

**Quality Improvement Strategies and Best Practices
in Critical Access Hospitals**

Working Paper Series

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EXECUTIVE SUMMARY

Critical Access Hospitals (CAHs), the smallest rural facilities, face many challenges in implementing quality improvement (QI) initiatives, including limited resources, low volume of patients, small staffs, and inadequate information technology. A primary goal of the Medicare Rural Hospital Flexibility Program (MRHFP) is to improve the quality of care provided by CAHs. The MRHFP has supported implementation of QI activities in CAHs through credentialing and quality assurance requirements, certification survey requirements, and cost-based Medicare reimbursement.

The purpose of the current study is to describe the continuing evolution and maturation of CAH QI activities, and to document the best practices of two CAHs that have developed innovative QI programs. This study is part of the overall monitoring effort of the MRHFP funded by the federal Office of Rural Health Policy. This component included a phone survey of 72 CAHs about their QI activities and in-depth case studies of two CAH “QI best practices” that can serve as models for other CAHs.

The results of the survey and site visits demonstrate that many CAHs are successfully implementing QI strategies, despite the challenges they face. Since conversion, the surveyed CAHs have implemented a wide range of QI activities that have made a significant contribution to improving patient care. These activities include patient safety initiatives; improvements in overall QI processes and peer review processes; and implementation of QI projects focused on treatment of one or more specific diseases such as pneumonia, congestive heart failure, acute myocardial infarction, or stroke. The CAHs are involved with multiple external organizations in these QI activities. Over half of the CAH respondents are working with their support hospitals and with groups of CAHs on their QI activities.

Cost-based Medicare reimbursement has been a key factor in the surveyed CAHs’ ability to fund additional staff, staff training, and equipment to improve patient care. Sixty percent of the CAHs have made staffing changes to improve patient care, most commonly the addition of nursing and ancillary staff. Two-thirds have changed their QI training for staff. The vast majority (83%) have obtained new or replacement equipment to improve patient diagnosis or treatment. Over four-fifths of the surveyed CAHs have implemented one or more clinical guidelines or protocols since conversion.

The two case study CAHs, Lincoln Hospital in Davenport, Washington and Hancock County Memorial Hospital in Britt, Iowa, have strong leadership that is committed to QI. They have made QI a priority for their hospitals, dedicated resources to QI activities, and worked with their support hospitals, statewide organizations and other CAHs to develop and implement rural-relevant QI initiatives.

Lincoln Hospital has developed a comprehensive QI process that involves all departments in the hospital. The hospital has hired a full-time QI coordinator and is collecting data on several quality indicators. It has increased on-site pharmacist staffing, purchased medication dispensing equipment and implemented telepharmacy services, to improve pharmaceutical care and medication safety. The hospital's contractual relationship with a family physician from Holy Family Hospital in Spokane for peer review activities has resulted in a positive process focused on improvement of care.

Lincoln Hospital has become a peer review model for other CAHs in Washington, and has taken an active role in development of a statewide CAH Quality Network, working in cooperation with several other CAHs. The network's plans to share quality data for benchmarking, and ultimately to develop rural-relevant standards of care, have potential to improve the quality of care provided by all CAHs in Washington.

The QI process at Hancock County Memorial Hospital (HCMH) is collaborative, and involves staff from throughout the hospital. The hospital collects data on quality indicators and benchmarks the data with several other Mercy Network hospitals in Iowa. HCMH's highest priority quality issue is patient safety, with a focus on medication errors and patient falls. It is implementing several patient safety initiatives internally, as well as joining with other Mercy Network hospitals to form the Patient Safety Health Care Network of North Iowa.

Membership in the Mercy System benefits HCMH's QI program in several ways. HCMH management and staff have access to Mercy Medical Center staff expertise, including a Project Consultant who works with all the small rural hospitals in the network on QI activities, and the system's information technology. They also have peer groups of individuals in similar positions at other small rural hospitals in the Mercy Network (e.g., administrators, directors of nursing, and pharmacists), with whom they work on quality issues.

By converting to CAH status and obtaining rural health clinic status for their primary care clinics, both Lincoln Hospital and HCMH have financially stabilized their local health care systems. Federal CAH requirements gave Lincoln Hospital an opportunity to develop a contractual relationship with Holy Family Hospital in Spokane for peer review, and helped to formalize relationships with regard to QI activities between small rural hospitals in the Mercy Network, including HCMH, and Mercy Medical Center. The availability of cost-based Medicare reimbursement has allowed both hospitals to allocate additional funds for quality-related activities and to implement new QI initiatives.

INTRODUCTION AND PURPOSE OF STUDY

Two landmark Institute of Medicine reports focused national attention on health care quality and patient safety issues (IOM, 2000; 2001). Since then, national and state hospital organizations, federal health care agencies, not-for-profit organizations, and business coalitions have promoted voluntary efforts to measure and improve quality, especially in hospital environments (American Hospital Association, 2004; National Quality Forum 2002a; 2002b; Centers for Medicare and Medicaid Services (CMS), 2003; Agency for Healthcare Research and Quality, 2003). The Prescription Drug, Improvement and Modernization Act of 2003 takes these efforts a step further by linking Medicare reimbursement to hospitals' quality reporting (CMS, 2003).

Rural health care providers face many challenges in implementing quality improvement (QI) initiatives, including limited resources, low volume of patients, small staffs, and inadequate information technology (Calico et. al., 2003; National Advisory Committee on Rural Health, 2003). The environment is especially difficult for Critical Access Hospitals (CAHs), the smallest rural facilities.

A primary goal of the Medicare Rural Hospital Flexibility Program (MRHFP) is to improve the quality of care provided by CAHs. The MRHFP has supported implementation of QI activities in CAHs in three major ways. First, it requires CAHs to have an agreement for credentialing and quality assurance with a support hospital; a peer review organization or equivalent entity; or another appropriate and qualified entity identified in the State rural health care plan. These credentialing and quality assurance requirements have encouraged many CAHs

to expand their existing relationships and develop new relationships with support hospitals, statewide organizations, and other CAHs to conduct quality-related activities. Second, hospitals converting to CAHs must undergo a certification survey by state officials, which focuses attention on quality of care issues. Third, through Medicare cost-based reimbursement, the MRHFP provides CAHs with additional financial resources that can be used to conduct quality-related activities.

Previous surveys and site visits have documented multiple strategies used by CAHs to enhance their QI activities (Moscovice and Gregg, 2001; Moscovice et. al., 2002). The purpose of the current study is to describe the continuing evolution and maturation of CAH QI activities, and to document the best practices of two CAHs that have developed innovative QI programs. This study is part of the overall monitoring effort of the MRHFP funded by the federal Office of Rural Health Policy. This component included a national phone survey of CAHs about their QI activities and in-depth case studies of two CAH “QI best practices” that can serve as models for other CAHs.

CAH SURVEY DESIGN

The University of Minnesota Rural Health Research Center conducted the telephone survey of CAHs in March and April 2003. The 75 CAHs surveyed were selected based on their responses to a previous survey of 388 CAHs conducted in late 2001 and early 2002 (Moscovice et. al., 2002). The selected CAHs represented the top 20% of composite scores on several quality-related scales. These scales measured the CEO’s assessment of the extent to which the CAH’s quality-related activities such as medical error reporting policies and QI training

initiatives had improved since conversion, as well as the CAH's participation in QI activities with Medicare Quality Improvement Organizations (QIOs), state hospital associations, and support hospitals.

The 75 CAHs in the survey sample are located in 24 different states. They had all been certified as CAHs for a minimum of two years prior to being surveyed. Eight facilities were certified between 1995 and 1998; 16 in 1999; 41 in 2000; and 11 in early 2001. Two hospitals closed prior to being surveyed, reducing the sample to 73 CAHs. Seventy-two hospitals responded to the survey, for a response rate of 98.6%. The surveys were conducted with the hospital administrator and/or another individual identified by the administrator as being the most knowledgeable about QI activities in the hospital. The respondents included 63 administrators and 42 other individuals (e.g., QI Directors, Directors of Nursing, and Directors of Patient Services).

The survey respondents were first asked to describe the QI activity that has made the most significant contribution to improving patient care since conversion to a CAH, including staffing and funding, involvement of external organizations, collection of data to support the activity, and evaluation. Next, respondents were asked about other changes the CAH had made since conversion, including: 1) staffing and equipment changes to improve diagnosis or treatment of patients; 2) changes in QI training for staff; 3) changes in the provision of feedback to staff regarding quality issues; and 4) new activities in the area of clinical guidelines or protocols. These four areas were selected based on the frequency of responses to an open-ended question in the 2001-02 survey about the activity that had made the most significant contribution

to improving quality of care in the hospital.

SURVEY RESULTS

Most Significant Quality Improvement Activity

Sixty-four of the 72 CAHs surveyed (89%) described a positive change in their QI program following conversion to a CAH. Survey respondents described a diverse range of activities as the QI activities that have made the most significant contribution to improving patient care since conversion (Table 1). The most frequent categories of responses were: 1) patient safety initiatives (e.g., infection prevention, implementation of medication dispensing equipment to reduce medication errors, alarms to prevent patient falls, prevention of decubitus ulcers); 2) improvement of the overall QI process; 3) improvement of the peer review process (e.g., implementing external chart review, conducting focused review of ER charts, set up of peer review process with other CAHs and/or support hospital); and 4) implementation of a QI project focused on treatment of one or more specific diseases (e.g., pneumonia, congestive heart failure, acute myocardial infarction, or stroke). Other significant activities included improvement in transfer processes; implementation of QI processes used by the CAH's support hospital; addition of new services; and improvements in staffing.

The majority of respondents (81%) reallocated staff from within the hospital to staff the new QI activity (Table 2). Small numbers of CAHs used contract staff or consultants to staff the initiatives, and hired new staff. Sixty-four percent of CAHs funded the QI activity internally; 22% used grant funds; and 13% used a combination of internal funds and grants. The large proportion of funding from hospital budgets suggests that these QI activities have considerable

TABLE 1

**Quality Improvement Activity That Has Made the Most Significant Contribution to
Improving Patient Care Since CAH Conversion
(n = 72)**

Activity	Number (%) of CAHs	
Patient safety initiatives	12	(16.7%)
Improvement of overall QI process	10	(13.9%)
Improvement of peer review process	8	(11.1%)
Implementation of a QI project focused on treatment of one or more specific diseases	8	(11.1%)
Improvement of process of transferring patients from the CAH to other hospitals	5	(6.9%)
Other activities	21	(29.2%)
No changes in QI post-conversion	8	(11.1%)

TABLE 2

**Staffing and Funding of Most Significant Quality Improvement Activity
(n = 64)**

	Number (%) of CAHs
Staffing	
New Staff	7 (10.9%)
Reallocated Staff	52 (81.2%)
Contract/consultant	5 (7.8%)
Funding	
Hospital budget	41 (64.0%)
Grant funds	14 (21.9%)
Hospital budget and grant funds	8 (12.5%)
Loan from support hospital	1 (1.6%)

internal value for the CAHs.

A variety of external organizations were involved in these QI activities (Table 3). The CAH's support hospital and a group of other CAHs were the organizations most likely to be involved, followed by a hospital network, State Office of Rural Health, and State Hospital Association. Several CAHs described important relationships with their support hospitals:

“We receive information from (support hospital)...they are a larger facility and able to look at the QI issues... Our top priority has always been patient care...but having a resource enabled us to implement programs with other hospitals and benchmark with hospitals in the network to see where we are, e.g. how fast turnover is in the ER, etc.”

“Our affiliated hospital is part of the team.....we teleconference two times a month to see if the project is going well.”

Other CAHs described working with other CAHs in a network or group on peer review, standards of care, and other quality-related issues:

“Our network hospital has a QI director who took all the QI directors from CAHs and developed a new peer review process...Providers from our hospital send blind records to another hospital and their providers do the peer review process...we were able to look at outside information from other providers...We are all small rural hospitals in the same situation.”

Staffing Changes

A significant proportion of CAHs (60%) indicated that they have made staffing changes that have improved patient diagnosis or treatment since conversion (Table 4). The most frequently reported types of staffing changes were the addition of nursing staff and ancillary staff, each reported by 14 CAHs. Eight CAHs reported adding physicians, while five CAHs each added physician assistants and/or nurse practitioners, and QI staff. Other staffing changes included increased compensation for nurses, filling of vacancies, and changing from census

TABLE 3

**Involvement of External Organizations in Most Significant Quality Improvement Activity
(n = 64)**

Organization	Number (%) of CAHs
Support hospital	38 (59.4%)
Group of CAHs	33 (51.6%)
Hospital network	28 (43.8%)
State Office of Rural Health	23 (35.9%)
State Hospital Association	20 (31.3%)
Quality Improvement Organization	17 (26.6%)
Hospital system	12 (18.8%)
Joint Commission on Accreditation of Health Care Organizations	10 (15.6%)
Other	4 (6.3%)

TABLE 4

Staffing Changes That Have Improved Patient Diagnosis or Treatment Since CAH Conversion
(n = 72)

Type of staffing change	Number (%) of CAHs
Added nursing staff	14 (19.4%)
Added ancillary staff (e.g. lab, radiology)	14 (19.4%)
Added physicians/medical staff	8 (11.1%)
Added physician assistant/nurse practitioner staff	5 (6.9%)
Added QI staff	5 (6.9%)
Added other administrative or professional staff (e.g. social worker)	4 (5.6%)
Added pharmacist	2 (2.8%)
Added paramedics	1 (1.4%)
Other	5 (6.9%)
No changes	29 (40.3%)

¹Some CAHs reported more than one type of staffing change.

based staffing to fixed staffing.

Several CAHs indicated that improved Medicare reimbursement had allowed the hospital to increase staffing and improve wages. One survey respondent said, “Conversion to CAH allowed the hospital to remain open and have money to recruit primary care physicians. We utilized Flex grant money for recruitment fees...Used extra money with cost-based reimbursement to help afford startup costs to set them up.” Another respondent noted, “We are able to fill vacancies...with CAH conversion we were able to increase the pay scale in nursing... now we can recruit and retain...before we were a rotating door.”

Equipment Changes

The vast majority of surveyed CAHs (83%) have obtained new or replacement equipment that has improved patient diagnosis or treatment since conversion (Table 5). The top categories of new or replacement equipment were CT scanners, radiology-related equipment, and lab equipment. The primary source of funding for these equipment purchases was the CAH itself. Additional funding sources included grants; foundation gifts and loans; revenue bonds; and part ownership of equipment through a cooperative.

Improved Medicare reimbursement was a key factor that allowed many CAHs to purchase new equipment that improved patient care. Examples of comments from survey respondents included:

- “Conversion to CAH enabled us to implement an electronic network of communication and have widespread use of PCs.”
- “The hospital converted to CAH status to survive...We are getting to the point where we can buy new equipment. In the past we only replaced old equipment.”

TABLE 5

**Equipment Changes That Have Improved Patient Diagnosis or
Treatment since CAH Conversion
(n = 72)**

Type of equipment	Number (%) of CAHs ¹
CT scan	21 (29.2%)
Radiology/teleradiology/telemetry/T-1 line	18 (25.0%)
Lab equipment/chemistry analyzer	18 (25.0%)
Computers/electronic medical records/software	9 (12.5%)
Defibrillators/crash carts	8 (11.1%)
Mammography	7 (9.7%)
Cardiac monitor/patient monitoring equipment	7 (9.7%)
Bone density measurement	7 (9.7%)
Surgical/laser surgery/anesthesia equipment	6 (8.3%)
Cardiac stress testing/cardiac rehabilitation	5 (6.9%)
Hospital beds/transfer stretchers	5 (6.9%)
Ultrasound	5 (6.9%)
Other	16 (22.2%)
No changes	12 (16.7%)

¹Some CAHs reported more than one type of equipment change.

- “With the T-1 line we can send trauma information immediately. We could not have afforded this prior to CAH, could not have gotten it if we were not a CAH hospital.”

Changes in Quality Improvement Training for Staff

Two-thirds of the surveyed CAHS have changed their QI training for staff since conversion (Table 6). The most frequently reported type of change involved increasing the amount of or upgrading the in-service training provided to staff or increasing the coverage of QI issues in staff meetings (16 CAHs). Seven CAHs have increased staff participation in conferences sponsored by the QIO, state hospital association, or a regional network, and six CAHs have implemented some type of computer-based learning.

Provision of Feedback to Staff Regarding Quality Issues

Sixty-one percent of the CAHs have made one or more changes in the way they provide feedback to staff regarding quality issues (Table 7). The most frequently cited changes relate to the provision of QI information at meetings and the peer review process used by the hospital. Other changes included methods of communicating with staff and the hospital board regarding quality issues.

Use of Clinical Guidelines/Protocols

Over four-fifths (81%) of CAHs have implemented one or more clinical guidelines or protocols since conversion (Table 8). The most frequently mentioned protocols are congestive heart failure, pneumonia, acute myocardial infarction, diabetes, and chest pain. CAHs also report using guidelines addressing other conditions (e.g., stroke, abdominal pain, pulmonary embolism); specific settings and procedures (e.g., Emergency Department, rapid sequence

TABLE 6

**Changes in Quality Improvement Training for Staff Since CAH Conversion
(n = 72)**

Type of training	Number (%) of CAHs¹
Increase/upgrade in-service training/QI meetings	16 (22.2%)
QIO/state hospital association/regional network conferences	7 (9.7%)
Implemented computer-based/web-based learning	6 (8.3%)
Training in consultation with support hospital	4 (5.6%)
ACLS/PALS training	4 (5.6%)
Restructure QI training (e.g. focus on benchmarks; more structured process)	4 (5.6%)
Other	17 (23.6%)
No changes	24 (33.3%)

¹Some CAHs reported more than one type of training change.

TABLE 7

**Changes in Provision of Feedback to Staff Regarding
Quality Issues Since CAH Conversion
(n = 72)**

Type of change	Number (%) of CAHs¹
Increased QI meetings/discussion with staff, management, medical staff	17 (23.6%)
Improved peer review process/external peer review/chart audits	13 (18.1%)
Improved communication with staff/share more, better information	8 (11.1%)
Implemented hospital newsletter	4 (5.6%)
Provide feedback to board on quality	3 (4.2%)
Other	5 (6.9%)
No changes	28 (38.9%)

¹Some CAHs reported more than one type of change.

TABLE 8
Clinical Guidelines/Protocols Implemented Since CAH Conversion
(n = 72)

Type of Guideline/Protocol	Number (%) of CAHs ¹
Congestive Heart Failure	30 (41.7%)
Pneumonia	28 (38.9%)
Acute Myocardial Infarction/Cardiac	13 (18.1%)
Diabetes	8 (11.1%)
Chest Pain/Angina	7 (9.7%)
Appropriate use of antibiotics/prophylactic antibiotics/infection control	4 (5.6%)
Atrial fibrillation	4 (5.6%)
Other	42 (58.3%)
In process of developing protocols	4 (5.6%)
None	13 (18.1%)

¹Some CAHs reported implementing multiple guidelines/protocols.

intubation); and hospital-wide issues (e.g., pain management, bioterrorism, and handwashing).

The most common sources for the clinical guidelines used by CAH are the Medicare QIO and the CAH's support hospital, followed by staff from the individual CAH and/or a group of CAHs (Table 9). (Respondents did not indicate whether these organizations actually developed the guidelines being used, or disseminated guidelines from other organizations). One respondent described an effort to implement protocols for several diseases:

“A group of six CAH hospitals formed a coalition and meet every other week. We took different diseases - pneumonia, CHF, stroke and AMI - and made criteria for care, we look at discharge teaching and packets for patients to bring home...We try to make all 6 hospitals' standards the same. We are now working on moving this program statewide.”

Key Survey Findings

- Since conversion, CAHs have implemented a wide range of QI activities that have made a significant contribution to improving patient care, including patient safety initiatives; improvement of the overall QI process; improvement of the peer review process; and implementation of QI projects focused on treatment of one or more specific diseases such as pneumonia, congestive heart failure, acute myocardial infarction, or stroke.
- A wide variety of external organizations were involved in the CAHs' QI activities. Over half of CAHs have worked with their support hospitals and with groups of CAHs on their QI activities.
- Sixty percent of CAHs have made staffing changes to improve patient care; the most frequent changes were the addition of nursing and ancillary staff. Two-thirds of CAHs changed their QI training for staff. The vast majority of CAHs (83%) obtained new or replacement equipment to improve patient diagnosis or treatment. Over four-fifths of CAHs have implemented one or more clinical guidelines or protocols since conversion.
- Cost-based Medicare reimbursement has been a key factor that has allowed many CAHs to fund additional staff, staff training, and equipment to improve patient care.

CASE STUDY DESIGN

From the 72 CAHs in the QI survey, two CAHs were selected for case studies based on their potential to serve as “best practice” sites that could be models for other CAHs. QI survey

TABLE 9

**Sources of Clinical Guidelines/Protocols
(n = 55)**

Sources of Clinical Guidelines/Protocols	Number (%) of CAHs
Quality Improvement Organization	15 (27.3%)
Support Hospital	12 (21.8%)
CAH staff/Group of CAHs	7 (12.7%)
State Hospital Association	5 (9.1%)
American Heart Association, American Diabetes Association	4 (7.3%)
Consultant	4 (7.3%)
State guidelines	3 (5.5%)
Other	5 (9.1%)

responses were reviewed and follow-up phone calls with CAH administrators were made to identify CAHs that were actively engaged in significant QI activities, and working in collaboration with other CAHs. The site visits were conducted at Lincoln Hospital, in Davenport, Washington in late July 2003 and Hancock County Memorial Hospital, in Britt, Iowa in early September 2003. For each case study, two researchers from the University of Minnesota Rural Health Research Center visited the hospital and conducted interviews with key individuals involved with QI activities at the CAH (e.g., the CEO, Medical Director, Director of Nursing, QI Director, and pharmacist) and other organizations involved in CAH QI activities as appropriate (e.g., CAH network staff, and support hospital staff).

CASE STUDY OF LINCOLN HOSPITAL, DAVENPORT, WA

Background

Lincoln Hospital is located in Davenport, Washington, a community of 1,720, approximately 35 miles from Spokane. The hospital currently has 25 beds, including swing beds, and has an attached Skilled Nursing Facility. In 2000, Lincoln Hospital had 677 admissions; a total of 23,155 inpatient days; 1,774 emergency room visits; 44 inpatient surgeries; and 345 outpatient surgeries. The hospital owns three medical clinics in Davenport, Wilbur, and Reardan, which are certified rural health clinics.

The medical staff at Lincoln Hospital includes three full-time and two part-time family physicians, a general surgeon, two nurse practitioners, and two physician assistants, all of whom are employed by the hospital. Specialty services provided by visiting specialists from Spokane include urology, ophthalmology, orthopedics, oncology, and cardiology. Mammography,

ultrasound, fluoroscopy, CT scan, and mobile MRI services are available at the hospital. A teleradiology connection enables radiologists in Spokane to read and interpret films from the hospital 24 hours a day, seven days a week. The community physicians cover the hospital emergency department.

Lincoln Hospital converted to a CAH in August 2000. Prior to conversion, the hospital and local medical practices were under financial stress. The medical staff supported CAH designation, because cost-based reimbursement was essential for survival of the hospital and their practices. Cost-based reimbursement has also provided Lincoln Hospital with additional resources to address quality issues.

Quality Improvement Initiatives

Until about three years ago, Lincoln Hospital had a traditional quality assurance program. The hospital developed QA indicators, but the process lacked focus and was done only because it was required by Medicare and State licensure. Now, however, the hospital's overall approach to QI and the attitude of hospital staff toward quality-related activities is changing. QI is seen as a hospital-wide effort that involves all departments, and as described by one staff member, "it has become a daily occurrence rather than a quarterly report."

Under the leadership of the CEO, who is strongly committed to QI, Lincoln Hospital has implemented several initiatives to improve the quality of care provided to patients. The hospital has developed a comprehensive QI process, and employs a Balanced Scorecard management approach focused on improving strategic performance in four areas: clinical, financial, safety, and consumer satisfaction. It has revised and expanded its peer review process, hired a full-time

QI coordinator, and made changes in pharmacy staffing and equipment to improve medication safety. The hospital is collecting data on quality indicators, and is working in cooperation with several other CAHs in Washington to develop a statewide CAH Quality Network that will benchmark quality data.

Quality Improvement Process

The Quality Improvement Committee, whose members include representatives of the Board of Directors and the medical staff, the hospital administrator, the vice president of clinical services, and the QI coordinator, is responsible for overall management of the hospital's QI program. The QI Committee oversees each hospital department's identification and correction of quality-related problems, and reviews formal reports from the hospital departments at its monthly meetings. Within the overall Balanced Scorecard framework, each department develops a plan that assigns responsibility for departmental monitoring and evaluation activities, and identifies the scope of care/services, aspects of care/services to be addressed, and the use of indicators and review criteria.

Historically, Lincoln Hospital was similar to many rural hospitals in assigning responsibility for quality assurance to an administrative coordinator with multiple other job responsibilities. However, in January 2003, the hospital hired a full time QI Coordinator to assist medical, nursing, and other hospital staff in developing and implementing a process for collecting data on quality indicators. The QI coordinator reviews a total of 25 to 30 patient charts a week, including all observation patients, and a sample of inpatient, outpatient, and emergency patients. The initial focus of chart review was on corporate compliance with

Medicare requirements, for example, documentation of reasons for observation, and the presence of signed consent forms, advance directives, and orders for billed items. A second phase of chart review is addressing compliance with clinical protocols for the care of patients with chest pain/acute myocardial infarction and community acquired pneumonia. The results of the chart audits are reviewed monthly by a Quality Task Force, whose members include the vice president of clinical services, the director of acute care nursing, the administrative coordinator, and the QI coordinator. Individual profiles are shared with each member of the medical staff.

Changes in Peer Review and Privileging

Prior to CAH conversion, it was a challenge to conduct peer review with only four physicians on staff. The hospital tried to conduct peer review activities on a quarterly basis with nearby rural hospitals, but the lack of comparable services in those facilities limited the acceptability of this process. The federal requirement for outside oversight of CAH quality of care gave Lincoln Hospital an opportunity to consider other options for peer review.

The hospital decided to contract with Holy Family Hospital in Spokane for peer review, using the services of a family practice physician who was the Vice President for Medical Affairs at Holy Family. He previously practiced for several years in a rural setting in Alaska and thus is familiar with rural practice, and also has a master's degree in Medical Management. He draws upon his relationships with specialists in Spokane who can assist with review of specialized cases. Under the contract, he conducts chart reviews once a month for about 4 to 6 hours on-site at Lincoln Hospital.

A list of indicators are used to select charts for review. For example, the general screening criteria for inpatients and outpatients include mortality that was not expected at admission, unscheduled readmission for the same problem, a discharge diagnosis that differs from the admission diagnosis, nosocomial infection, and transfers to another facility. The physician reviewer uses a standardized set of chart review questions that address whether the diagnoses and conditions were identified correctly, the treatment was appropriate and effective, communication was effective, and documentation was complete. For example, transfer charts are reviewed to assess whether the transfer was justified based on the patient's condition, if it occurred too early or too late, and whether appropriate care was provided until the transfer. The physician reviewer gives each case a score from 0 to 4, with 3 being an adverse outcome, and 4 a serious adverse outcome. He looks for trends, and then meets with the medical staff to discuss the trends and issues that arise during the reviews.

The overall focus of the peer review process is on how care can be better, and discussions of identified cases are viewed as learning opportunities. A physician on the medical staff describes the new approach as "more positive" and "a much healthier process." The physicians find it useful to have information about changes in practice brought to them (e.g., how cardiologists are using beta blockers).

The hospital is also implementing formal processes for credentialing and privileging. In the past, the medical staff decided which procedures each physician would do, and the hospital board approved it. The process was informal, as is typical of many rural hospitals. With the assistance of the physician peer reviewer, the hospital is implementing a more formalized

process, and developing relationships with specialists in Spokane for formal proctoring opportunities. To assure that they are proficient to do specialized procedures, local physicians either go to Spokane for proctoring or have a Spokane physician come out to Davenport to work with them.

Quality-Related Changes in Services and Use of Protocols

Lincoln Hospital stopped providing obstetrical services about a year ago. The county only has about 100 births a year. Some of these births are high risk and need to be delivered in Spokane, while other obstetrical patients choose to go Spokane. Although it was a difficult decision to stop providing obstetrical services, the low volume of births and very few C-sections done at the hospital resulted in a degree of risk that the hospital administration found unacceptable.

As part of efforts to focus QI activities on patient outcomes, Lincoln Hospital is examining best practices and implementing several clinical protocols, including cardiac care, community acquired pneumonia, diabetes, and appropriate use of antibiotics.

Pharmacy and Medication Safety

Over the past year, Lincoln Hospital enhanced its capacity to improve the quality of pharmaceutical care and medication safety through increased pharmacy staffing and the purchase of computerized medication ordering and dispensing equipment. For several years, a part-time pharmacist handled the hospital pharmacy responsibilities in addition to full-time work in a retail pharmacy, leaving little time for quality activities in pharmacy. A year ago, the hospital hired a pharmacist to work exclusively in the hospital for 30 hours per week. She recently began

receiving assistance from a part-time pharmacy technician.

For the past six months, the pharmacist has been working to implement PYXIS, a computerized medication ordering and dispensing system, in the hospital, and a telepharmacy connection with Sacred Heart Hospital in Spokane. Lincoln Hospital was one of four rural hospitals that received a \$175,000 grant from Inland Northwest Health Services (a non-profit corporation formed by the major Spokane health systems, Empire Health and Providence Services of Eastern Washington) to cover the costs of purchasing the PYXIS machine, software, and training.

With the PYXIS system, the hospital is changing from handwritten medication administration records (MARs) to computerized entry and review of medication orders by the pharmacist, and from having the pharmacist set up the medications for each patient to having nurses retrieve patient medications from the PYXIS machine. When the telepharmacy program is fully implemented, the charge nurse at Lincoln Hospital will be able to place a physician's medication order on a scanner, and send it to the Sacred Heart hospital pharmacy for pharmacist review after hours. Once the order is verified, it will be transmitted to the PYXIS machine, where the charge nurse can access the medication. Use of the PYXIS system and telepharmacy are expected to reduce transcription errors and dosing errors.

The pharmacist also has been working on the implementation of protocols related to standards of care for patients with certain diseases, for example, regarding the use of heparin, and antibiotic selection for pneumonia patients. The hospital's future plans for pharmacy quality-related activities include developing a more formal program of tracking medication

errors, establishing a quality assurance program for telepharmacy and PYXIS, and conducting standard of care quality audits on prescribing practices and trends. The pharmacist would also like to have more staff education and development regarding new medications.

CAH Quality Network

Lincoln Hospital was one of the first CAHs certified in Washington State. The state health officials who conducted their CAH certification survey were very positive about the peer review process at Lincoln Hospital. They told other rural hospitals about it, and several additional rural hospitals in Eastern Washington subsequently set up similar peer review processes through contracts with Holy Family Hospital for the services of the same physician. Many of these hospitals are part of the Providence System, as is Holy Family Hospital.

In 2002, ten rural hospitals in Eastern Washington, including Lincoln Hospital, began the process of formalizing a CAH Quality Network, to legitimize the sharing of quality information and benchmarking, and to obtain legal protection against discovery of the peer review data. The Washington Department of Health contracted with the Washington Health Foundation to help start the CAH Quality Network. The Washington Health Foundation, a non-profit organization that was previously part of the state hospital association, historically has had a strong rural health program, and has awarded many grants to rural health care facilities. It has helped to fund consulting services for the CAH Quality Network, and has provided the network with a quality consultant who has legal and nursing experience, to assist with network development.

As of July 2003, the physician peer reviewer from Holy Family Hospital was working with 11 CAHs and one non-CAH rural hospital, along with three rural health clinics. He will be

working full time for the CAH Quality Network, but will continue to be an employee of Holy Family Hospital for insurance and benefit purposes. The network will contract with Holy Family for his time. Because network members are located throughout the state of Washington, the network will need to recruit another physician to help provide consulting and services to the facilities on the west side of the state.

After the process of establishing the CAH Quality Network began, several rural hospitals on the west side of the state asked to join. As of July 2003, the network was legally incorporated, and 21 hospitals throughout the state of Washington (including 19 CAHs and two hospitals in the process of applying to be CAHs) had joined the network. The members have elected a governing board and are helping to fund the network infrastructure. In return, they will be able to obtain services from the network, including peer review and credentialing services, at cost. Network members will be able to choose the activities in which they want to participate; some members want to use the network for peer review and credentialing, as well as sharing quality data for benchmarking, while others only want to share data. In the future, the network will develop a list of services that will be available to non-members on a cost plus basis. Ultimately, the network wants to develop rural-relevant standards of care for its member hospitals.

Key Aspects of QI at Lincoln Hospital

- Located only 35 miles from Spokane, Lincoln Hospital faces competition from several urban hospitals. This competitive pressure has motivated the hospital to demonstrate that its quality of care is equivalent to that of the urban hospitals.
- At the same time, the hospital's relative proximity to Spokane also provides opportunities such as proctoring of Davenport physicians by Spokane specialists. Lincoln Hospital has effectively used technology and financial resources from urban-based health care organizations in Spokane to supplement hospital staffing through teleradiology and telepharmacy services. Availability of these services improves access to care for Lincoln

Hospital patients, and has the potential to improve the quality of care and reduce medical errors.

- Lincoln Hospital has strong and visionary leadership that is committed to QI, has effectively communicated that commitment to hospital staff, and dedicated resources to QI activities.
- By converting to a CAH and obtaining rural health clinic status for its primary care clinics, Lincoln Hospital has financially stabilized the health care system in Davenport and nearby rural communities. Cost-based reimbursement allows the hospital to allocate additional funds to QI activities.
- The hospital's contractual relationship with the family physician from Holy Family Hospital in Spokane for peer review activities has resulted in a positive process focused on improvement of care. It has become a peer review model for other CAHs in Washington.
- Lincoln Hospital has taken an active role in development of the statewide CAH Quality Network in Washington. The network's plans to share quality data for benchmarking, and ultimately to develop rural-relevant standards of care, have potential to improve the quality of care provided by all CAHs in Washington.

CASE STUDY OF HANCOCK COUNTY MEMORIAL HOSPITAL, BRITT, IA

Background

Hancock County Memorial Hospital (HCMH) is located in Britt, Iowa, a community of 2,052, approximately 32 miles from Mason City. HCMH currently has 25 beds, including swing beds. In 2000, the hospital had 449 admissions; a total of 2,449 inpatient days; 41 inpatient surgeries; 436 outpatient surgeries; and 1,453 emergency room visits. HCMH owns four medical clinics in Britt, Garner, Kanawha, and Wesley; two are provider-based and two are stand-alone rural health clinics.

HCMH is a county-owned hospital, affiliated with Mercy Health Network-North Iowa. Its secondary referral hospital, Mercy Medical Center-North Iowa, is located in Mason City.

Mercy Health Network-North Iowa consists of hospitals and primary care clinics in nine rural communities, a primary care and specialty physician network, home health and senior services agencies, a regional referral laboratory, and an emergency services network. The Mercy Network service area covers 23 counties in northern Iowa. The HCMH hospital administrator, chief financial officer, director of nursing, pharmacist, and physical therapist are employed by Mercy Medical Center. The physicians are employed by Mercy as well, and have a Physician Hospital Organization contract with HCMH.

The medical staff at HCMH includes three family physicians, two nurse practitioners, and one physician assistant. Two independent surgeons perform surgery at HCMH. Specialty services provided by visiting specialists include urology, ENT, ophthalmology, neurology, podiatry, orthopedics, and cardiology. Mammography, CT Scan, mobile ultrasound, mobile MRI, and teleradiology services are available at the hospital. The hospital does not provide obstetric services. A high proportion of patients are Medicare beneficiaries.

The physicians and mid-level practitioners generally see patients at one or two of the clinic sites. Mercy medical residents cover primary ER call on weekends. One of the nurse practitioners functions in a hospitalist position, monitoring inpatients and covering the ER, during five 12-hour night shifts every other week. The physicians and other mid-level providers share call during the weeks that are not covered by the hospitalist. A physician is also on backup call when a mid-level practitioner is the primary call person. The hospital is currently trying to recruit another nurse practitioner or physician assistant for a second hospitalist position to cover the alternate weeks.

HCMH converted to a CAH in August 2000. Seven of the nine rural hospitals in the Mercy Health-North Iowa Network are CAHs. Each CAH has a formal agreement with Mercy Medical Center that defines the terms of their relationship with regard to credentialing, performance improvement, quality assurance, peer review, transfer and referral activities.

Quality Improvement Initiatives

In the past, HCMH collected quality assurance data, but the process was not very meaningful to the staff. As a result of questions raised during the CAH certification survey, the hospital took a critical look at its quality structure. The current HCMH administrator has a nursing background, a strong interest in QI activities, and previous experience working at Mercy Medical Center and with rural hospitals in the Mercy Network on quality issues. Since she came to HCMH three years ago, the hospital has made several major changes in how it conducts QI activities, both as an individual facility and in collaboration with other hospitals in the Mercy Health Network.

HCMH utilizes a straightforward QI process that starts with problem identification and moves to implementation of action steps, with an emphasis on loop closure. The hospital has developed a QI plan that is coordinated with the hospital's strategic plan and the network wide-quality plan. It has implemented a Balanced Scorecard management approach to improving strategic performance, and formed a departmental QI team. With other Mercy Health Network hospitals, HCMH helps fund a position that supports network hospitals, and participates in a "mock survey" process. The hospital collects data on quality indicators and benchmarks the data with other Mercy Network hospitals. It also evaluates patient and employee satisfaction on a

regular basis. Trends and patterns in patient complaints are examined to identify quality problems and issues to work on.

The hospital's highest priority quality issue is patient safety, with a focus on medication errors and patient falls. HCMH is implementing several patient safety initiatives internally, as well as joining with other Mercy Network hospitals to form the Patient Safety Health Care Network of North Iowa. HCMH is not accredited by the Joint Commission on Accreditation of Health Care Facilities (JCAHO) but is working on the JCAHO National Patient Safety Goals as part of a network-wide initiative.

Departmental QI Committee

In addition to the traditional Quality Management Committee of the Medical Staff, which focuses on peer review, the hospital established a Departmental Quality Improvement Committee that meets monthly. The Departmental QI Committee consists of the Administrator, Director of Nursing-Clinical Services, Chief Financial Officer, directors of each hospital department, and a representative from the Mercy Network. The focus of the Committee's efforts is on how departments can work better together on quality issues. For example, they have implemented procedures to ensure that test results are reported from the lab in a timely manner, have clarified pharmacy and nursing responsibilities for checking crash cart supplies, and ensured that hospital-wide disinfectant is disposed of when it reaches the end of the time it should be used.

Medical Records and Peer Review

During the past year, the hospital upgraded its dictation and transcription system, which

allows transcription from remote sites, and results in much faster turnaround time on dictation. The hospital medical records department took over responsibility for clinic coding. The new systems have made it much easier to identify and correct coding and billing problems. A new Mercy Network lab information system provides remote results, and HCMH physicians can access Mercy Medical Center's power charts to track lab and radiology results online for their patients who are hospitalized in Mason City.

The Director of Medical Records is HCMH's quality assurance coordinator. She supervises coding of medical records, and selects medical charts for review by the Medical Staff or the hospitalist nurse practitioner. The physicians and mid-level practitioners then discuss the results of the chart reviews in the bi-monthly Medical Staff QI meetings. The hospital occasionally sends charts to Mercy Medical Center for review. The NP hospitalist reviews charts for all hospital inpatients, to determine if care followed medical guidelines and if there is proper documentation in the record. She tallies compliance by hand, and prepares reports that summarize results for all providers and individual reports that show each provider where they need to improve. The Acute Care Director has primary responsibility for nursing record review.

Quality Indicators and Risk Management

HCMH currently collects QI data involving general variances, medication errors, patient falls, and provider issues, using a paper reporting form from the Mercy system. Department managers send the completed forms to the Director of Nursing -Clinical Services, who analyzes the data and generates trend reports for various hospital committees and task forces that address quality issues. These include the medical staff Quality Management Committee, Departmental

Quality Improvement Committee, Pharmacy and Therapeutics Committees, Medication Errors Task Force and Falls Reduction Task Force. The Mercy Network is moving to a computerized reporting system, PEERS (Potential Error and Event Reporting System), for reporting of incidents and near misses.

Mercy Health Network Support for QI and Benchmarking

Initial efforts to develop a network-wide quality plan started about six years ago, but moved slowly at first to limit the network hospitals' fears regarding loss of independence. More recently, the Network Nursing and Patient Care Team, which includes the Directors of Nursing from all of the Mercy Network hospitals, identified a need to work more closely together on quality issues, including identifying quality indicators and benchmarking.

The Mercy Network has begun to participate in the National Voluntary Hospital Reporting Initiative sponsored by the American Hospital Association. However, it has taken a significant amount of information system time from the Mercy Network to support the CART [Center for Medicare and Medicaid Services (CMS) Abstraction and Reporting Tool] software and they have not received timely reports. The Mercy Network is collecting data for five indicators related to care for patients with pneumonia (oxygenation assessment, pneumococcal screening and/or vaccination, and antibiotic timing) and congestive heart failure (left ventricular function assessment and use of ACE inhibitors). Network hospitals are benchmarking with each other on these five indicators, and reporting their data to CMS in the aggregate.

In 2002, the Mercy Network developed a Project Consultant position to support the network hospitals in quality-related functions and assist them with credentialing, risk

management, and regulatory issues. The Project Consultant is a Mercy employee with extensive nursing and administrative experience; the network hospitals pay part of her salary because they value the assistance. She participates in the department and medical staff QI meetings at each network hospital.

“Mock Survey” Process

The first hospital in the Mercy Network to convert to CAH status had some difficulties with its certification survey. Subsequently, Mercy Medical Center and the network hospitals, including HCMH, developed a “mock survey” process to help hospitals prepare for their CAH certification surveys. The “mock survey” teams consist of the Mercy Network Project Consultant and hospital nursing and administrative staff from the network hospitals. The Mercy Network has decided to do mock surveys on an ongoing basis every other year because the state does not have the resources to survey the hospitals that often, and hospitals find the process useful. The network has also conducted mock surveys on a fee basis for non-network hospitals. The HCMH Administrator and Director of Nursing Services are members of a “mock survey” team, and have found that it helps inform them about QI activities that are being conducted in other hospitals.

Pharmacy Best Practices and Medication Safety

The HCMH pharmacy is staffed by a pharmacist and a pharmacy technician who each work at the hospital 24 hours per week. (The pharmacist also works about nine hours a week at another CAH in the Mercy Network.) When the pharmacist is not at HCMH, she can usually be reached by cell phone; when she can't be reached, a pharmacist at Mercy Medical Center is

available 24 hours a day/7 days a week. Medications are dispensed from a medication cart filled by the pharmacist.

The pharmacy is computerized, allowing the pharmacist to look up drug interactions and to prepare computerized medication administration records. Computerization of the pharmacy has freed up nursing time, facilitated tracking of medication errors, and made it easier for a substitute pharmacist to fill in for the regular pharmacist. About 2½ years ago, the hospital pharmacist and nurses, along with local clinics, obtained online access to Micromedex, a medication information resource for staff and patient education. HCMH obtained the pharmacy computer system and Micromedex as a satellite of Mercy Medical Center, which was much less expensive than purchasing them independently. However, Mercy Medical Center is now in the process of changing computer systems, raising questions about whether it will continue to support the existing network hospital computer systems in the future.

The pharmacist and Acute Care Director assist with tracking of medication errors. Errors are reported to the Pharmacy and Therapeutics committee and the Departmental QI Committee. The hospital has also established a Medication Errors Task Force, which includes the pharmacist, Acute Care Director, two staff RNs and a representative of the medical staff, to examine medication error trends and develop actions they can take to prevent errors. Adverse drug reactions are tracked through medical records coding.

In collaboration with other hospitals in the Mercy network, HCMH has developed and implemented several pharmacy “best practices” initiatives. To ensure that pharmacy technicians are well-trained to perform multiple responsibilities in the small network hospitals, network

pharmacists developed a competency-based orientation manual and training process for pharmacy technicians. The pharmacists in the Mercy network meet regularly, and share protocols, policies, forms, and patient education materials, which are then adapted to meet local needs. These products include an informational chart on Coumadin and antibiotic drug interactions, a patient education booklet on anticoagulation therapy, protocols regarding appropriate use of antibiotics, including when to switch from IV to oral antibiotics, and a standardized sliding scale for insulin.

Patient Safety Network

With funding from a three year \$600,000 Federal Rural Health Network Development grant, HCMH, Mercy Medical Center, and the other hospitals in the Mercy Network have formed the Patient Safety Health Care Network of North Iowa. The Patient Safety Network is developing and implementing a patient safety plan to improve patient care and reduce medical errors across the network hospitals, clinics, and pharmacies. Medication safety is a special focus of the grant project. The Patient Safety Network is developing a computerized medical error reporting system, establishing benchmark goals, and implementing clinical guidelines and protocols to reduce medical errors. The project staff and consultants will assess the information technology systems in network hospitals and clinics, and develop a plan to acquire appropriate technologies to improve patient safety in small rural facilities.

Key Aspects of QI at Hancock County Memorial Hospital

- The CAH requirements and certification survey process helped to formalize relationships with regard to QI activities between small rural hospitals in the Mercy Network, including HCMH, and Mercy Medical Center. They also led to the development of the Mercy Network's ongoing "mock survey" process, which focuses attention on quality

issues for CAHs in the Network.

- Membership in the Mercy System benefits HCMH's QI program in several ways. HCMH management and staff have access to Mercy Medical Center staff expertise, including a Project Consultant who works with all the small rural hospitals in the network on QI activities, and the system's information technology. They also have peer groups of individuals in similar positions at other small rural hospitals in the Mercy Network (e.g. administrators, directors of nursing, and pharmacists) with whom they work on quality issues.
- HCMH's leadership places a high priority on QI activities, and has an action-oriented approach to quality issues. The administrator's extensive clinical experience, personal interest in quality and patient safety issues, and knowledge of Mercy System resources are strong assets for developing and implementing QI initiatives.
- The QI process at HCMH is collaborative, and involves staff from throughout the hospital. Mid-level practitioners are actively involved in the QI process, including participating in Medical Staff QI meetings. A nurse practitioner has primary responsibility for medical chart review. The Acute Care Nursing Director has primary responsibility for nursing chart review.
- Cost-based reimbursement for the CAH and its rural health clinics have allowed HCMH to allocate internal funds for quality-related activities. The collaborative efforts of the Mercy Network small rural hospitals and Mercy Medical Center have generated additional Federal grant dollars for patient safety activities.

CONCLUSIONS

The results of the survey and site visits demonstrate that CAHs are successfully implementing QI strategies, despite the challenges they face. Survey respondents and interviewees from the case study CAHs described the importance of cost-based Medicare reimbursement in their ability to fund a range of post-conversion activities that improve the quality of care, including additional staff, staff training, and new medical equipment. The commitment of hospital leaders and key staff is a crucial factor in moving QI initiatives forward in CAHs. The administrators of the two case study CAHs, for example, recognize the

difficulties of measuring the quality of care and implementing QI in small rural facilities.

However, rather than using these difficulties as reasons not to address quality issues, they have used other strategies, such as reviewing every case when the number of patients with a given condition is too small for statistical comparisons. They have made QI a priority for their hospitals and ensured that resources are available for QI activities. Working with their support hospitals, other CAHs, and statewide organizations, they have demonstrated the importance of building linkages to develop and implement rural-relevant QI initiatives.

REFERENCES

Agency for Healthcare Research and Quality (AHRQ). *National Healthcare Quality Report*. U.S. Department of Health and Human Services, December 2003. Available at:

<http://www.qualitytools.ahrq.gov/>

American Hospital Association. *The Quality Initiative: A Public Resource on Hospital Performance*. January 15, 2004. Available at:

http://www.hospitalconnect.com/aha/key_issues/patient_safety/advocacy/quality_initiative.html

Calico, F., Dillard, C., Moscovice, I. and Wakefield, M. "A Framework and Action Agenda for Quality Improvement in Rural Health Care." *Journal of Rural Health* 19:226-232, 2003..

Centers for Medicare and Medicaid Services (CMS). *Hospital Quality Initiative*. December 9, 2003. Available at: <http://cms.hhs.gov/quality/hospital/>

Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press, 2001.

Institute of Medicine. *To Err is Human: Building A Safer Health System*. Washington, DC: National Academy Press, 2000.

Moscovice, M. and Gregg, W. "CAH Quality Assurance (QA) and Quality Improvement (QI) Strategies." *Rural Hospital Flexibility Program Tracking Project Year Two Report*. September 2001.

Moscovice, M., Gregg, W. and Klingner, J. "The Maturation of Rural Hospital Quality Assurance (QA) and Quality Improvement (QI) Strategies." *Rural Hospital Flexibility Program Tracking Project Year Three Report*, September 2002.

National Advisory Committee on Rural Health and Human Services. *Health Care Quality: The Rural Context*. Rockville, MD: U.S. Department of Health and Human Services. April 2003.

National Quality Forum. *Hospital Care National Performance Measures (Group 1)*.

Washington, DC: NQF, 2002. Available at:

http://www.qualityforum.org/activities/ca_archive.htm

National Quality Forum. *Voluntary Consensus Standards for Hospital Care (Group 2 Measures)*.

Washington, DC: NQF, 2002. Available at:

http://www.qualityforum.org/activities/ca_archive.htm