

Grant Final Report

Grant ID: UC1HS016154

The Chronic Care Project

Inclusive Dates: 09/01/05 - 06/30/09

Principal Investigator:

Georges Nashan, RN, MS, CPHQ

Team Member Organizations:

The Aroostook Medical Center*

Charles A Dean Memorial Hospital†

Sebasticook Valley Hospital‡

Inland Hospital§

Bangor Area Visiting Nurses**

Blue Hill Memorial Hospital††

Maine Network for Health**

Eastern Maine Medical Center **

Eastern Maine Healthcare Systems**

* Presque Isle, Maine

† Greenville, Maine

‡ Pittsfield, Maine

§ Waterville, Maine

** Bangor, Maine

†† Blue Hill, Maine

Performing Organization:

Aroostook Medical Center

Project Officer:

Angela Lavanderos

Submitted to:

The Agency for Healthcare Research and Quality (AHRQ)

U.S. Department of Health and Human Services

540 Gaither Road

Rockville, MD 20850

www.ahrq.gov

Abstract

Purpose: This three year project was focused on improving the care of patients with chronic disease through the appropriate implementation of cost-effective technology solutions.

Scope: Twenty-eight healthcare teams participated in the project, including five nursing homes, seven physician's practices, three hospitals, six rural health centers, one mental health center, one tribal health center, three homecare services, one community action program, one industrial health program and one pharmacy service. Teams represented a variety of settings, both rural/urban, independent/system affiliated, large/small and inpatient/outpatient. In addition, several organizations provided IT and program support.

Methods: The IHI Collaborative Model was used, wherein participating teams are brought together for three learning sessions over the course of a year, with monthly on-site coaching sessions in-between. One Collaborative was run in year two in the Aroostook County area and a second was run in the Penobscot and Piscataquis Counties area.

Results: Major projects undertaken by the teams included: hospital EMR access by nursing home staff; electronic prescribing; electronic ordering of patient homecare supplies; fax server implementation, phone system redesign and implementation of secure e-mail in primary care settings; and decision support system implementation for patient care and triage in primary care practices. In addition, two regional health web portals were created to provide a trusted, accurate source for basic health and wellness and chronic disease self-management information, including a calendar of local health related educational events and a searchable database of local healthcare and wellness resources.

Key Words: chronic disease, technology, patient self-management

<p>The authors of this report are responsible for its content. Statements in the report should not be construed as endorsement by the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services of a particular drug, device, test, treatment, or other clinical service.</p>
--

Final Report

Purpose

The Chronic Care Technology Project was developed to work toward improving the quality, efficiency and safety of care of rural patients with chronic illness by implementing appropriate technology solutions that facilitate the accurate, efficient, timely and reliable transfer of patient care information between healthcare providers in a variety of settings across the continuum of care and between providers and patients, many of whom have difficulty effectively advocating for themselves due to age, language, education, income or cultural barriers. Determination of specific technology solutions, implementation planning and execution were done through regional learning collaboratives, based on the Institute of Healthcare Improvement's IHI Break Through Series (BTS) collaborative model, of health care providers and related stakeholders.¹

The project objective of the CCTP was to identify technology solutions that support elements of the Planned Care Model by facilitating the transfer of information a) between different providers and b) between providers and patients. Specific technology solutions were determined through regional learning Collaboratives, consisting of health care providers and related stakeholders; these forums were also used for planning and implementation.

Scope

Background

National Quality Improvement Efforts. During the last decade, improving quality of healthcare has become an important national goal. The Institute of Medicine (IOM), which has been on the forefront of this effort, launched a concerted, ongoing Quality Initiative focused on assessing and improving the nation's quality of care in 1996. In November 1999, the IOM released the report, "To Err is Human: Building a Safer Health System", effectively spotlighting the tens of thousands of Americans who die each year from medical errors. In 2001, a follow-up report, "Crossing the Quality Chasm: A New Health System for the 21st Century", described broader quality issues and asserted that care should be safe, effective, patient-centered, timely, efficient, and equitable. The Quality Chasm report also highlighted the need for healthcare to become more patient-centered, evidence-based, and coordinated among providers.

¹ The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2003.

In response to the Quality Chasm report, the US Agency for Healthcare Quality and Research (AHRQ) made funding available for Health Information Technology (HIT) projects in 2004, especially for rural areas. Projects were funded to promote the goals and strategies of the 2004 “Framework for Strategic Action”. These goals included: 1) inform clinical practice (electronic health record adoption), 2) interconnect clinicians, 3) personalize care (consumer-centric information), and 4) improve population health.

Context

Improving Quality in the State of Maine. At the same time as these federal quality improvement efforts, the State of Maine began initiatives to improve quality in health care and to spread health information technology (HIT) on the local level. On February 1, 2000, Governor Angus King appointed a Blue Ribbon Commission on Health Care, which was charged with recommending potential strategies for stabilizing health care costs. The Commission released a report in December, stating the importance of improving medical records and clinical information systems in Maine. In August 2004, the State of Maine launched the Maine Health Information Network Technology (MHINT) project, a feasibility study to determine the readiness of Maine’s healthcare community to develop a statewide clinical data sharing network.

Studies in the northern, eastern, and central regions of Maine also identified a need for health care quality improvement efforts that focus on chronic disease care in those rural areas. The assessment found that compared to statistics for the nation and peer groups elsewhere in Maine, residents of this region are not particularly healthy; it substantiated a need for comprehensive efforts to address chronic health conditions, to reduce the high cost of care, and to expand critical access to comprehensive services in rural areas of Maine.

In response to the 2001 Community Health Needs Assessment, Eastern Maine Healthcare Systems established the Institute for Medical Improvement (IMI). The IMI was intended to be a collaborative effort involving physicians, employers, payers, hospitals, and patients that would take a proactive approach to ensure the delivery of evidence-based health care services in rural settings. To address chronic conditions such as tobacco use among pregnant women and Chronic Obstructive Pulmonary Disease (COPD), the IMI initiated learning collaboratives. It also identified a clear need to improve quality of care and HIT in the region and, in 2004, IMI began working with providers at The Aroostook Medical Center (TAMC), the IMI Leadership Team, and others at EMHS to develop the Chronic Care Technology Project (CCTP).

Settings and Participants

The collaborative in year two included:

- Acadia Home Care, Presque Isle
- Acadia Medical Center, Fort Fairfield
- Aroostook County Action Program, Presque Isle
- Aroostook Family Practice, Presque Isle

- Aroostook Health Center, Mars Hill
- Aroostook Mental Health Center, Caribou
- The Aroostook Band Micmacs, Presque Isle
- The Aroostook Medical Center, Presque Isle
- Fraser Paper Employee Health, Madawaska
- Horizons Caribou Health Center, Caribou
- Horizon's Orthopedics, Presque Isle
- Horizon's Surgical Services, Presque Isle
- Horizon's Madawaska Regional Health Center, Madawaska
- Maine Veterans Home, Caribou
- Presque Isle Rehab and Nursing, Presque Isle
- Visiting Nurses of Aroostook, Caribou

The collaborative in year three included:

- Lakewood Continuing Care Center, Waterville
- Eastern Maine Medical Center (EMMC) Hospitalists, Bangor
- Millinocket Regional Hospital Physician Practices, Millinocket
- Affiliated Pharmacy Services, Bangor
- Orono Family Practice, Orono
- Ross Manor Nursing Home, Bangor
- Husson Family Practice, Bangor
- Eastern Maine Home Care, Bangor
- Newport Family Practice, Newport
- C.A. Dean Memorial Hospital & Nursing Home, Greenville
- Osteopathic Center for Family Medicine

Inclusion of AHRQ Priority Populations

Organizations that participated in the project serve the following priority populations: rural; inner-city; low income; minority; women; children; elderly; and those with special health care needs, including those who have disabilities, need chronic care, or need end-of-life health care. Most are located in rural areas and all serve rural and low income clients.

The Chronic Care Technology Project (CCTP)

The IMI initiated preliminary planning for the CCTP in October 2004. The planning project was designed to examine information technology systems among regional health care organizations, to determine readiness to change, and to create a network of organizations with a common goal of advancing the sharing of healthcare information electronically. An overriding goal was to create a roadmap for implementing information technology (HIT) that improves care for those patients with chronic medical conditions in rural Maine.

Project Framework

The CCTP is designed to use the Planned Care Model, the IHI “Breakthrough Series” (BTS) change methods and the Model for Improvement.

The Planned Care Model was developed by Ed Wagner, MD, MPH, the national program director of Improving Chronic Illness Care. The model, which has shown to improve systematic care for chronic illnesses, identifies six essential elements of systems that promote high-quality chronic disease management. According to the Planned Care Model, a health system ideally should:

- be linked to community programs and organizations that provide support;
- have improved patient care as part of the organizational goals;
- support patients in managing their disease outside of the physician’s office;
- identify clear roles for those involved with delivering care to patients specifically, a care team;
- have a clearly outlined care and treatment process based on proven guidelines;
- include a patient registry to allow tracking of individual patients as well as groups of patients.

The vision behind the BTS model is that although there is ample scientific information on best practices that could improve the outcomes of health care delivery and reduce costs, health care organizations often have difficulty implementing these changes into their daily workflow. The BTS model is designed to help organizations close that gap by creating a structure in which organizations can share ideas and learn more about Quality Improvement tools and resources.

The BTS model generally includes a series of three to four learning sessions to train practice staff on ideas for implementing technology changes in a healthcare environment. Learning sessions are face-to-face meetings where multidisciplinary teams from each organization and expert faculty come together to exchange ideas, plan interventions, and follow-up on post improvement action. During the learning sessions, information and resources are shared and practice teams work together to develop practice-specific interventions that align with strategic goals in their organization. BTS change methods rely on group collaboration as a means of educating health care providers and support staff in new ideas.

Teams learn about the “Model for Improvement” during the first learning session. The “Model for Improvement,” an approach for organizing and carrying out improvement work, is a key piece of a BTS learning collaborative. The key ideas in the Model for Improvement are to determine: 1) What are we trying to accomplish (e.g., goal or aim)? 2) How will we know if we have made our improvements (e.g., measures)? 3) What changes will we make to reach our goal (e.g., e-prescribing)?

Once teams have determined the changes they will make, they use cycles known as “plan-do-study-act” (PDSA) cycles. Under these cycles, they *plan* who will do what when, *do* (or implement) changes, *study* results, and finally *act* on those changes. Using a PDSA for several tests of ideas/changes before full implementation is key. While the BTS model and the Model for Improvement have been tested and proven in many healthcare systems, including in rural areas of Maine, there are several unique aspects of this project compared with other BTS-type initiatives.

- In this initiative, the BTS model was being used to implement technology solutions to chronic care improvement. Prior BTS-type initiatives in Maine focused on improving quality of care for individual diseases, but technology adoption and implementation poses a unique set of challenges.
- The BTS model traditionally has been used to implement practice change within an individual healthcare organization. In this project, however, the model was being applied to technology-focused projects where two or more organizations are improving the transfer of information. The evaluation focused on the applicability of the BTS model to these two unique aspects of this project and its ability to improve elements of care as specified by the Planned Care Model. In short we wanted to determine whether the model is appropriate for quality improvement projects that occur between organizations and whether it has utility for the adoption of changes within an organization requiring technology solutions.

Methods

Project Planning and Organization/Team Recruitment

During the first 6 months of the project, the project leadership team met regularly to prepare for the Aroostook Collaborative Learning Sessions and, generally, to plan the Collaborative. During this planning phase, the leadership team determined specific needs for the Collaborative,

identified potential speakers for the Learning Sessions, and began developing materials for the Learning Sessions, the Action Periods, and the evaluation. These activities were repeated at the end of the Aroostook Collaborative in preparation for the Bangor Area Collaborative.

Prior to the Aroostook Collaborative, a systematic recruitment effort took place. Initially, the goal was to recruit organizations within a 50 mile radius of Presque Isle, Maine. However, due to the rural nature of Aroostook County, the recruitment area had to be expanded to ensure enough participants. Recruitment focused on getting a mixture of organizations from different components of the health care system, including physician practices, home health organizations, nursing homes, hospitals, etc. Direct mailings were sent out to organizations throughout the region and potential participants. Recruitment materials included a postcard and a flyer and were followed by a phone call with more information to those who were interested. One of the most important aspects of getting practices to participate in the Aroostook Collaborative was the influence of a senior level administrator, Dr. Jim Haley, who encouraged attendance. Generally, the Collaborative was portrayed as an information sharing opportunity that would provide resources and guidance on technology issues.

For the Bangor Area Collaborative, a more informal recruitment process was used. Although there was still an attempt to get a mixture of organizations from various components of the health care system, this was done informally. Most of the recruitment by project staff focused on EMHS and its affiliates, and the effort was made more difficult because there was no senior level administrator involved during the recruitment period and there was turnover in Collaborative staff during this recruiting time. Prior to the start of the two Collaboratives, team leaders from the participating organizations also completed surveys that provided baseline data for the evaluation and that also served to assess organizational technology needs.

Learning Sessions

Three Learning Sessions were held during each Collaborative. For the Aroostook Collaborative, the first was held in April 2006, the second in September 2006 and the third in April 2007. For the Bangor Collaborative, the first was held in June 2007, the second in November 2007, and the third in June 2008. The Learning Sessions had a variety of objectives. They were intended provide participants with information on the project, to provide them with tools needed to select and implement changes, to facilitate team-building, and to facilitate work across the organizations.

Of all the Learning Sessions, Learning Session 1 was particularly important for setting the stage, providing background information, and helping teams to initially plan the changes that were priority to their organization. During each of the Collaboratives, the first Learning Session lasted two days and provided information on goals and objectives of the initiative and an introduction to the IHI Collaborative Process, the Planned Care Model, and the Model for Improvement. There were presentations on technology topics, on the evaluation methods, and on the development of effective change teams. There was also a panel discussion on the integration of healthcare information. In addition, there were opportunities for teams to get together and brainstorm ideas for change and to develop goals and to meet with other organizational teams participating in the collaborative with which they share information (their organizations' external customers).

During the second Learning Session, teams had been implementing changes for more than four months. At the Learning Session, they were given the opportunity to share their

accomplishments and discuss challenges and barriers. Teams spent time brainstorming solutions to barriers, with input from other participants. The Learning Session was also used to educate participants about a Web Portal that was under development as part of the project to provide information to practices and patients on available community resources for improving health. In the afternoon, teams assembled to review and update their goals.

Each team reported briefly on their additional goals and plans for the future. During the third Learning Session, teams again reported on their overall cumulative successes and on the challenges they had faced during the project. Participants were also presented with information on telehealth, information on recent HIT projects implemented at EMHS, and a demonstration of the Aroostook Web Portal (<http://www.arostookhealth.org/>) or the Bangor Area Web Portal (<http://www.WhatYouDoMatters.org>). At the end of the day, teams met to plan for sustaining and expanding technology improvements in the future.

Results

The initial goal of this project was to provide assistance through the Break Through Series (BTS) Collaborative model for organizations to address patient information exchange issues. While some organizations identified information exchange projects, some organizations focused on implementing other technology and process changes that did not directly affect patient information exchange processes (although changes may have had indirect effects).

The most common changes among the organizations were the implementation of a secure email system and/or the use of a scanner to improve the efficient transfer of documents with patient information. At least 4 organizations also developed a referral template that could be used with the secure email system, while 3 focused on e-prescribing. Some organizations experimented with other technologies as well (See Table 1). The Aroostook practices tended to have a strong focus on secure email, scanners, and referral templates. The projects that were undertaken by the Bangor-Area practices were more diverse and ranged from patient registries to the addition of laptops to access patient records to Problem Knowledge Coupler (PKC) for phone triage to electronic-prescribing.

Because the nature of the changes implemented by participating practices varied so widely, the impact of the changes on practice workflow and on staff responsibilities varied widely. In addition, the impact on practice efficiency and patient safety varied widely.

Interviews with team leaders revealed that some team leaders perceived changes made during the project as very useful to their organization, citing improvements in practice workflow, patient safety, provider/staff satisfaction, etc. Other team leaders did not perceive the changes made by their organization as being particularly useful. Although changes were initially intended to be geared toward projects that would address patient information exchange issues, many of the organizations focused on technology and process changes that addressed other improvements needed in their organizations.

Some team leaders reported that the changes were very useful for the organization. For example, one Aroostook team leader reported that secure email and scanners made a big difference to his/her practice in terms of time and postage savings. A Bangor area physician reported that e-prescribing resulted in improvements in patient safety, as drug-drug interaction was less likely; the physician also reported improvements in patient satisfaction due to quicker

processing. A Bangor Area team leader whose organization had implemented Problem Knowledge Coupler reported improvements in patient satisfaction, in staff and provider satisfaction, and in patient safety. Additionally, another Bangor Area team leader reported a variety of improvements in practice efficiency and in patient/staff satisfaction.

Table 1. Summary of changes

Main Changes	# of Orgs reporting Implementation of Technology or Process: Aroostook	# of Orgs reporting Implementation of Technology or Process: Bangor Area	# of Orgs reporting Implementation of Technology or Process: Total
Secure Email	7	2	9
Scanner	6	1	7
Referral template	4		4
E-prescribing	1	2	3
Implementation of Problem Knowledge Coupler (PKC) for phone triage		2	2
Added laptops or other workstations to improve access to patient records throughout the building		2	2
Improved faxing processes		2	2
Created template for moving patients internally	1		1
Email protocols	1		1
System to track patient information and print physician orders	1		1
Sending physician orders using EMR	1		1
Wireless Internet access	1		1
Development of database to track medication safety issues		1	1
Improved access to EMRs of referring hospitals		1	1
Tanberg conferencing equipment		1	1
Electronic supply ordering		1	1
Live answering of phone system		1	1
Improved access to hospital system for medical reports		1	1
New patient registries created which extract information from EMR		1	1
Electronic Prior Authorization form created		1	1

In other cases, team leaders anticipated that technology/process changes would become more useful as time went on because they had not yet been completed. For example, one Aroostook organization was still waiting for the IT department to conduct training on secure email and to implement scanning capabilities. Another organization was waiting for a contract to be signed to initiate e-prescribing. The team had accomplished all that it could without the contract being signed but the actual signing of the contract was outside of the team’s control.

Still other team leaders reported that they would become more useful as they became more widely accepted among external customers. For example, the pharmacies working on e-prescribing reported that the changes were currently more cumbersome to their workflow because they were not yet widely used but that once e-prescribing becomes a standard and used by half of their clients, it will be more efficient than the prior process.

Finally, some team leaders reported that the changes would have occurred with or without the participation in the Collaborative. This was particularly evident among the Aroostook County organizations. One Aroostook County team leader said, “The changes had little effect on the workflow/process at our organization.” Another said, “We made some accomplishments, but they were things we were working on already... We didn’t really accomplish anything that was due to this project.” A third Aroostook leader expressed frustration with his/her team’s attempts to develop an electronic referral process with another organization, “We ended up getting frustrated as we tried to follow through and reverted back to doing it the old way.” Although Bangor Area team leaders appeared to be more likely to perceive that the changes were useful, at least one Bangor Area team leader reported that, “There were no real outcomes related to our goals.”

Changes Resulted in Technologies/Processes that Tended to Be More Efficient, that Reduced Errors, and that Improved Security of Information

Team leaders were asked their opinions on the process/technology used prior to the beginning of the project (pre-) and the process used by the end of the project (post-) (See Figure 1). Some questions were asked during both Collaboratives, while others were TAMC Chronic Care Technology Project: Evaluation of the Aroostook Collaborative asked only to the Bangor-Area participants. A total of 15 team leaders completed both pre- and post- surveys.

By the end of the Collaborative, team leaders tended to report that the new processes/technologies they were using required fewer resources, resulted in fewer errors, and were more secure. In most cases, substantial changes occurred. For example, before the project, more than 60% of team leaders reported that the process/technology they were using created problems with the security of health information; after the project, less than 10% reported that there were security issues with the new process/technology. With the new process/technology, a substantial portion of team leaders reported reductions in errors, improvements in completeness of information that is received and transmitted, timelier receipt/transmittal of information, and reductions in cost to the organization. By the end of the project 100% of the Bangor area team leaders also reported that they felt comfortable that health information was secure with the new processes they were using.

Additional data collected in the Bangor-Area collaborative confirms that the changes made during this project reduced errors and improved the frequency that information transferred and received is complete and easy to read and interpret (See Tables 2 and 3).

Table 2. Perceptions of learning session participants on frequency of meetings

How did you meet with your team during the Action period?*	Results of Learning Session 3 Survey: Aroostook	Results of Learning Session 3 Survey: Bangor	Results of Learning Session 3 Survey: Total	Results of Learning Session 3 Survey: P-value
Met regularly	19%	53%	37%	0.009
Met once or twice	27%	11%	19%	0.125
Did not have formal meetings but got together informally when possible	54%	32%	43%	
Communicated in other ways (phone, email)	42%	39%	41%	0.091
We did not communicate	0%	0%	0%	0.520

* Respondents could check more than one response.

Process Evaluation

Planning and organizing a BTS Collaborative around technology issues in rural Maine posed some significant challenges, including the recruitment of an adequate number of team. The project team found that the recruitment process was more difficult than expected and was particularly difficult in the second year (Bangor-Area Collaborative) because of project staff turn-over and the lack of a senior-level administrator in the Bangor Area to promote the Collaborative.

For recruitment to proceed smoothly, senior leadership at the systems level must promote the value of a Collaborative and engage leadership at the organizational and practice level early on. Organizational leaders must see the benefits of participation and be willing to make a significant commitment to participation before signing up. Senior level leadership at the health systems level should be accompanied by dedicated project staff who can carry out the day-to-day work of recruitment, including identifying potential participants and answering questions and doing extensive work with teams and leadership before the first Learning Session to ensure that teams have a full understanding of the commitment required. Both of these levels of recruitment (administrator level and project staff level) were lacking in the Bangor-Area Collaborative, which made recruitment efforts more difficult. Ideally, enough teams would be recruited to enable a selective process in which only teams that appear to be "ready for change" and have the elements necessary for success (e.g., leadership, organizational buy-in, IT support) would be included.

Beyond recruitment, the project team learned that involvement of IT specialists from the first Learning Session onward – both organizational level specialists and system level specialists – is essential. Involvement of IT support from the start ensures that projects are in-line with system-level priorities, that they are feasible, and that they will not be duplicative with other planned projects.

Table 3. Perceptions of learning session participants**Table 3a. Before the Learning Session 1**

	% Who Agreed (N=64)
There were people available to answer our questions about the goals of the collaborative and the expectations for our team.	83
My organization received the information it needed to assemble a team that would have all the skills and interests necessary to make this project successful.	67

Table 3b. Now that I have attended Learning Session 1

	% Who Agreed (N=64)
I have a better understanding of the goals of the Collaborative.	97
My team has the tools and understanding to form an effective change team.	95
I have a better understanding of how a PDSA cycle can be used to help implement technology changes.	95
Our team was able to successfully create organizational goals that are in line with the Collaborative goals.	95
My team has the information it needs to work with other organizations to adopt technology.	94
I have a better understanding of the Planned Care Model and Model for improvement.	91
My team has the information it needs to make informed decisions about technology adoption.	91

Table 3c. Teams and consensus-building during Learning Session 1

	% Who Agreed (N=64)
Our team was able to reach consensus on how our organization will implement our identified changes.	86
Because of our involvement in this Learning Session, a wide variety of people in our organization will have input into the changes we make.	81
Our team was able to reach consensus on the changes we will make.	79
During the brainstorming session, our team came up with ideas we wouldn't have otherwise considered.	77

Table 3d. Responses after Learning Session 3

	% Who Agreed (N=55)
Our team had an adequate understanding of technology to implement our action plans.	89
Our team has developed realistic, workable action plans.	87
The information gained through participation in LS1 and LS2 enabled us to overcome barriers and adjust when changes were not working.	58
Our team's action plans have changed significantly since the first learning session..	51

Effectiveness of the Breakthrough Series Model

Despite the barriers faced by participating practices and associated frustrations, participation and interest in the project was maintained. For certain teams, the BTS Collaborative generally was effective at getting teams together to start working on technological issues and prompting organizations to begin to use existing technology or that identify additional needs for technology. In some cases, small projects had significant impacts on practice efficiency and patient care, and, even among teams that made little progress, the identification of new needs and the team building that occurred as a result of the BTS process are expected to lead to additional changes in the future.

For still other teams that were planning to make technology advancements within their organization(s), the BTS Collaborative was used to facilitate those changes faster and forge new relationships in the health system for future projects.

For the most part, participants in the collaborative came to the meeting with far greater clinical and administrative skills than knowledge and experience with technology. Previously, the vast majority of IT projects were driven by information technology departments. The activity of this project significantly improved the technology literacy of the project participants and made them not only more knowledgeable about what was available to aide their processes, but also provided them with the ability to better communicate information technology solutions and be a better partner with their technology departments.

Impact of Technology Adoption on Practice Efficiency and Patient Safety

For most organizations, the technologies adopted in this project tended to be relatively simple in nature (secure email, scanners, development of referral templates, addition of work stations). However, some practices did implement more technically challenging projects (e-prescribing, Problem Knowledge Coupler). In general, the new processes/technologies implemented through the Collaboratives required fewer resources, resulted in fewer errors, and were perceived to be more secure. They improved the frequency that information transferred/received was complete and was easy to read and interpret.

It is interesting that, even in those practices that made only small changes, changes resulted in significant improvements in practice efficiency. Perhaps one of the most important take-away messages from this project was that, for many of the small, rural Maine practices who participated in our Collaborative, even simple, comparatively cheap technologies like secure email or scanning systems can have important and significant impacts on practice efficiency and patient safety. Additionally, unlike organizations who came into the Collaborative with major technology projects they were planning to focus on, the organizations that focused on small, incremental changes were less likely to have completed their projects without the impetus of the Collaborative. Thus, these improvements to practice efficiency and patient safety would not have been achieved without the BTS Collaborative.

Impact of Technology Adoption on Patient Care Management

This project was intended to help organizations implement technology solutions that would improve care as described in the Planned Care Model. Although actual improvements in patient care and patient health outcomes were not documented quantitatively, our interviews with team leaders and surveys of team leaders indicated that team leaders tended to perceive that their projects improved patient care in some way, whether that was improving the process of care, strengthening the care team, improving the efficiency of interactions with existing collaborators in the community, providing support for delivering evidence-based care, or providing better access to patient data.

List of Publications and Products

Aroostook Area Health Web Portal. Copyright 2007
Institute for Medical Improvement, AHRQ Contract No.
UC1 HS 016154. Agency for Healthcare Research and
Quality, Rockville, MD. <http://www.aroostookhealth.org>

Penobscot/Piscataquis Area Health Web Portal. Copyright
2008 Institute for Medical Improvement, AHRQ Contract
No. UC1 HS 016154. Agency for Healthcare Research and

Quality, Rockville, MD.
<http://www.whatyoudomatters.org>

Deprez R, Kinner A, Cattabriga G, et al. Center for Health
Policy, Planning and Research, University of New England.
*Final Evaluation Report of The Aroostook Medical
Center's (TAMC) Chronic Care Technology Project.* 2009.
Agency for Healthcare Research and Quality, Rockville,
MD, AHRQ Contract No. UC1 HS 016154. 2009 Feb