Rural Healthcare Quality Network (RHQN) – Agency for Healthcare Research and Quality Grant

FINAL REPORT

BACKGROUND

Purpose of the Study

The purpose of the study was to examine clinician's attitudes and practices regarding best practice guidelines and information technology for quality improvement in small rural hospitals.

Purpose of the Larger Grant

This study was part of a larger grant. The purpose of the grant— the Rural Health Information Technology Cooperative (RHITC)— is to design, implement, and evaluate information technology (IT) approaches to foster awareness and use of clinical practice guidelines for acute myocardial infarction (AMI) and community-acquired pneumonia (CAP) in rural hospitals in the state of Washington in the United States of America.

The main intervention includes the design and implementation of a website as a means to facilitate access to best practice guidelines and performance data for each hospital regarding care for patients with AMI or CAP.
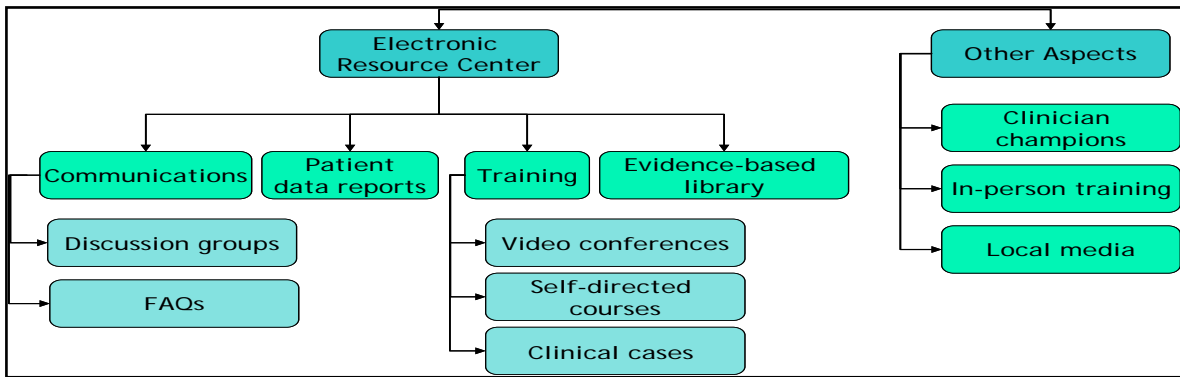
Selection of Clinical Quality Measures

A Steering Committee was convened to examine and define relevant quality measures for rural hospitals. The committee was made up of national and regional experts as well as practitioners from rural hospitals. The final measures for Acute Myocardial Infarction (AMI) and Community-Acquired Pneumonia (CAP) were as follows:

AMI	CAP
Aspirin at Arrival	Initial Antibiotic Within 4 hrs of Arrival
Beta Blocker at Arrival	Initial Antibiotic Selection
EKG Within 10 Minutes of Arrival	Oxygenation Assessment
Collection of Cardiac Enzymes	Influenza Vaccination
Thrombolytic Agent w/in 30 Minutes	Pneumococcal Vaccination
********	Smoking Cessation Counseling

After the final measures had been selected, a data abstraction tool was developed and tested. When inter-rater reliability abstractions had been completed and a 95% agreement had been achieved, pre-intervention data abstraction was started in order to establish a baseline.

Hospitals Participating in the Study
- 14 hospitals belonging to the Rural Healthcare Quality Network (RHQN), located in the eastern and western regions of Washington. The hospitals located in the western part of the state were also members of the Western Washington Rural Health Collaborative, and the hospitals located in the eastern part of the state were members of the Critical Access Hospital Network. Before the study was completed, one hospital located in the eastern region chose to withdraw from the study. A total of 13 hospitals completed the study.

Table 1. Hospital Characteristics (n=13)

	Mean	Range
Patient Volume/Utilization		
Average daily patient census in acute care	5	<1-16
Average daily number of ER patients	18	1-59
Total Number of Clinicians on Staff		
Physicians (MD)	20	1-36
Nurses (RN)	38	8-120
Nurse Practitioners (NP)	21	0-4
Physician Assistants (PA)	2	0-5
Travel Time to Referral Hospital for AMI (approximate minutes)		
By land	81	25-240
By air	28	7-50

Figure 2. Locations of Participating Hospitals
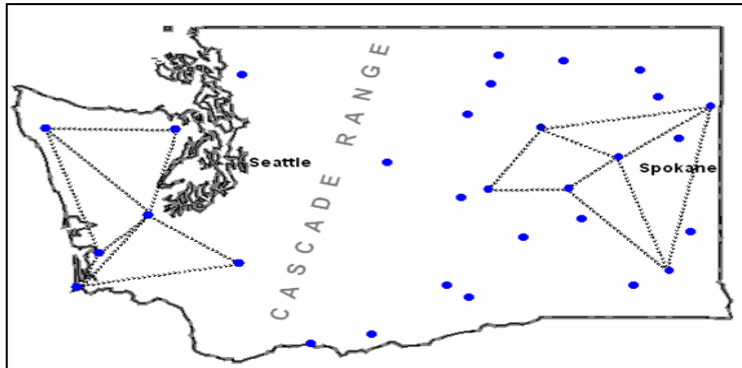
METHODS
Qualitative Data Collection
Data were gathered from clinical staff at the participating hospitals through in-person interviews and web and mail surveys. IRB approval was obtained for all data collection.

Interviews and focus groups
- Interviewed hospital administrators and clinicians during 1-day site visits at 13 rural hospitals in Washington State
- Conducted individual interviews with 63 hospital administrators and clinicians and seven focus groups with registered nurses
- Interview topics included:
  – Knowledge and attitudes regarding practice guidelines for AMI and pneumonia
  – Attitudes and use of computers and other information technology
  – Leadership and support
  – Quality improvement practices
  – Staff characteristics

Clinician surveys
- The survey included 41 items across six topics. Response scales included 5-point agree/disagree (41%), 5-point frequency (22%), 6-point frequency (10%); demographic (20%); and 10-point knowledge (5%).
- The survey was sent via email and regular mail to 686 clinicians, at 13 hospitals, who were asked to send it back after completion. All physicians, registered nurses, physician assistants, and nurse practitioners who performed clinical functions were eligible to participate.
- Survey topics included:
  – Leadership support for quality improvement

- Hospital environment
- Best practice guidelines
- Computers and information technology
- Training

Qualitative Data Analysis

<u>Interviews and focus groups</u>
- Interviews and focus groups were audiotaped, and notes were taken.
- Notes were coded and analyzed, using Atlas.ti, by key theme: guidelines, information technology, work environment, quality improvement, communication, and training.

<u>Clinician survey responses</u>
- Conducted two-way contingency tables and used the Pearson chi-square statistic to examine the relationship between staff positions (Physician, Midlevel, Nurse) for each of the 25 substantive items
- Conducted exploratory factor analysis (EFA) on 25 substantive survey items and used Cronbach's alpha to estimate the reliability of potential composites. These analyses supported collapsing the 25 items into five composites:
    - Leadership support for quality improvement (alpha = 0.88)
    - Hospital environment (alpha = 0.91)
    - Attitudes toward best practice guidelines (alpha = 0.84)
    - Use of the computer to perform professional tasks (alpha = 0.77)
    - Computer literacy, which measures respondent's personal experience with computers and the internet as well as attitudes toward the use of computers (alpha = 0.75)
- Composites were constructed by calculating the mean of the composite items for all respondents who had non-missing data for at least half the composite items. Composite means were transformed to a 100-point scale.
- To test the difference in mean composite scores across the staff positions, we conducted mean separation tests in an ANOVA using the Ryan-Einot-Gabriel-Welsch Multiple Range Test to control for multiplicity.
- Survey response rate = 59% (406/686 clinicians)

Table 2. Characteristics of the clinician survey sample (n=406)

	RN	PA/NP	MD	Total
Total Sampled	522	40	124	686
Total Surveyed	290	33	67	406
Response Rate	56%	83%	54%	59%
Gender				
Female	93%	48%	24%	77%
Male	7%	52%	76%	23%

| Length of time worked at hospital				
Less than 1 year	3%	7%	0%	3%
1 to 5 years	14%	13%	21%	15%
6 to 10 years	17%	17%	15%	16%
11 to 15 years	15%	17%	17%	15%
16 to 20 years	14%	13%	15%	14%
21 years or more	37%	33%	32%	36%

RESULTS
Clinical Practice Guidelines
- **Perceived Benefits**
    - Most staff felt that best practice guidelines improve the quality of care. Guidelines were perceived as:
        - Improving response time
        - Serving as reminders, especially for temporary staff or rare conditions seen in rural hospitals
        - Being evidence based
    - Nurses, in particular, perceived potential increased autonomy through the use of clinical practice guidelines that would include standing orders and protocols for actions that they could perform without previous physician approval.
    - Nurses were more likely than midlevel staff or physicians to strongly agree that "following best practice guidelines is good patient care."

Following BPGs is Good Patient Care (n=383)
(Results from a two-way contingency table; chi-square significant at p < .001)
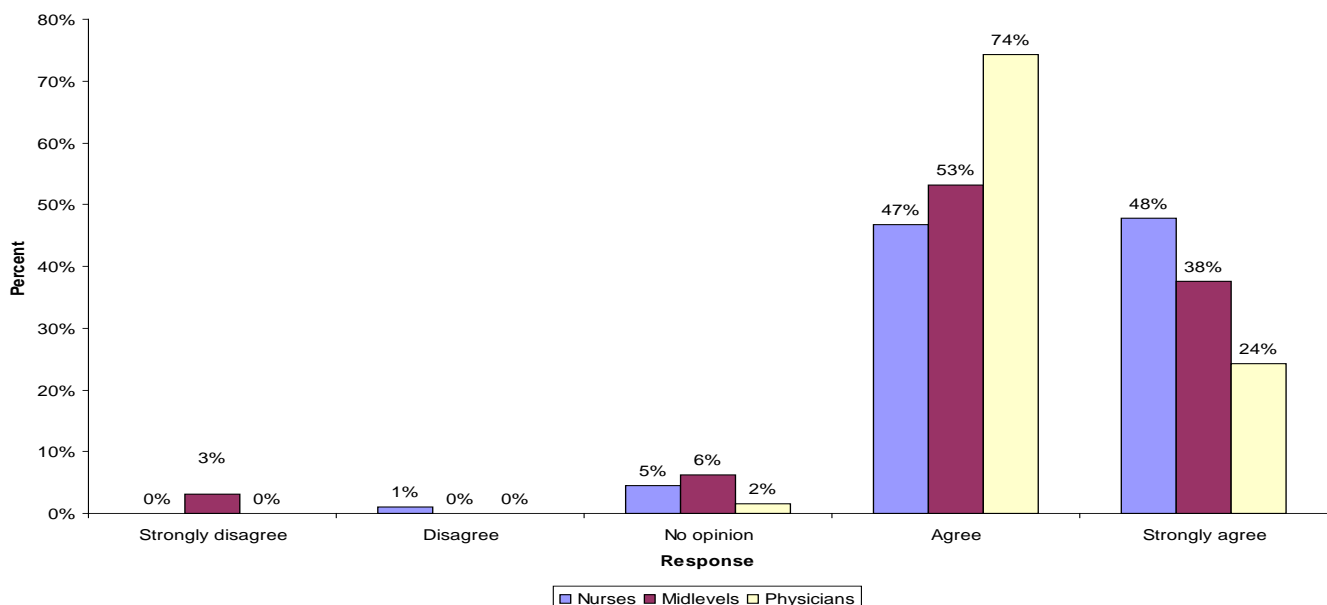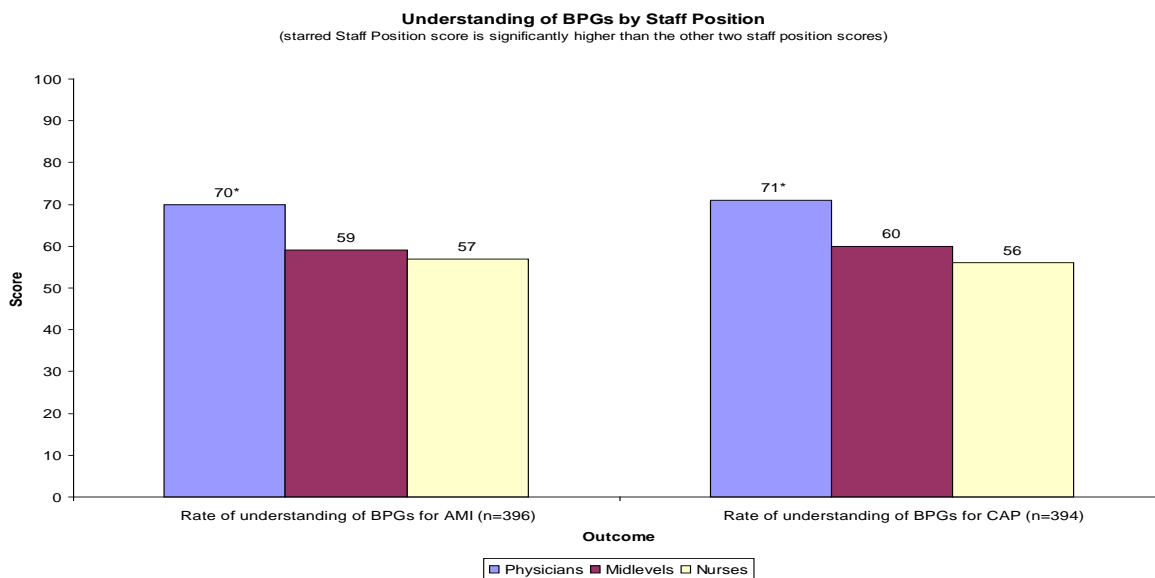
- **Perceived Barriers**
    - Perceived and stated lack of physician support or "buy-in." Reasons reported in the interviews included:
        - Guidelines may not consider an individual's medical history and situation
        - Guidelines take time and resources to document
        - There is a lack of evidence to support guidelines
    - Difficulties in disseminating guidelines to staff were perceived as a barrier to implementing guidelines, particularly by nurses.
    - 26% of all clinicians strongly agreed or agreed with the statement, "Using best practice guidelines is like practicing cookbook medicine," and agreement tended to increase as the hierarchy increased from nurse to midlevel to physician.

- **Knowledge**
    - Self-reported knowledge of best practice guidelines was 7 on a 0-to-10 scale, regardless of the condition. Physician self-reported knowledge scores were significantly higher than those of midlevel staff and nurses for both AMI and CAP ($*p<.05$).

Understanding of BPGs by Staff Position
(starred Staff Position score is significantly higher than the other two staff position scores)
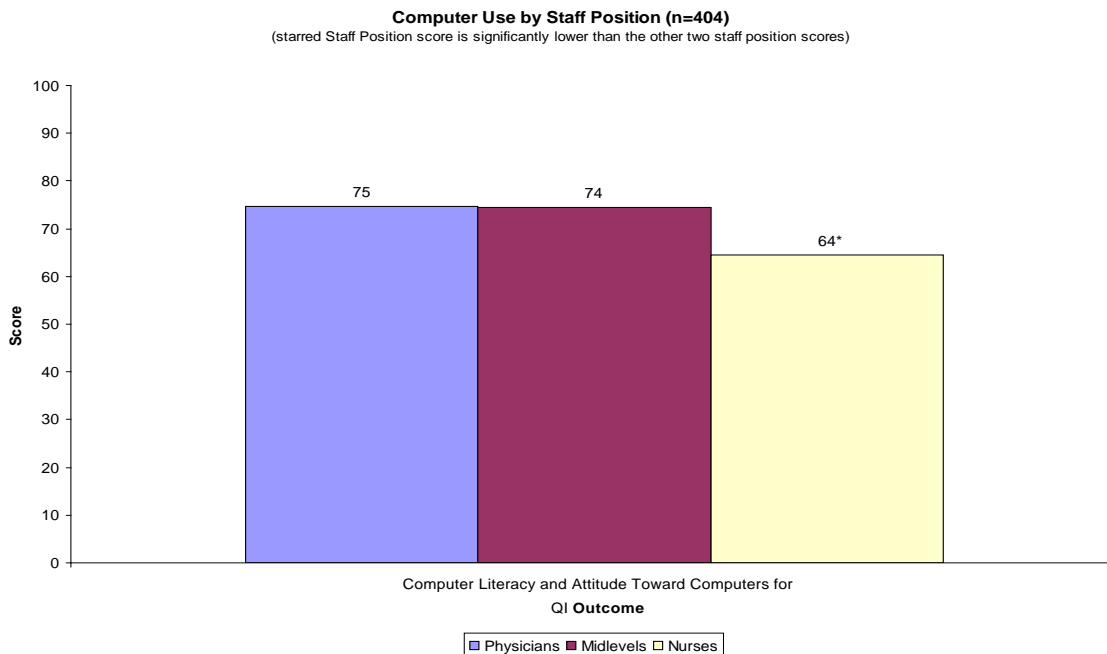

Information Technology
- **Access**
    - At several hospitals, at least some of the nurses did not have access to computers or the internet. At a few hospitals, administrators said that they did not provide access to the internet to nurses, because it would be used for nonclinical activities.

- Levels of computer and internet use varied by hospital and by individual but was generally low.
- Experience and use of information technology for clinical purposes tend to be low. Many clinical tasks were completed with little or no use of information technology. Software available focused on logistical and financial aspects of patient care.

Computer Use by Staff Position (n=357)
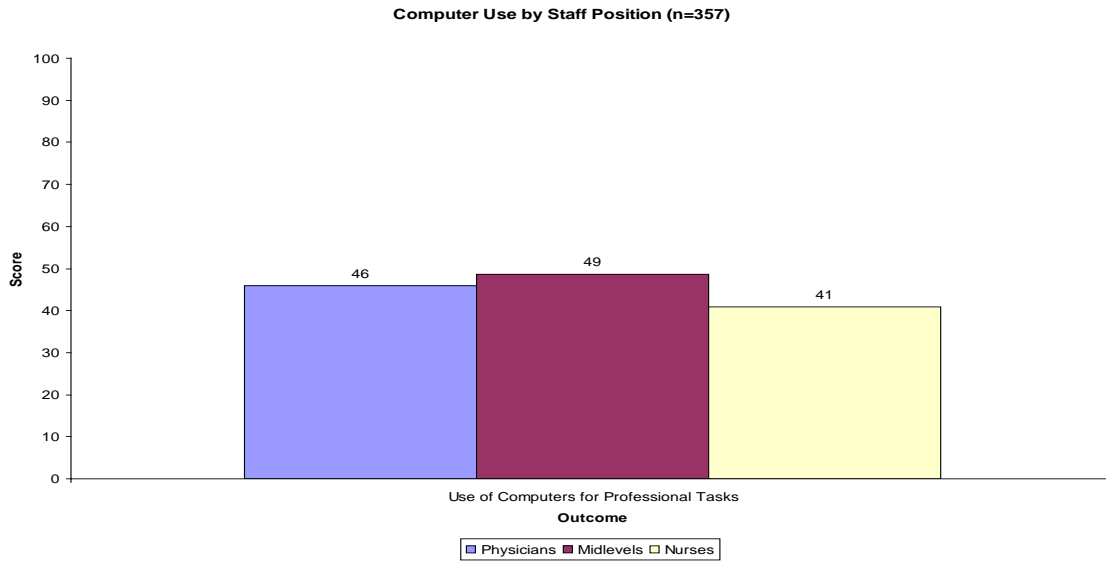
- Physicians and midlevel staff reported accessing the internet at work more frequently than nurses
- Overall, physicians reported more experience with computers, the internet, and handheld devices than did other staff.

Computer Use by Staff Position (n=404)
(starred Staff Position score is significantly lower than the other two staff position scores)

Attitudes
- – Most doctors perceived themselves and were perceived by others as more technologically savvy than other hospital staff
- – Perceived barriers to using IT include:
  - • Lack of computer literacy
  - • Lack of time at work (nurses)
  - • Expensive subscriptions to knowledge resources (physicians)
  - • Slow, spotty internet service (at two hospitals)

QUANTATATIVE DATA ANALYSIS

Although the change is slight, there does appear to be evidence of statistically relevant improvement in the selected quality measures per AIR analysts. Process changes did occur in most of the participating hospitals and are expected to have a greater impact on improving quality in the future. Because of a number of delays, dedicated efforts by hospitals to improve performance on the selected quality measures did not truly start until the final 9-12 months of the grant. Each hospital received quarterly reports, and participants were encouraged to share with all staff and the Board of Directors.

FINAL COMPARISON DATA

COMMUNITY-ACQUIRED PNEUMONIA MEASURES
Goal > 90%

MEASURE	FINAL EASTERN WA	FINAL WESTERN WA
Initial Antibiotic within 4 hrs of Hospital Arrival	98%	98%
Initial Antibiotic Selection	99%	99%
Oxygenation Assessment	98%	100%
Influenza Vaccination	11%	6%
Pneumococcal Vaccination	6%	8%
Smoking Cessation Counseling	33%	48%

ACUTE MYOCARDIAL INFARCTION MEAURES
  Goal > 90%

MEASURE	FINAL EASTERN WA	FINAL WESTERN WA
Aspirin at Arrival	78%	79%
Beta Blocker at Arrival	13%	28%
EKG Within 10 Minutes of Arrival	44%	42%
Collection of Cardiac Enzymes	98%	96%
Thrombolytic Agent w/in 30 min	12%	31%

Each participating hospital received their individual final data reports during 2008.

QUALITY IMPROVEMENT

Interventions

Each participating hospital was invited to send staff to a quality improvement workshop hosted by the RHQN. These Plan-Do-Study-Act (PDSA) workshops were held regionally. The purpose of the workshops was to introduce frontline staff to quality improvement methodology. These were interactive workshops, presented in a "train-the-trainer" format, that were held regionally. Additionally, a videotape regarding PDSA methodology was placed on the RHITC website so that hospitals could view it on demand.

Furthermore, each participating hospital received onsite team building and communication presentations from Convergent Systems. These full-day sessions were made available to all clinical hospital staff. Convergent Systems representatives Spence Byrum and Ken Stahl, MD, were also available for individual consult. A videotaped recording of the main presentation and interactive participation of the training were also made available through the RHITC website for hospitals to use for training purposes.

When the RHITC website had been completed, each participating hospital received training via videoconference on how to access the site, complete data entry, initiate online discussion, retrieve evidence-based articles, complete self-education tests, and obtain free Continuing Medical Education (CME) and nursing education credits as well

as retrieve their data reports, which were completed by the American Institute of Research (AIR).

Hospitals were asked to identify physicians, physician assistants, nurse practitioners, clinical nurses, and medical record staff who would be accessing the website. Subsequently, each identified "user" was issued a personal log-in number and password that was distributed in a "toolkit," consisting of plastic card with their information plus instructions.

Posters were distributed to each participating hospital. One poster was for public display, informing patients and visitors that the hospital was participating in this study. A second poster was distributed that highlighted the clinical quality measures and encouraged use of the RHITC site to get additional information.

Each hospital received training via videoconference on how to abstract data and enter data. Each hospital was required to send five data abstractions per abstractor on paper tools to the Principle Investigator for both AMI and CAP for inter-rater reliability review (IRR). After a 95% IRR was achieved for each abstractor per facility, hospitals were able to begin submitting data to the RHITC website.

Each of the western hospitals received financial support in order to assist with the cost of abstracting baseline data. In addition, outside abstractors were hired to assist with collecting baseline data at the larger hospitals. Due to the interruption of the grant work, as a result of the INHS involvement, the western hospitals in particular experienced significant delay and had more baseline cases to abstract.

After the initial training has been conducted, separate monthly meetings were held with the western and eastern hospitals. Using a modified version of the Institute for Healthcare Improvement's Breakthrough Collaborative methodology, hospitals were asked to report on the past month's activities, including progress, barriers, and next steps.

Three opportunities were provided for participants from both groups to come together for face-to-face meetings to learn about how each was progressing and to listen to presentations from experts in the field of research, quality, and patient safety.

The RHITC website was populated with relevant and up-to-date information on best practices in the care of AMI and CAP as well as other related articles. Links to the American College of Cardiology and the Infectious Diseases Society and Thoracic Surgeons Society for up-to-date clinical guidelines were provided. The website was also populated with quality improvement and patient safety articles and reports, including the Institute of Medicine's reports, To Err is Human and Crossing the Quality Chasm and Quality Through Collaboration, to allow hospitals to download them for their staff and to highlight pertinent areas for their new employee orientation programs.

Barriers to Success

There was a significant delay of approximately 1 year in initiating quality improvement activities because of efforts to engage Inland Northwest Health Services (INHS) in developing an electronic data collection tool. Although that had not been part of the original plan, there was pressure from several hospitals in the eastern region for INHS to be involved; subsequently, there was agreement to allow INHS to modify the Meditech tool in order to incorporate the clinical quality measures identified for this study. Once it became apparent that INHS could not accomplish this goal because of basic restrictions of the Meditech tool itself, this effort was stopped and the tool originally designed for the study was implemented. After this occurred, the tool allowed the work of the grant to resume and also allowed for greater data integrity and overall efficiency in data entry, data retrieval, and data analysis.

After initial barriers had been eliminated, monthly meetings were scheduled with both the eastern hospitals and the western hospitals. Because the eastern hospitals were the "experimental" group, the monthly meeting format included videoconference, teleconference, and face-to-face meetings at which representatives from the hospitals were asked to give presentations on the work they were doing, including sharing information regarding barriers, challenges, and lessons learned. Monthly meetings with the western hospitals, the "comparison" hospitals, were held via videoconference and teleconference. Both groups were invited to attend face-to-face meetings for all participating hospitals in March and May of 2007 and in March 2008.

Generally, hospitals reported the following:

- Not all RHQN members were given the opportunity to participate in the grant: Hospitals were selected from the two existing networks as a matter of convenience, but other hospitals expressed interest post-intervention.
- Significant delay occurred in initiating data collection efforts by hospitals because of the INHS experiment and lack of resources.
- Significant expenditure was noted for data abstraction as a result of the INHS experiment.
- Delay existed in establishing monthly meetings with participants.
- Many participants reported that they were having difficulty implementing quality improvement initiatives because of the lack of buy-in from providers and staff and a lack of time/resources.
- Sporadic intervention - Some hospitals did not follow through with stated goals on an ongoing basis because of staffing changes; lack of follow through was detrimental to the overall improvement efforts of all hospitals.

Lessons Learned

It appears that, although a number of hospitals participating in this study were not fully engaged and/or were not able to implement quality improvement initiatives in their institutions for a variety of reasons already outlined in this report, there were several hospitals that were committed to overcoming the barriers they faced and proceeded with pursuing quality improvement and demonstrating excellence in the care they provide to their patients. This effort proves that, with attention and persistence, many of the identified barriers can be overcome in critical access hospitals with limited resources.

Particular attention should be brought to the remarkable achievement by **Lincoln Hospital** and the Cardiac One initiative, which was largely borne out by their participation in the AHRQ grant. Lincoln Hospital spearheaded a regional initiative to improve the care given to patients presenting with chest pain and/or acute myocardial infarction. Lincoln Hospital administration and staff showed great leadership in the efforts to improve cardiac care in their hospital and the region and initiated a partnership with a major referral hospital in the region. The partnership has now grown to 11 hospitals, including other critical access hospitals in the eastern region of Washington State. Lincoln Hospital was also a recipient of the Washington State Quality Improvement Organization (QIO) Quality Award in 2008 for the Cardiac One initiative. The following hospitals also showed great promise in facilitating changes to allow for demonstrable quality improvement efforts in their facilities:

- Odessa Memorial Hospital
- Forks Community Hospital
- Newport Community Hospital
- Ocean Beach Community Hospital
- Mason General Hospital

CONCLUSIONS

- Barriers remain for the widespread use of information technology and the implementation of clinical practice guidelines in small rural hospitals in Washington State. These barriers are related to attitudes toward and experience with guidelines and the use of computers in clinical care. Although attitudes and experiences are improving, there remains a significant opportunity for improvement.
- An online resource center may facilitate access to guidelines and the evidence that supports them and eventually may facilitate their adoption to improve clinical care and outcomes for patients with AMI or CAP, but this change needs the approval and facilitation by senior leadership and buy-in from clinical staff.
- There is a lack of dedicated resources to implement interdisciplinary quality improvement efforts in most rural hospitals.
- There was a lack of quality improvement expertise in most critical access hospitals taking part in this study.

- Not all hospital administrators require quality improvement initiatives to be a core element of the work they do every day, and not all include QI as part of a balanced scorecard.
- Many hospitals had not participated in research projects before and had difficulty understanding the need for a specific tool to collect data and the general research methodology.
- A few hospitals did not understand the importance of their contributions to this national demonstration project.

RECOMMENDATIONS for Future Research Studies for the Rural Healthcare Quality Network (RHQN)

- It is recommended that only those hospitals that are willing to commit the energy and resources needed to participate in national or statewide research projects be included in research projects with a quality improvement component.
- Extensive information should be shared, and education provided, prior to recruitment of participants.
- Once participants have been identified, a Memorandum of Understanding and a Letter of Agreement should be signed by the hospital administrator and delegated key contact.
- Limit the use of contracted employees for better use of funds.
- Ensure data integrity by allowing Principle Investigator and/or analysts to determine data collection methodology, as is standard for research projects.
- Provide a better understanding of the confidentiality requirements associated with research.