reside in remote areas or were founded before the modern pressures of managed care and the management of complicated comorbidities. BHCS, however, demonstrates that substantial health care delivery improvement can occur in just a few years. Despite its long history, much of BHCS's transformational change began in 1999 when David Ballard, M.D., Ph.D., was hired as the BHCS's first chief quality officer.[4] BHCS's commitment to innovation was further secured in 2000 with a Board of Trustees declaration to embrace the quality of health care as a major challenge.

From fiscal year 2004 to fiscal year 2006, BHCS reduced its overall risk-adjusted mortality rates by 17.2 percent (all admissions, including end-of-life patients). In fiscal years 2007 and 2008, further improvements of 7.8 and 8.3 percent were observed.

BHCS seeks "[t]o be trusted as the best place to give and receive safe, quality, compassionate health care,"[5] by adhering to five values:

- **Integrity.** Conducting themselves in an ethical and respectful manner.

- **Servanthood.** Serving with an attitude of unselfish concern.

- **Quality.** Meeting the needs and striving to exceed the expectations of those they serve through continuous improvement.

- **Innovation.** Constantly exploring, studying, and researching new concepts and opportunities.

- **Stewardship.** Managing resources entrusted to them in a responsible manner.[6]

BHCS'S QUALITY INFRASTRUCTURE
Best Care Committee

Integral to BHCS's quality improvement strategy is the Best Care Committee (BCC). Formed in 2001 in response to the Board of Trustees' declaration the previous year, the BCC began as a forum to define, discuss, and develop implementation strategies for care

improvement initiatives, including systemwide implementation of Centers for Medicare and Medicaid Services (CMS) and Joint Commission core measures. The mandate of the committee is to "define and implement evidence-based best care in all that we do."[7] In March 2005, with leadership from Gary Brock, BHCS chief operating officer, and Dr. Carl Couch, HTPN medical director, the BCC reformed to become a legislature-like body with over 100 voting members.

The BCC is currently cochaired by the system-level chief medical officer and, to better engage nursing staff, by the chief nursing officer. In addition to the hospital presidents, chief nursing officers, and medical staff presidents, members of the BCC include the system's chief quality officer, patient safety officer, and chief medical informatics officer; health care improvement directors and chief operating officers for each hospital; Physician Champions and nursing leaders; and other professionals representing the patient safety, equity, patient-centeredness, finance, and business development areas of BHCS.

The current membership list is maintained by the BHCS chief operating officer. BHCS is in the process of deploying hospital-level BCCs, cochaired by the hospital vice president for medical affairs, chief nursing officer, and president of the medical staff.

Since March 2005, the BCC has passed more than two dozen major quality initiatives. Each of these becomes the responsibility of each BCC member to implement at their home hospital. The BCC meets every other month for a total of six times per year. Seven ground rules instruct the BCC to define and implement Best Care evidence-based processes for all care delivered at BHCS, and to include the input of physicians and nurses. The ground rules also address dissemination: "Once the BCC passes an initiative, it is to be adopted across all facilities; BCC members will promote the adoption of these Best Care initiatives across all facilities; adoption and impact will be monitored and used to promote continuous improvement of the care that we deliver."[8] In other words, as BHCS Physician Champion leader Dr. Carl Couch told us, the BCC becomes the answer to "Who Says?" As

the BHCS clinical authority, it is the chief counterargument to the statement of local autonomy, "That's not the way we do it here."

Although the BCC has no explicit executive authority, it achieves success via persuasion, common alignment of goals, and focused implementation efforts.[9] BCC initiatives are not *enforced*, but rather are *implemented*.[10] This is accomplished through a monthly reporting of process and/or outcome metrics to the Best Care Executive Committee, local hospital committees, and ultimately to the hospital and system boards. Implementation is driven by Physician Champions, who are recruited from BHCS's physician ranks and are compensated for their time spent on quality initiatives.[11]
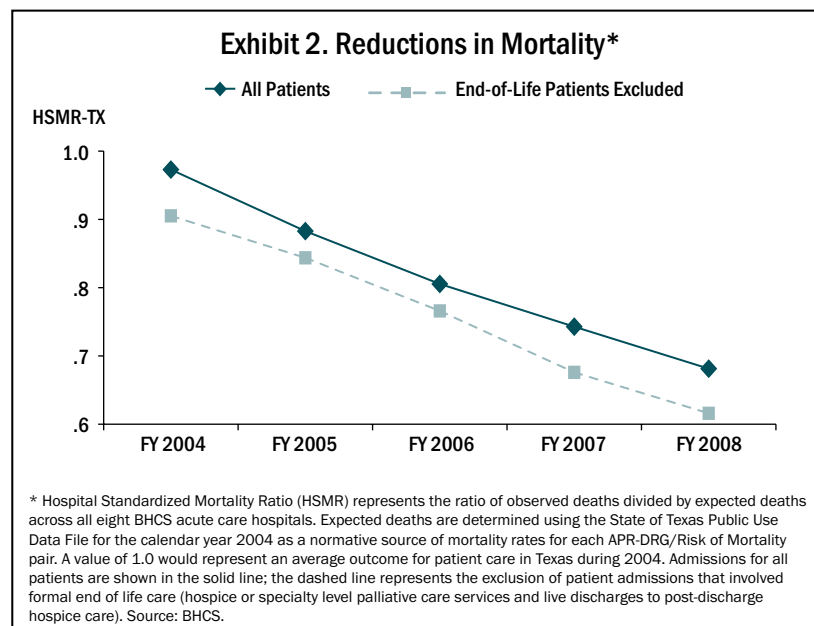
Best Care Executive Committee

The Best Care Executive Committee establishes the strategy and agenda for the BCC and ensures that it follows the six aims established by the Institute of Medicine: care that is safe, timely, effective, efficient, equitable, and patient-centered. BHCS coined in 2001 and subsequently trademarked the acronym STEEEP™ to communicate these aims across the Baylor Health Care System and to convey the challenging nature of the journey from the current state of health care qual-

ity to attaining ideal care. The Executive Committee has a number of oversight responsibilities, including:

1. review measurements that represent patient safety, including mortality, falls, and others it designates;

2. conduct secondary reviews of other elements of STEEEP™, such as patient-centeredness and equity, that are primarily overseen elsewhere in the BHCS system;

3. suggest and act on improvement and implementation actions on both the BHCS system and individual hospital level; and

4. set and approve the agenda for the BCC meetings.[12]

Another important responsibility of the Executive Committee is the review of clinical outcomes at BHCS hospitals that represent the elements of STEEEP™, including Best Care Initiatives. An example of a Best Care Initiative is BHCS's participation in the Institute for Healthcare Improvement's 100,000 Lives Campaign. The Baylor Health Care System was one of the first 10 health care systems to commit to the 100,000 Lives Campaign (which then

Exhibit 2. Reductions in Mortality*

All Patients — ◆ — End-of-Life Patients Excluded — ■ —

HSMR-TX

* Hospital Standardized Mortality Ratio (HSMR) represents the ratio of observed deaths divided by expected deaths across all eight BHCS acute care hospitals. Expected deaths are determined using the State of Texas Public Use Data File for the calendar year 2004 as a normative source of mortality rates for each APR-DRG/Risk of Mortality pair. A value of 1.0 would represent an average outcome for patient care in Texas during 2004. Admissions for all patients are shown in the solid line; the dashed line represents the exclusion of patient admissions that involved formal end of life care (hospice or specialty level palliative care services and live discharges to post-discharge hospice care). Source: BHCS.

became the Protecting 5 Million Lives Campaign),[13] and reduced its mortality rate after the Board of Trustees passed the following resolution in 2005:

> Baylor Health Care System management, medical staffs and hospitals will commit their attention and necessary resources to rapidly implement the six programs that are part of the Institute for Healthcare Improvement Saving 100K Lives Campaign, and the Baylor Health Care System has, during fiscal year 2006, established a target to reduce the inpatient mortality rate experienced during fiscal year 2005 by at least 4 percent, in each acute care hospital and in the aggregate across the system.[14]

The objective of the Campaign was to support the improvement of medical care in the United States by soliciting hospitals to help significantly reduce current levels of morbidity (illness or medical harm such as adverse drug events or surgical complications) and mortality. Although the Campaign's goal was a 5 percent reduction in mortality, BHCS reduced risk-adjusted mortality 10.1 percent across the system from July 2004 to June 2006 (fiscal years 2005 and 2006). During the following 12 months, risk-adjusted mortality continued to decline by 11.4 percent.[15]

The Executive Committee also implemented six care improvements recommended by the Institute for Healthcare Improvement: rapid response teams (described below); ventilator bundle (to prevent ventilator-associated pneumonia); central-line bundle (to prevent central line infections); delivery of evidence-based care for acute myocardial infarction; the prevention of surgical-site infections; and the use of medication reconciliation to prevent adverse drug events. Compliance data for these and other Best Care initiatives are reported monthly to the Board of Trustees and are available via intranet for all BHCS employees.[16]

HealthTexas Quality Committee

As Dr. Couch writes in a recent *Physician Champions Annual Report*, "Alignment with physicians is nationally recognized by hospitals as a critical success factor in health care delivery and quality improvement."[17] BHCS achieves this coordination with its employed physician group, HealthTexas Provider Network (HTPN), as well as through a broad range of other physician relationships. Specifically, BHCS's facilities work closely with the HTPN quality committee to improve physician performance in the delivery of clinical preventative services.

Exhibit 3. Delivery of Clinical Preventive Services
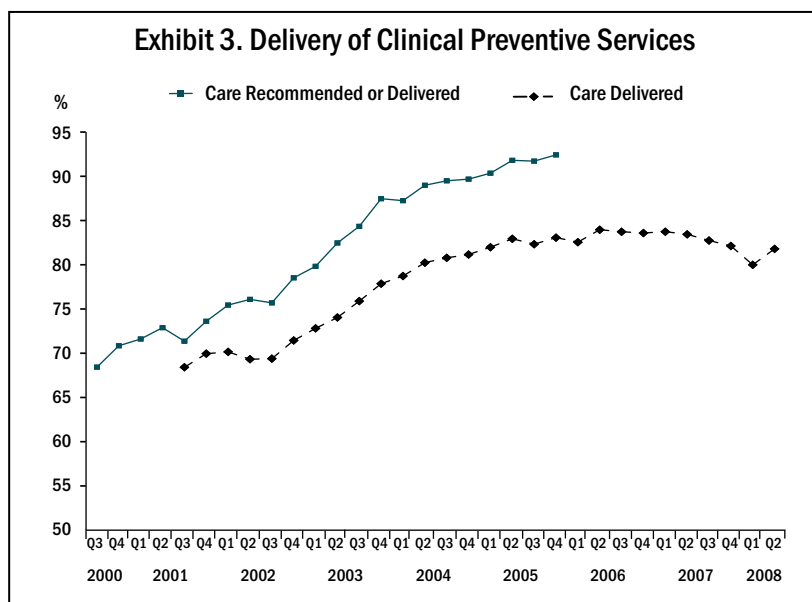
Working with Dr. Ballard, who had been recently hired as BHCS's first chief quality officer, the HTPN quality committee first focused on a practice area that had been vastly underdelivered: adult preventive health services, also known as clinical preventive services (CPS).[18] In 2007, Dr. Ballard and colleagues published the results of BHCS's focus on CPS. By increasing productivity through 11 interventions—ordered sequentially to further enable the provision of these services at each step—the delivery or recommendation of CPS rose from 68 percent to 92 percent from 1999 to 2006.[19]

Shortly after this study began, BHCS began measuring the actual delivery of CPS. HTPN reports and quality initiatives focus only on delivered preventive services because leadership believes physicians should be held accountable for care that is *delivered*, not simply care that is recommended or delivered.

From 2001 to 2008, the delivery of CPS rose from 68 percent to 82 percent, reaching as high as 84 percent. BHCS physicians, however, have thus far not been able to break through the 84 percent ceiling, which has been ascribed to the limits of its paper-based processes. Leaders are considering how to deploy decision support tools, which are components of the ambulatory electronic health record software, for improved CPS delivery.[20]

The HTPN board is now considering whether its physicians should have a portion of salary tied to quality performance. Additionally, HTPN has identified leaders for increasing flu and tetanus vaccinations, as well as breast and colon cancer screenings. HTPN hopes to improve the flu vaccination rate to 80 percent, the tetanus immunization rate to 75.5 percent, the mammography screening rate in eligible women to 80

Exhibit 4. Interventions Undertaken Within HTPN to Improve Delivery of Clinical Preventive Services	
Intervention	**Date initiated**
1. Adult Clinical Preventive Services Medical Record Form provided to all practices for use in documenting delivery of clinical preventive services	Fourth quarter, 1999
2. Feedback of audit results to individual physicians	First quarter, 2000
3. Training of physician-to-physician academic detailers to share results and discuss best practice	Fourth quarter, 2001
4. Testing a team-based approach to improvement, followed by promotion of this strategy in the network Quality Improvement committee and to poorly performing clinics and physicians	First quarter, 2002
5. Unblinding of individual physician clinical preventive services performance	Second quarter, 2002
6. Publishing a series of preventative service articles in internal group newsletters	Second quarter, 2002
7. Recognition of high achievers in clinical preventive services delivery	Fourth quarter, 2002
8. Discussions regarding linking physician performance to financial incentives	Fourth quarter, 2002
9. Training physicians on rapid-cycle continuous quality improvement strategies	Fourth quarter, 2002
10. Providing "physician champions" with compensated time to develop and disseminate individual process improvement projects	Third quarter, 2003
11. Funding a network-wide ambulatory care improvement champion to focus on disseminating best practices across HealthTexas Provider Network	First quarter, 2005

percent, and the colorectal cancer screening rate to 77 percent in 2009.[21]

Office of Clinical Transformation

The Office of Clinical Transformation works in tandem with the Best Care Committee to improve the way medicine is practiced. Although the BCC has the final say regarding rules on what initiatives will be implemented systemwide, the mission of Clinical Transformation is to define and standardize evidence-based order sets and protocols and then embed them in the EHR. An order set instructs caregivers what course certain procedures should take to ensure that important steps are not left out. Over 28 order sets have been developed and completed, including ones for sepsis, stroke, and hip and knee surgery, and eight sets for obstetrics. Appendix 3 of this paper contains an excerpt of BHCS's Adult Pneumonia Order Set.

TRAINING
Accelerating Best Care at Baylor

In late 2001, senior members of the BHCS and HTPN traveled to Intermountain Health Care/Latter-Day Saints Hospital in Salt Lake City, Utah, to learn how it successfully reformed its delivery of health care through systematic quality improvement. Inspired, the attendees returned to BHCS and created the Physician Champions program, discussed in more detail below, and their own Quality Improvement education pro-

gram. Patterned after the Intermountain model, Accelerating Best Care at Baylor (ABC-Baylor) began in January 2004 with the assistance of Intermountain's Brent James. It features a six-day seminar designed to provide the tools for rapid-cycle process improvement throughout BHCS.[22]

ABC-Baylor uses the strategy popularized by W. Edwards Deming, Plan-Do-Check-Act,[23] as its model for improvement.[24] One physician, Dr. Cliff Fullerton, established a PDCA to improve the number of diabetic patients taking a daily aspirin, an intervention that has been shown as a simple and cost-effective strategy to reduce heart attack and stroke among many diabetics.[25] Among eligible patients, 64 percent at the chosen family practice clinic were taking aspirin, whereas only 51 percent of HTPN diabetic patients over the age of 40 were taking aspirin. The cause of the difference was a lack of provider and patient awareness regarding the benefits of aspirin.[26]

Dr. Fullerton created an Aim Statement, declaring that within six months, all of his type 2 diabetic patients over 40 years old would be documented in their EHR as taking aspirin or there would be a reason shown for its contraindication. Then he followed the PDCA strategy:

- Plan: Gathered data; identified root causes; identified stakeholders.

- Do: Implemented a pop-up reminder in the EHR for relevant patients; sent a letter to

Exhibit 5. Dr. Fullerton's PDCA Results

Percent of diabetic patients taking aspirin

	Pre-PDCA	6 weeks	4 months
	67	84	100
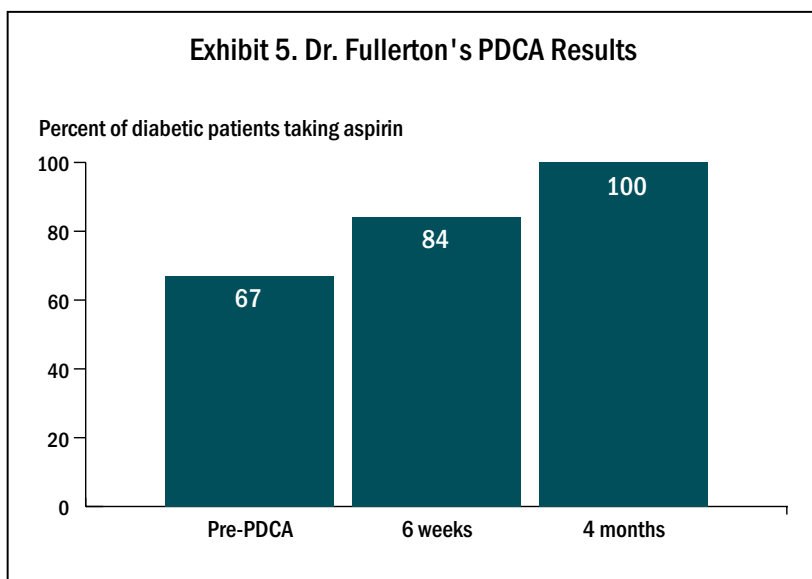
relevant patients reminding them to take aspirin if appropriate.

- Check: Collected data.

- Act: Evaluated success; communicated further with relevant patients still not taking aspirin.[27]

In six weeks, Dr. Fullerton witnessed modest success in the percentage of clinically indicated patients taking aspirin rising from 67 percent to 84 percent. Within four months, he had achieved 100 percent compliance.[28] When physicians have data, strategy, and a goal, major improvements can occur in the health of their population.

As an additional incentive to its providers, BHCS's Quality Improvement Award Program offers multidisciplinary improvement teams cash prizes for demonstrating sustained quality improvement that supports BHCS goals. More than 600 clinicians, administrators, and board members have graduated from the full six-day ABC-Baylor course, and more than 500 unit nurses have completed ABC Fast Track, the one-day accelerated version of the program.[29]

Physician Champions

Returning from Intermountain Health Care, HealthTexas appointed five ambulatory care Physician Champions to join the initial set of BHCS hospital clinical champions appointed in 2000. Physician Champions contractually agree to commit between 4 and 16 hours per week to support Best Care initiatives; they are paid by the hour and have specific expectations and duties. Some are HTPN physicians and some are members of the voluntary medical staffs that serve BHCS. They are paid below their standard market rate, but paid well enough to demonstrate respect for their time (via compensation), combined with commitment to purpose, results in their strong engagement.

Physician Champions' duties include graduating from ABC-Baylor; influencing peers to adopt Best Care Committee initiatives (including EHR and computerized physician order entry usage); developing standardized order sets (a grouping of patient orders for a specific diagnosis or condition);[30] helping define measurable clinical, financial, and patient satisfaction outcomes; being responsible for their improvement on a local level; and serving as needed as a member of the Best Care Committee.

Exhibit 6. Adjusted Effectiveness of Pneumonia Order Sets on Quality of Care*

Quality Indicator	Improvement
Order set use—increase	55%
Reduction of in-hospital mortality versus no order set—average	34%
Compliance with pneumonia core measures** versus no order set—average	23%

Notes: All findings are statistically significant.

*Findings are covariate adjusted for age, sex, race, type of physician (hospitalist), Greenfield comorbidity, APR DRG (risk of mortality or severity), payer type, admission source, hospital, and discharge month.

**Core measures include:
1. PN-1 oxygenation assessment
2. PN-2 pneumococcal vaccination
3. PN-3b blood culture before first antibiotic
4. PN-4 adult smoking cessation advice/counseling
5. PN-5b initial antibiotic received within 4 hours of hospital arrival
6. PN-6a initial antibiotic selection for community-acquired pneumonia (CAP) in immunocompetent ICU patients
7. PN-6b initial antibiotic selection for CAP in immunocompetent non-ICU patients
8. PN-7 influenza vaccination

Source: Ballard, Ogola, Fleming et al., "The Impact of Standardized Order Sets on Quality and Financial Outcomes," in *Advances in Patient Safety: New Directions and Alternative Approaches,* Vol. 2 (Agency for Healthcare Research and Quality, July 2008).

HTPN believes that inspiring a certain number of physicians (numerically represented as *N*) to change requires a number of leaders equal to the square root of the total ($\sqrt{N}$).[31] With 450 HealthTexas members, plus 3,000 additional physicians practicing at BHCS hospitals, 58 physicians is the number necessary to effect change. BHCS budgets $3 million annually to recruit, train, and pay Physician Champions to implement Best Care measures and EHRs.

Physician Champions first pursued more effective delivery of the 11 adult Clinical Preventive Services (CPS) described earlier in the HTPN section. With 10 other physicians from the quality committee, they set out to influence 200 of their colleagues to improve this part of their practice. The results have been substantial: delivery or recommendation of CPS rose to 92 percent by 2006, as described above.

One success of the Physician Champions involved a review of clinical audit data of 13,000 diabetics served by HTPN. The review revealed individual physicians' identities, so that their colleagues were able to associate patient outcomes patterns with the treating physician.[32]

Another quality improvement success of the Physician Champions is the development and implementation of the BHCS Adult Pneumonia Order Set.[33] The execution of this order set is responsible for a 34 percent reduction in in-hospital pneumonia mortality, as well as reductions in 30-day readmission rates for pneumonia over the course of 19 months, between March 2006 and September 2007.[34]

To create its own order sets, BHCS relies on the Physician Design Team, which is a multidisciplinary team that includes Physician Champions, nurses, pharmacists, and ancillary care providers. With Dr. Jeff Kerr's leadership, this team has overseen Champion-led workgroups that have developed Best Care clinical tools and order sets.

QUALITY INNOVATIONS AND SUCCESSES
Electronic Health Records

BHCS began preparing to implement electronic health records (EHRs) in 2005.[35] It took a measured approach to the digitization process, moving toward a paperless system after gaining acceptance of other quality improvement initiatives.[36] BHCS's leaders reason that if they can gain physician and nurse acceptance of Best Care processes and order sets in paper form, there will be little (or less) resistance to these tools in electronic form. In essence, BHCS is standardizing quality processes using paper records prior to implementing EHRs.

In 2005, after input from administrators and physicians, BHCS chose two EHR software products. For outpatient care, BHCS chose General Electric's Centricity Physician Office. For inpatient care, they chose the Eclipsys Sunrise Clinical Manager.

Building on the positive experience of one HTPN practice, Family Medical Center at North Garland, BHCS is using Physician Office, as well as other products and services, to implement an ambulatory electronic health record (AEHR). Centricity is the platform through which clinical and demographic information is integrated. Clinical Content Consultants provide content and clinical decision support. A third-party software program, Kryptiq, provides secure messaging (physician-to-patient and physician-to-physician) and incorporates another application called Docutrack, which provides integrated scanning. Together the individual programs underpin an AEHR that includes integrated clinical decision support, faxing, and scanning; facilitates secure messaging between physicians and between physicians and patients; allows remote access and wireless connection; assists evaluation and management coding; and facilitates development of automated electronic orders cycles. An orders cycle is a "loop" of care whereby a test is ordered, scheduled, performed, and the results conveyed to the patient and provider.[37]

Centricity is available off-site: physicians have access to their patients' EHR anywhere there is an Internet connection, day or night. It also includes a secure messaging function that allows easy communication with patients.[38] Physician Champions have worked to develop a number of BHCS-created disease management tools and integrate them into Centricity, among them decision support, standardized protocols, standardized documentation, data feedback to physi-

cian (such as blood sugar and aspirin use for a physician's diabetic population), patient education material, and data collection methods.[39]

For inpatient care, Eclipsys Sunrise Clinical Manager's computerized physician order entry (CPOE) has a user-friendly interface and is used by physicians to manage orders, build their own order sets, and complete their documentation. Physician Champions have contributed over 2,000 hours to develop and implement over 20 systemwide, evidence-based inpatient order sets.[40] They are now working on design issues, including physician workflow and clinical decision support.[41]

In addition to the Physician Champions, BHCS is creating Medical Directors of EHR Implementation to oversee these issues at the system level; these physicians will lead multidisciplinary teams that will include medical staff leaders.[42]

By the end of 2009, HTPN expects full implementation.[43] Although the two platforms don't exchange data or communicate with each other, BHCS is experimenting with various ways for Centricity and Eclipsys to interact, including the testing of one log-in to view information from both records.[44] Centricity and Eclipsys both allow BHCS physicians to incorporate newly developed order sets, and can be integrated with other hardware, such as an EKG machine.[45]

Heart Failure Clinic

To improve follow-up for heart failure patients and prevent readmissions, the Heart Failure Clinic was launched at the Baylor University Medical Center in 2003. Reforms included redesigning the patient discharge process to emphasize patient education and attendance at follow-up appointments, as well as sharing information from the Clinic with the patient's primary care physician. Follow-up appointments are allowed to occur with either the Heart Failure Clinic or with the primary care physician, as both have access to the same clinical information. Since the launch of the Clinic, 30-day readmission rates have dropped substantially.[46]

In turn, the work of the Clinic led to measuring a number of outpatient processes for treating heart failure, the development of a Heart Failure Ambulatory Toolkit by BHCS, treatment guidelines, and a beta-blocker protocol. The need is clear: congestive heart failure is the most common reason Medicare beneficiaries are admitted to the hospital.[47]

Based on this work, which started in 2003, a four-part heart failure action plan is now being implemented:

1. Deployment of a standardized heart failure order set.

2. Medication reconciliation focused on heart failure.

3. Continuum of care for heart failure inpatients.

Exhibit 7. Congestive Heart Failure (CHF) Readmission Rate

Percent of CHF Readmission Rate
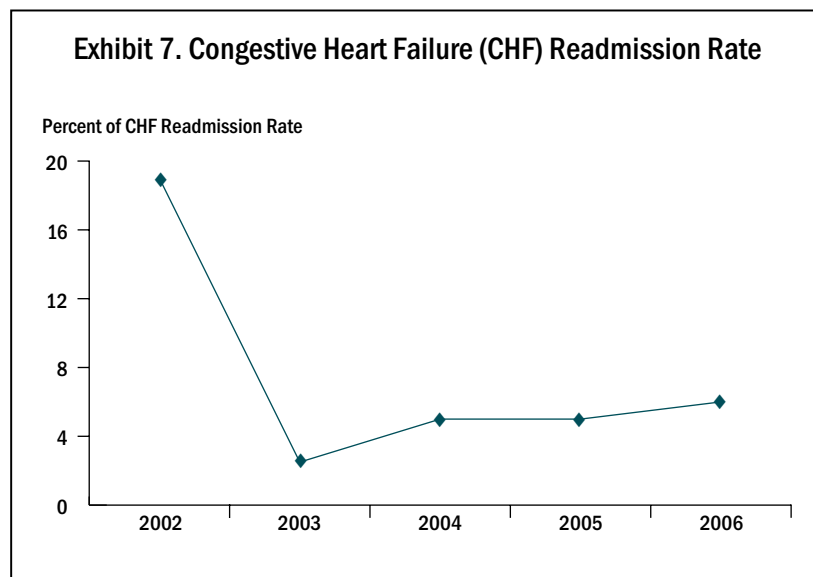
4. End-of-life care, palliative care, and advanced directives.

Although the impact of the standardized heart failure order set on patient outcomes has not been formally evaluated, crude rates of 30-day readmission and risk-adjusted mortality show decreases of approximately 3.5 percent and 1 percent (respectively) with order set use. Additionally, compliance with the All-or-None Heart Failure Core Measures Bundle has increased 2 percent over the first 10 months following order set deployment, December 2007 to October 2008.

Rapid Response Teams

A major component of preventable hospital mortality is attributed to a failure to recognize deteriorating patient condition, which too often leads to a failure to rescue. Rapid Response Teams (RRTs) are among the strategies hospitals have implemented in attempts to reverse this trend. The BHCS RRTs include at least two critical care clinicians—a respiratory therapist to intubate patients if necessary and an intensive care unit registered nurse to assess their cardiac condition—who can respond if a patient needs immediate attention.[48] RRTs are believed to have been an important factor in the decrease in BHCS's risk-adjusted mortality rate.

RRTs were mandated across BHCS by the Best Care Committee and successfully implemented in large part due to Physician Champions. Using protocols developed by the Institute for Healthcare Improvement, the Office of Patient Safety worked with Physician Champions to implement RRTs at all BHCS hospitals. Patients, nurses, and even family members are encouraged to call RRTs before a patient "crashes"—ideally at the first sign of physical or mental deterioration.

Because the first sign of deterioration can be subjective, a judgment call, BHCS produced a movie starring a real patient whose life was saved by an RRT. The 10-minute DVD, distributed to patients, physicians, and staff, demonstrates how to identify a deteriorating patient and when RRTs should be contacted. If the call is later deemed a false alarm, no one is penalized.

The Office of Patient Safety is also teaching nurses in these situations to describe—not analyze—what is happening to a patient. This is achieved through incorporating situation background assessment recommendations (SBARs) into BHCS's nurses' practice. Much like clinical order sets, an SBAR is a standardized procedure meant to improve communication and decrease variation. Quickly but clearly, a nurse will describe the situation (what is happening), the background information (patient information and/or history), assessment (prediction of outcomes), and recommendation (what needs to be done). Once a physician is given this information efficiently, he or she can make a judgment or inquire for more information.

The Office of Patient Safety gives physicians their own version of SBAR: sit back and relax. Often, stressed clinicians try to too quickly elicit information and fail to receive all the pertinent details. When nurses and physicians practice their own version of SBAR, however, all the necessary information is relayed. The Office of Patient Safety also conducts statistical analysis of adverse events to measure cost, payment, and work time issues. A smaller group of safety-oriented Physician Champions disseminates best practices with regard to these issues.[49]

EXPORTABLE LESSONS FROM BHCS

Physician Leadership Is Critical. BHCS's administrators get physician cooperation because they pay for it. As described earlier in this case study, the Physician Champions program pays physicians who are early adopters of quality improvement initiatives and EHRs on a part-time basis to positively influence their peers. As Dr. Couch, the lead Physician Champion, states: "It is unrealistic to expect practicing physicians to dedicate significant time to help the healthcare system advance quality unless compensated for that time."[50]

Physicians are notoriously resistant to outsiders telling them how to practice medicine; physicians—not insurance companies, administrators, or governments—are best suited to communicate with other physicians. As Dr. Phil Aponte told us, success all comes down to a physician's willingness to change. Physicians are more willing to change when they receive advice and instruction from a member of their profession.

Board Leadership Is Critical. BHCS's Boards of Trustees have made quality improvement a major priority. Their leadership includes setting targets for reducing mortality and identifying participation goals relating to quality improvement campaigns such as the Institute for Healthcare Improvement's 100,000 Lives. Similarly, a staffer for Premier, Inc., a group purchasing organization, reported that the hospitals most successful in its Hospital Quality Incentive Demonstration project were those where the Board and physicians took the initiative seriously. If something is a priority for the Board, it becomes a priority for the organization.

Quality Needs an Answer to "Who Says?" The Best Care Committee is the clinical authority for the entire BHCS system; its research, deliberations, and decisions are based on the tools Physician Champions use to improve the quality of care that BHCS patients receive. In addition, information about evidence-based medicine needs to be available to Physician Champions so that they can work with their peers.

Don't Rush into Electronic Medical Records. BHCS leaders reasoned that if they could gain physician and nurse acceptance of Best Care processes and order sets in paper form, there would be little resistance to transitioning these tools into electronic form. They thought that if the clinical staff were already familiar with this new way of managing care, "going electronic" would only improve their ability to be efficient and adhere to protocols. On the other hand, if EHRs were implemented "cold," that is, integrated into practices before Best Care processes and standardized order sets were introduced and adhered to, efforts to transition to EHRs would likely encounter push-back. Peter Orszag, currently director of the Office of Management and Budget in the Obama administration, has made similar statements.[51]

Enable Continuous Learning. The ABC-Baylor program teaches Physician Champions, administrators, Board members, and others the approaches necessary to improve their outcomes and look for new solutions. Educational efforts focus on the PDCA method, how to examine cause and effect, and other analytical tools. These programs allow graduates of ABC-Baylor to initiate their own quality improvement.

Let Doctors Compete. By posting unblinded patient outcome scores on the organizational intranet, BHCS capitalizes on the competitive nature of physicians and their desire to be the best. These side-by-side comparisons make it more likely that physicians will consult a Physician Champion to discuss ideas on how to improve their results.

Learn How to Approach Change. When asked what advice he would give a fictional medium-sized stand-alone hospital, BHCS CEO Joel Allison did not recommend necessarily mimicking any of the innovations described herein. Rather, he recommended the hospital identify goals and then map out a pathway to success. Allison praised the series of books by John P. Kotter on the eight stages of change. Among others, these stages include establishing a sense of urgency, creating a guiding coalition, and developing a vision and strategy.[52] He also commended *Good to Great* by Jim Collins, which describes the management and strategy of the most successful companies.[53]

Some Lessons Might Be Limited to Integrated Systems. BHCS's affiliated physician organization, HTPN, serves as a catalyst for engaging physicians. Another hospital system might have trouble aligning with physicians if the physicians work with multiple hospitals or are in single-specialty groups or very small practices.

CONCLUSION

BHCS's efforts were recognized by several parties in 2008. In May, it received the annual National Quality Healthcare Award from the National Quality Forum and *Modern Healthcare*, and the Leapfrog Patient-Centered Care Award for the engagement and leadership of the BHCS Board in patient-centered care.[54] A few weeks later, Steve Hines and Maulik Joshi published an article, "The Variation in Quality of Care Within Health Systems," naming BHCS the third-highest-performing system in the United States in quality performance, out of 73 systems ranked.[55] HealthTexas Provider Network won the 2008 Top Leadership Teams in Healthcare Award in July for the medical group practices category because of their superb leadership teamwork.[56] In September 2008, *Modern Healthcare* named the Baylor Health Care System one of the top 100 places to work in health care.[57]

Using a governance model such as the Best Care Committee to establish and earn the authority to enforce the delivery of high-quality care allows BHCS the organizational infrastructure to channel and influence the application of professional autonomy toward common goals and best practices in medicine. Accelerating Best Care at Baylor allows for standardized dissemination of the tools used in quality improvement. Physician Champions engage doctors to ensure the success of systemwide initiatives. These three vital elements, in addition to the other innovations described in this case study, allow BHCS to be a continuous learning organization that has improved care substantially over the past decade and shows no signs of slowing.

NOTES

[1] While not the subject of this study, it is important to note that in 1929, Baylor University Hospital served as the birthplace of Blue Cross and modern American health insurance; see P. Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982), 295; P.V. Dutton, *Differential Diagnoses: A Comparative History of Health Care Problems and Solutions in the United States and France* (Ithaca, N.Y.: Cornell University, 2007).

[2] *Baylor University Medical Center Proceedings,* http://www.baylorhealth.edu/proceedings/ (accessed Sept. 17, 2008).

[3] S. M. Shortell, R. R. Gillies, and D. A. Anderson, *Remaking Health Care in America, 2nd Edition* (San Francisco: Jossey-Bass, 2000), 53–59.

[4] R.D. Sekula, "Strong Medicine: How Joel Allison Turned Baylor Health Care System into a Powerhouse of Medical Service," *Smart Business Dallas*, Feb. 2008.

[5] Fact sheet for the Baylor Health Care System, http://www.baylorhealth.com/About/FactsStats/FactSheets/Pages/history.aspx (accessed Sept. 12, 2008).

[6] Ibid.

[7] P. Convery, C. Couch, and J. Baker, *Best Care Update,* April 2008, p. 6.

[8] Ibid.

[9] D.J. Ballard, personal e-mail, July 29, 2008.

[10] P. Convery, personal e-mail, Aug. 5, 2008.

[11] Ibid.

[12] Convery, Couch, and Baker, p. 7.

[13] "Protecting 5 Million Lives," *Institute for Healthcare Improvement* http://www.ihi.org/IHI/Programs/Campaign/ (accessed September 24, 2008); "Baylor News," *BUMC Proceedings,* 2006 19(4): 398–401.

14 Convery, Couch, and Baker, p. 7.

15 Baylor's National Quality in Health Care Award application, submitted 2007.

16 Ibid.

17 C. Couch, *Physician Champion Annual Report—Baylor Health Care System*, Jan. 2008, p. 3.

18 E. A. McGlynn, S. M. Asch, J. Adams et al., "The Quality of Health Care Delivered to Adults in the United States," *New England Journal of Medicine*, June 26, 2003 348(26):2635–2645.

19 D. J. Ballard, D. A. Nicewander, H. Qin et al., "Improving Delivery of Clinical Preventive Services: A Multi-Year Journey," *American Journal of Preventive Medicine*, Dec. 2007 33(6):492–497.

20 D. Ballard, personal e-mail communication, Oct. 23, 2008.

21 B. da Graca, personal e-mail communication, Dec. 23, 2008.

22 *Accelerating Best Care at Baylor Improvement Toolkit*.

23 PDCA (Plan-Do-Check-Act) and PDSA (Plan-Do-Study-Act) are interchangeable; we have used one or the other based on what the organization studied uses. Deming popularized PDCA, often calling it the Shewhart Cycle (after its inventor Walter A. Shewhart), but Deming later changed the "Check" to "Study" to better illustrate the third step. See: 12Manage: Deming Cycle, http://www.12manage.com/methods_demingcycle.html (accessed Oct. 10, 2008).

24 ABC Baylor Improvement Toolkit, p. 4.

25 "Diabetes and Aspirin," American Heart Association, Aug. 15, 2008 http://www.americanheart.org/presenter.jhtml?identifier=3044772 (accessed Sept. 24, 2008); for further reading on possible contraindications, see "Aspirin Does Not Benefit Many Stroke, Heart Attack Patients," *Medical News Today,* Feb. 26, 2008, http://www.medicalnewstoday.com/articles/98609.php (accessed Sept. 24, 2008).

26 C. Fullerton and E. Ballard, "Aspirin Use in Type 2 Diabetics," presentation, 2008.

27 Ibid.

28 Ibid.

29 Couch, p. 5.

30 "Health Policy and Clinical Effectiveness Glossary," Cincinnati Children's Hospital Medical Center, http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/glossary.htm (accessed Sept. 16, 2008).

31 Couch, p. 4; E. Auriol and R. J. Gary-Bobo, "The More the Merrier? Choosing the Optimal Number of Representatives in Modern Democracies," *Vox,* Oct. 9, 2007, http://www.voxeu.org/index.php?q=node/601 (accessed Sept. 12, 2008).

32 C. Fullerton, "Ambulatory Clinical Content and Disease Management," *Physician Champion Annual Report—Baylor Health Care System*, Jan. 2008, p. 17.

33 See Appendix 3.

34 D. J. Ballard, G. Ogola, N. S. Fleming et al., "The Impact of Standardized Order Sets on Quality and Financial Outcomes," *Advances in Patient Safety: New Directions and Alternative Approaches, vol. 2* (Washington, D.C.: Agency for Healthcare Research and Quality, July 2008); J. Kerr, "Inpatient Order Set Development," *Physician Champion Annual Report—Baylor Health Care System*, January 2008, p. 19.

35 EHRs are electronic records of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface—including evidence-based decision support, quality management, and outcomes reporting. (Source: BHCS)

36 D.J. Ballard, B. Spreadbury, and R.S. Hopkins, "Health Care Quality Improvement across the Baylor Health Care System: The First Century," *BUMC Proceedings*, 2004 17(3):286; C. Fullerton et al., "Lessons Learned from Pilot Site Implementation of an Ambulatory Electronic Health Record," *BUMC Proceedings*, 2006 19(4).

37 Fullerton et al., *BUMC Proceedings,* 2006.

38 Ibid.

39 C. Fullerton, "Ambulatory Clinical Content and Disease Management," *Physician Champion Annual Report—Baylor Health Care System*, January 2008, p. 16.

40 J. Kerr, "Inpatient Order Set Development," *Physician Champion Annual Report—Baylor Health Care System*, January 2008, p. 20.

41 Ibid.

42 J.H. Schneider, personal e-mail, July 29, 2008.

43 Couch, p. 10; Fullerton et al., *BUMC Proceedings,* 2006.

44 J. Schneider, personal e-mail, July 29, 2008; D. Bragg, personal e-mail, July 30, 2008.

45 D. Bragg, "GE Centricity Ambulatory Implementation," *Physician Champion Annual Report—Baylor Health Care System*, Jan. 2008, p. 15.

46 "In Their Own Words: Baylor Tells Its Story," *National Quality Healthcare Award Gala Program*, May 15, 2008, p. 18, http://www.qualityforum.org/awards/txNQF_08Awards_ProgramFINAL.pdf (accessed October 10, 2008).

47 D. M. Berwick, T. W. Nolan and J. Whittington, "The Triple Aim: Care, Health, and Cost," *Health Affairs*, May/June 2008 27(3): 759–769; H. M. Krumholz, E. M. Parent, N. Tu et al., "Readmission after Hospitalization for Congestive Heart Failure among Medicare Beneficiaries," *Archives of Internal Medicine*, Jan. 13, 1997 157(1):99–104.

48 "Establish a Rapid Response Team," *Institute for Healthcare Improvement* http://www.ihi.org/IHI/Topics/CriticalCare/IntensiveCare/Changes/EstablishaRapidResponseTeam.htm (accessed Sept. 16, 2008).

49 C. Couch, personal e-mail, July 27, 2008.

50 Couch, p. 11.

51 Congressional Budget Office, "Evidence on the Costs and Benefits of Health Information Technology," May 2008, http://www.cbo.gov/doc.cfm?index=9168.

52 J.P. Kotter, *Leading Change,* 1996*; Heart of Change,* 2002*; Our Iceberg Is Melting,* 2006.

53 J. Collins, *Good to Great,* 2001.

54 J.M. Corrigan, *National Quality Healthcare Award Gala Program*, May 15, 2008, p. 1 http://www.qualityforum.org/awards/txNQF_08Awards_ProgramFINAL.pdf (accessed Oct. 10, 2008).

55 S. Hines and M. S. Joshi, "The Variation in Quality of Care Within Health Systems," *The Joint Commission Journal on Quality and Patient Safety*, 2008 34(6): 331.

56 "Top Leadership Teams in Healthcare Announced by HealthLeaders Media," *HealthLeaders Media*, July 9, 2008 http://www.healthleadersmedia.com/content/214785/topic/WS_HLM2_LED/Top-Leadership-Teams-in-Healthcare-Announced-by-HealthLeaders-Media.html (accessed Sept. 15, 2008).

57 "The Best Places to Work in Healthcare," *Modern Healthcare* http://www.modernhealthcare.com/apps/pbcs.dll/article?AID=/20080908/FREE/309089997/0/FRONTPAGE (accessed Sept.12, 2008).

Appendix 1
Methods Used for the BHCS Case Study

This study's site visit was conducted April 10 and 11, 2008 at Baylor University Medical Center and the offices of BHCS's Institute for Health Care Research and Improvement in Dallas, Texas.

The following individuals were interviewed:

- Joel Allison, FACHE; president and CEO, Baylor Health Care System (BHCS)
- Phil Aponte, M.D.; clinical informaticist, BHCS
- Bill Aston, Board of Trustees, Baylor University Medical Center
- David Ballard, M.D., MSPH, Ph.D., FACP; senior vice president and chief quality officer, BHCS
- Carl Couch, M.D., MMM; senior consultant for clinical excellence and medical director, HTPN
- Marsha Cox, R.N., M.B.A., Ph.D.; ABC BHCS coach, BHCS
- Cliff Fullerton, M.D.; chair, Quality Committee, HTPN
- Julie Gunderson, R.N., B.S.N., MM, CPHQ; director of quality measurement, improvement, and consulting services, BHCS
- Ziad Haydar, M.D.; vice president, health care improvement, BHCS
- Don Kennerly, M.D., Ph.D.; vice president and chief patient safety officer, BHCS
- Roy Lamkin, chairman of the Board of Trustees, Baylor Regional Medical Center at Plano
- Andy Masica, M.D.; hospitalist clinical scholar, HTPN and BHCS
- David Muntz, senior vice president and chief information officer, BHCS
- Kristi Sherrill, vice president, government affairs, BHCS
- Jim Walton, DO; vice president, chief health equity officer, BHCS

Appendix 2
Protocols and Questions Used for BHCS Case Study

Intro
- "Why we're here."
- Please tell us what you do for BHCS.

Issue
- Why did BHCS become early adopters of pay for performance? What was the nature of the problem that you were seeking to address?
- Does much of the focus go toward managing a patient's comorbidities?
- How do you disseminate quality improvement throughout the large BHCS system? Is ABC-Baylor the only way to do so?

Objective and Intervention
- What is the objective of these initiatives? What do you hope to achieve or accomplish?

Target Population
- Whom did each intervention target?

Organization
- How does the intervention fit within your organization's overall mission or strategy?
- What are the advantages of having HealthTexas Provider Network separate from the Baylor Health Care System? Are there any disadvantages? BHCS controls HTPN's budget, so how separate are they?
- What fraction of physicians affiliated with BHCS are employees? What are the specific challenges that your model presents for bringing about change, versus a Kaiser or VA context?
- How does BHCS's improvement strategy differ from its competitors?
- Do you feel that BHCS achieves low administrative costs, or is there waste to cut?

Information Infrastructure
- How—and to what extent—is a patient's clinically relevant information made available to all providers of the care system at the point-of-care?
- How do you assure good communication between providers (for patients seeing multiple providers) and needed support during care transitions—both within and across care settings?

Leadership
- Who are the key people involved or responsible in your quality improvement initiatives?
- How were the initiatives that we discussed initially received?
- How crucial is Board buy-in? How crucial is physician buy-in?

Process of Change
- What was the process, critical steps, or pathways that you undertook to implement these initiatives? How did you go about the work?

- Do physicians volunteer to participate in quality improvement exercises, or do you initiate by asking them? Are the physicians self-selecting or are they required to participate? How did (and does) BHCS encourage physicians to get on board with pay for performance? Is it strictly economic?
- What is the best way to reach resisters (physicians and nonphysicians)?
- What are the specific issues and challenges integrating ABC-Baylor into practice techniques? Are physicians compensated for working with ABC-Baylor or is it a requirement to participate in the system?

Implementation Timeline
- When did you start working on the interventions?
- What were the major implementation milestones?

Key Measures
- What were your quantitative and qualitative measures of impact or success? (Or what were the "dots" or "levers" that you were seeking to move or push?) Do these measures and effects differ by subpopulation? How do measures take into account interactions between the different innovations?
- Throughout all of these, how are the needs of patients with chronic conditions met?

Results
- How do you assess the quantitative and qualitative impact of individual quality components?
- Are there interactive effects among the innovations?
- How critical is physician feedback to improving health outcomes?
- How critical is patient feedback to improving health outcomes; how vital is the "ideal patient experience program" to this effort?

Lessons Learned
- What take away lessons have you learned from your experience?
- What were the critical success factors?
- What challenges did you face and how did you overcome them?
- What advice would you give to someone seeking to replicate your success, for example, opportunities to seek, mistakes to avoid?

Implications
- What public policy issues does this example raise?
- Are there policy issues that must be addressed to enable or promote wider replication?
- Which BHCS innovations would be most transferable to other settings?
- How would wider replication help transform health system performance?

Appendix 3
Example of a BHCS Order Set (First Page)

CLINICAL *transformation*

BAYLOR HEALTH CARE SYSTEM
PHYSICIAN ORDERS
ADULT PNEUMONIA ORDER SET

Date: _____

Admit	Select an order item by placing a mark in the corresponding box ☑ ☒		
Admit Status	**Attending**	**Referring Physician**	**Primary Care Physician**
☐ Inpatient			

☐ Floor
  ☐ Telemetry
  ☐ ICU
  ☐ Other			

☐ Observation			

Diagnosis

1.	4.
2.	5.
3.	6.

☐ Allergies *(list below)* ☐ No Known Allergies	Reaction

Code Status
☐ Full code
☐ Do not resuscitate / Do not intubate (allow natural death)
☐ Other_____

Vital Signs
☐ Vital signs every _____
☐ Neurological checks with vitals every _____

Venous Thromboembolism (VTE) Prophylaxis
✷Best Practice
☑ VTE Risk Assessment and Order Set

Diet

☐ Regular	☐ NPO	☐ NPO except medications
☐ Diabetic diet _____ calories	☐ Cardiac diet	☐ Other: _____

Activity

☐ Bed rest	☐ Out of bed to chair _____ (enter frequency)
☐ Bed rest with bedside commode	☐ Ambulate with assistance _____ (enter frequency)
☐ Bed rest with bathroom privileges	☐ Up ad lib
☐ Activity per physical therapy / occupational therapy (PT / OT) evaluation	☐ Other:

Legend: bpm=beats per minute, BUN=blood urea nitrogen, CAP=community acquired pneumonia, dL=deciliter, FiO₂=fraction of inspired oxygen, g=gram, mmHg=millimeters of Mercury, IV=intravenous, IVPB=intravenous piggyback, JCAHO=Joint Commission on Accreditation of Healthcare Organizations, kg=kilogram, mg=milligram, mL=milliliter, mm=millimeter, NPO=nothing by mouth, PₐO₂=arterial oxygen pressure, PO= by mouth, PR=per rectum, PRN=as needed, q=every, SpO₂=oxygen saturation by pulse oximeter, SDMO=Standing Delegated Medical Order, subcut=subcutaneous, UOM=units of measure

BAYLOR HEALTH CARE SYSTEM

4 9 0 0 4

BHCS-49004 (Rev. 08/06/07)
PHYSICIAN ORDERS
ADULT PNEUMONIA ORDER SET
Page 1 of 6

ABOUT THE AUTHORS

Tom Emswiler is a delivery system consultant for the New America Foundation's Health Policy Program. He is currently pursuing a master's degree in health administration from Virginia Commonwealth University. In addition to investigating health care quality initiatives for the program, he serves as a policy analyst on payment and governance reforms in New America's Medicare Program and is a writer for the New Health Dialogue blog. Previously, Mr. Emswiler served as a senior program associate with New America and as a legislative assistant for U.S. Representative Jim Cooper. He holds a B.A. in political science from James Madison University. He can be emailed at tomems@gmail.com.

Len Nichols, Ph.D., directs the Health Policy Program at the New America Foundation. A highly respected health economist and health policy analyst, Dr. Nichols has also served as a vice president of the Center for Studying Health System Change, a principal research associate at the Urban Institute, and the senior advisor for health policy at the Office of Management and Budget during the Clinton reform efforts of 1993–94. Earlier, he was chair of the economics department at Wellesley College, where he taught for 10 years. He also served as a member of the Competitive Pricing Advisory Commission (CPAC) and the 2001 Technical Review Panel for the Medicare Trustees Reports. Dr. Nichols received his Ph.D. in economics from the University of Illinois. He can be emailed at nichols@newamerica.net.

THE
COMMONWEALTH
FUND