

Implementing Colorectal Cancer Screening in Community Health Centers

Addressing Cancer Health Disparities Through a Regional Cancer Collaborative

Stephen H. Taplin, MD, MPH,* David Haggstrom, MD, MAS,†‡§¶|| Tracy Jacobs, RN,||
Ada Determan, MPH,# Jennifer Granger, MPH,** Wanda Montalvo, RN, ANP,††
William M. Snyder, PhD,‡‡ Susan Lockhart, PhD,§§ and Ahmed Calvo, MD, MPH#

Background: The population served by Federally Qualified Health Centers (FQHCs) has lower levels of cancer screening compared with the general population and suffers a disproportionate cancer burden. To address these disparities, 3 federal agencies and a primary care association established and tested the feasibility of a Regional Cancer Collaborative (RCC) in 2005.

Methods: RCC faculty implemented a learning model to improve cancer screening across 4 FQHCs that met explicit organizational readiness criteria. Regional faculty trained “care process leaders,” who worked with primary care teams to plan and implement practice changes. FQHCs monitored progress across the following measures of screening implementation: self-management goal-setting; number and percent screened for breast, cervical, and colorectal cancer; percent timely results notification; and percent abnormal screens evaluated within 90 days. Progress and plans were reviewed in

regular teleconferences. FQHCs were encouraged to create local communities of practice (LCOP) involving community resources to support cancer screening and to participate in a monthly teleconference that linked the LCOPs into a regional community of practice. Summary reports and administrative data facilitated a process evaluation of the RCC. χ^2 test and test of trends compared baseline and follow-up screening rates.

Results: The RCC taught the collaborative process using process leader training, teleconferences, 2 regional meetings, and local process improvement efforts. All organizations created clinical tracking capabilities and 3 of the 4 established LCOPs, which met monthly in an regional community of practice. Screening documentation increased for all 3 cancers from 2005 to 2007. Colorectal cancer screening increased from 8.6% to 21.2%.

Conclusions: A regional plan to enable collaborative learning for cancer screening implementation is feasible, and improvements in screening rates can occur among carefully selected organizations.

Key Words: colorectal cancer screening, quality improvement, health disparities

(*Med Care* 2008;46: S74–S83)

From the *National Cancer Institute (NCI), Bethesda, Maryland; †VA Health Services Research & Development Center of Excellence on Implementing Evidence-Based Practice, Roubush Veterans Affairs Medical Center; ‡Indiana University Center for Health Services and Outcomes Research, Regenstrief Institute; §Division of General Internal Medicine and Geriatrics, Department of Internal Medicine, Indiana University School of Medicine; ¶Indiana University Cancer Center, Indianapolis, Indiana; ||Institute for Healthcare Improvement (IHI), Cambridge, Massachusetts; #Health Resources Services Administration (HRSA), Rockville, Maryland; **Community Health Center Association of Connecticut (CHCACT), Newington, Connecticut; ††Community Health Center Association of New York, New York, NY; ‡‡Social Capital Group, Cambridge, Massachusetts; and §§Centers for Disease Control and Prevention (CDC), Atlanta, Georgia.

Supported by an Inter-Agency-Agreement between HRSA and the CDC for support of the teams, faculty, and infrastructure; in-kind contributions from the National Cancer Institute for the time, travel, and activity of Dr. Taplin; from HRSA for the infrastructure of the internet based Knowledge Management System for sharing of insights and data as well as in kind contribution of staff time, travel, and activity of Dr. Calvo and Ada Determan; and in kind support from CDC with regards to staff time, travel, and activity of Dr. Susan Lockhart.

This work was conducted by the individuals noted and cannot be construed to represent the opinions of the federal government or any of its agencies.

The opinions and conclusions are solely those of the authors.

Reprints: Stephen Taplin, MD, MPH, 6130 Executive Blvd., MSC 7344, Bethesda, MD 20892. E-mail: taplins@mail.nih.gov.

Copyright © 2008 by Lippincott Williams & Wilkins
ISSN: 0025-7079/08/4600-0074

It is widely recognized that Americans do not receive recommended health care,¹ particularly the uninsured and underinsured.² Evidence indicates that, compared with the general population, the uninsured and underinsured get less screening for breast (58% vs. 70%), cervical (69% vs. 82%), and colorectal cancer (20% vs. 40%) and suffer disproportionate cancer morbidity and mortality.^{3–6} Evidence from randomized trials and observational studies of cancer screening suggest that reaching the unscreened will substantially affect cancer morbidity and mortality.^{7–11} To address low screening rates among the uninsured and underinsured, the Health Resources and Services Administration (HRSA), the Centers for Disease Control and Prevention (CDC), and the National Cancer Institute (NCI), developed the Regional Cancer Collaborative (RCC). This article describes this demonstration project and its results.

The foundation for this demonstration project was HRSA's "Health Disparities Collaboratives (HDC)" that began in 1998 to promote a systems approach to health care improvement.¹²⁻¹⁴ The HDC model involved 20-30 clinic teams (eg, receptionists, medical records clerks, nurses, physicians) meeting with national experts in large learning sessions, addressing specific disease conditions and developing quality improvement plans to address these conditions in their local health centers.^{15,16} An HDC-model collaborative addressing cancer occurred among 21 teams from 2002 to 2004. In 2005, nearly 800 Federally Qualified Health Centers (FQHCs) were operating around the United States, but only half of them had at least 1 team trained in the collaborative process for one or more conditions.

Based on the experience with the HDC model, a need existed for an approach that could: (1) reach all the primary care providers in HRSA-supported institutions, (2) use fewer resources and less time away from health centers, and (3) make changes that affect the care of a larger proportion of the people served by FQHCs. The RCC was developed in 2005 as a demonstration project to test the feasibility of meeting these goals by teaching the collaborative model through primary care associations. This article describes the demonstration project, results of a process evaluation to identify key cancer screening implementation activities, and the activities' impact on cancer screening rates, including those for colorectal cancer.

METHODS

Demonstration Project Setting and Overview

HRSA currently provides partial support to at least 1365 privately operated FQHCs around the United States serving 14 million people (40% uninsured). Many (64%) of those served by FQHCs are from minority populations, including 23% Black/African American, 3% Asian American/Pacific Islander, 1% American Indian/Alaska Native, and 36% Hispanic/Latino (HRSA 2005 Uniform Data Set). FQHCs vary in their organization but operate as independent businesses that fund their operation through insurance reimbursements, fees, and subsidies. FQHCs may include 1 or more primary care centers, which may include 1 or more primary care teams (physician or physician's assistant, nurse practitioners, nurses, receptionists, and medical records staff). Nationally, more than 50 HRSA-funded Primary Care Associations in the states and territories assist the FQHCs in meeting their mission. The Community Health Center Association of Connecticut (CHCACT) led the Northeastern United States activities (Health and Human Service Regions 1 and 2) when this demonstration project occurred there.

Organization Selection

The regional nurse/administrative leader for HDCs in regions 1 and 2 recruited the FQHCs for the RCC based on explicit criteria:

The FQHC had to

1. Include a team that previously completed an HDC collaborative (diabetes, cardiovascular disease, asthma, or depression) or equivalent;

2. Demonstrate high performance in their collaborative work;
3. Have organizational leadership that would give teams the time and encouragement to actively influence practice in all its clinical sites;
4. Have a computerized clinical management system capable of managing thousands of patients, including identifying patients eligible for cancer screening, identifying patients' cancer screening status, tracking patients with abnormal screening results and sending appropriate reminders, and tracking the relevant variables for other conditions for similar planned care;
5. Be able to enter the entire population eligible for screening into the clinical management system;
6. Be willing to send staff for training as "care process leaders."

After identifying potentially eligible organizations, the CHCACT project leader (WM) performed telephone and in-person interviews with FQHC leaders to assess their information system against the criteria, and subjectively evaluate their enthusiasm for the project and willingness to commit the time and personnel necessary for success.

Teaching Model

The challenge was to transform the traditional HDC national model into a regional model capable of facilitating the cancer collaborative teaching activities by regional and local leaders. To achieve this end, we developed 3 distinct groups of faculty:

1. National faculty were responsible for the core content of cancer screening and the process of health care evaluation and change. This faculty included a primary care physician/researcher and breast cancer screening expert from NCI [0.2 Full Time Equivalent (FTE), ST], an Institute for Healthcare Improvement nurse and care process expert, (0.35 FTE, TJ), an American Cancer Society colorectal cancer expert (15 hours), university faculty in cervical and colorectal cancer (15 hours each), and primary care experts in information technology and care processes (80 hours);
2. Regional faculty trained process leaders and facilitated their work at each health center. This faculty included an administrative leader (0.2 FTE, JG), support staff (0.2 FTE), a nurse/administrator (0.35 FTE, WM), and a CHCACT information technology specialist (0.25 FTE);
3. Local faculty, established the measurement systems, evaluated the care processes in their organizations, and led other provider teams to make changes in their care processes. This faculty included the process leader, physicians, nurses, information technology specialists, and staff (average of 4 FTE/team with an aggregate of 950 hours/team).

Process Leader Selection and Training

The care process leaders, who worked with the primary care teams and administrative personnel, were identified as respected opinion leaders with sufficient authority within the administrative structure to manage change. They were clinical practitioners interested in improving clinical processes, clinical quality staff leaders or champions interested in clinical quality improvement, or administrators responsible for clinical integration strategies.

At least 1 person from each FQHC was sent to a 2-day Process Leader training session early in 2005. The Process Leaders learned about the Chronic Care Model,¹⁷ which categorizes factors relevant to care processes and planning such as “decision support,” “self-management support,” “clinical information systems,” and “community,”¹⁸ and how to evaluate health care processes (eg, screening, timely follow-up) within this model. They also learned about the Plan/Do/Study/Act (PDSA) Model for improvement developed from industrial quality improvement efforts.¹⁹ Process leaders facilitated team engagement in multiple small PDSA cycles, in which teams would plan (P) a change [eg, whether standing orders for fecal occult blood testing (FOBT) could be followed by those to whom they were delegated], do (D) it, study (S) the results with quick measures, and act (A) to make changes in care in short periods of time (days, weeks) based on what was learned. Leaders also encouraged teams to critically evaluate their care and plan changes.

Implementation

The faculty carried out a variation on the train-the-trainer model of education in the cancer collaborative process. Instead of a top-down training cascade, a collaborative exchange of expertise was used. National faculty had cancer screening and change process expertise and regional faculty had knowledge of local conditions and change process experience. National faculty worked with the regional faculty to enable process leaders and their teams to use information systems, evaluate care process, and implement changes at local primary care clinics. The teams also implemented specific care activities they thought would increase their screening rates based on evidence and the face validity of the work. “Cancer Control Activities” were specific actions undertaken that involved one or more team members to assess or change their daily practice with respect to cancer screening. The national faculty facilitated monthly teleconferences with FQHC teams, conducted 2 in-person educational sessions for FQHC teams, and convened monthly teleconferences with organizational representatives and regional members from the Communities of Practice, described below. All faculty members participated in the collaborative for 1 year ending March 31, 2006. The teams continued their work beyond that date.

National and regional faculty worked with the care process leaders and 4 FQHCs to enhance the health center teams’ understanding and implementation of cancer control activities. This approach included several steps called “planned cancer screening,” which were expected to increase cancer screening rates based on earlier experiences and evidence from the cancer control literature^{20–24}:

1. Enter the entire eligible population into a clinical management system;
2. Participate in monthly teleconferences to review screening content and implementation challenges;
3. Review the screening rates and consider practices using the Chronic Care Model;
4. Use Cancer Planet (<http://cancercontrolplanet.cancer.gov>) and available evidence to plan specific improvement cycles and test and implement changes in care (activities); and

5. Engage community resources to create a Local Community of Practice (LCOP) focused on improving local screening rates and cancer care capabilities.

Communities of Practice

At the local level, FQHCs did not have the capacity to provide complete care for people with abnormal screening tests and cancer diagnoses, and few had partnerships with the full array of available community resources. The RCC therefore formed an LCOP around each FQHC (Fig. 1)—voluntary groups of people who learned and worked together on issues of shared interest or concern.²⁵ Figure 1A describes key elements of the LCOP: its domain (area of focus), the community involved, and the activities undertaken (practice).

Simultaneously, the NCI sponsored a Regional Community of Practice (RCOP) (Fig. 1B), which provided a multistate forum for sharing ideas, identifying resources, and encouraging action on local community-building efforts. For example, members described new approaches to FOBT screening and methods for launching an LCOP and establishing an on-line directory of collaborating organizations. Regional community members included researchers focused on cancer health disparities, American Cancer Society leaders, State Health Department Comprehensive Cancer Plan leaders, and State Breast and Cervical Cancer Program administrators. Regional community members participated in the 2 in-person education sessions and monthly teleconferences. The national faculty (ST) worked with regional participants in the RCOP, establishing the agenda and encouraging discussion and knowledge-sharing on key issues.

Measurement

A fundamental aspect of the RCC was the measurement of screening processes to guide changes. Health center teams reported 6 measures of screening implementation, including self-management goal setting; rates of screening for breast, cervical and colorectal cancer; rates of timely test result notification for any of the 3 cancers; and rates of diagnostic evaluation within 90 days of abnormal screens for all 3 cancers (Table 1). Teams recorded the measures from automated clinical management systems beginning in September 2005 and reported them to a central data repository on a monthly basis through February 2007. Numerators for the self-management goal setting came from data entry sheets that were incorporated into the flow of care. The data entry form was also a part of the medical record and included documentation of the discussion and recommendation for screening (shared decision making). The occurrence of the test was documented in laboratory and administrative data. The denominator for all screening measures was all those age-eligible for screening who had 1 or more primary care visits to the FQHC in the previous 3 years. The teams reported their progress on a secure data repository and discussed them in the monthly calls.

Process and Impact Evaluation

The process and impact evaluation included collecting descriptive data, reviewing and describing the team’s cancer

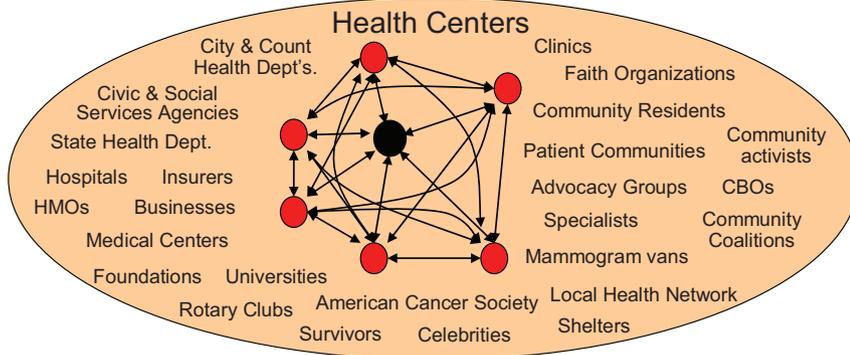
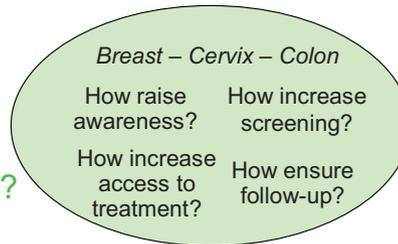
A

Goal: Maximize community resources to reduce cancer morbidity and mortality

Domain: What issues to address?

Community: Who to engage?

Practice: How to learn and work together?



B

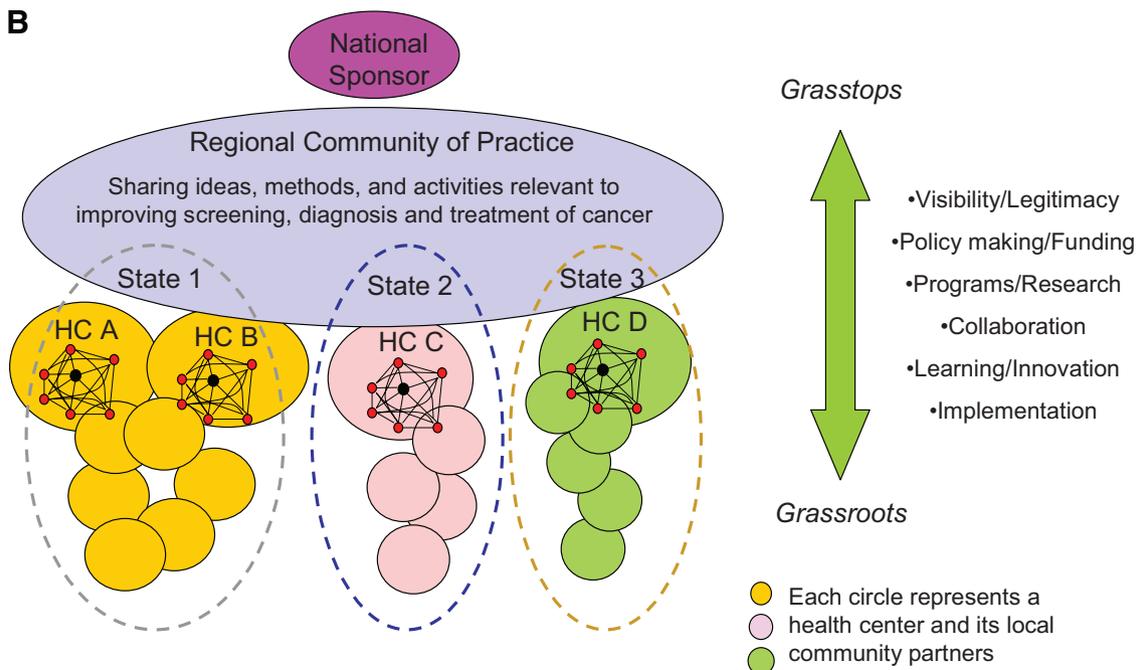


FIGURE 1. Local and regional communities of practice. A, Local community of practice at the level of a federally qualified health center. Goal: Maximize community resources to reduce cancer morbidity and mortality. B, Regional community of practice. Goal: Learn and share successful strategies.

TABLE 1. Screening Measures

Measure*	Definition*
1. Self-management goal setting	Percent of patients (women ≥ 21 yr of age and men ≥ 51) having documentation of a discussion of age-appropriate cancer screening (shared decision making)
2. Mammography screening	Percent of women ≥ 42 yr of age who have had a mammogram in the previous 2 yr
3. Cervical cancer screening	Percent of women age ≥ 21 who have had a Pap smear within the prior 3 yr*
4. Colorectal cancer screening	Percent of adults age ≥ 51 who have been appropriately screened for colorectal cancer FOBT within 1 yr Sigmoidoscopy within 5 yr Colonoscopy within 10 yr
5. Notification of results	Percent of screened patients having documented notification of mammogram, PAP and colorectal cancer screening results within 30 d
6. Completion of follow-up care	Percent of patients requiring additional evaluation and/or treatment completing that assessment/treatment within appropriate time frame

*For details of how the measures were taken see the cancer section of the Health disparities collaboratives website at <http://www.healthdisparities.net/hdc/html/collaboratives.topics.cancer.aspx>.

control activities, and collecting and analyzing data on screening rates. We collected descriptive data for this article through several sources: monthly team reports of screening rates, online planning documents for team activities, summary narrative reports about team activities, and HRSA health center demographic data. We summarized the cancer control activities from monthly written team narratives and a separate aggregate report abstracted from these narratives for the monthly calls. The aggregate report informed teams about how others successfully executed activities. All reports and summaries were reviewed by the national care process expert (TJ) and activities were grouped by the kind of care activity undertaken.

We conducted a before-after analysis of the screening measures at the organization level using a χ^2 test and a test of trends. The analysis excluded the first 2 months of observation when the centers were developing their measurement systems. One center did not report the measure regarding results notification and was therefore excluded from that analysis. We compared the proportions meeting measures at baseline to the proportion meeting them in February 2007.

RESULTS

Among 292 FQHCs in the targeted geographic region, 21 met the initial selection criteria. After interviews with the regional leader, 4 met the final criteria and accepted the invitation to participate. To maintain their anonymity they were called organization A, B, C, D. Two factors limited eligibility. The first was institutional leaders who did not show interest or would not make explicit commitments of time and resources to the project. The second was data systems that were not capable of handling the large denominator, identifying screening status, or sending reminders to patients.

The 4 organizations meeting the criteria served populations that varied in size from about 8000 to 40,000 people. They had large uninsured populations (13–53%) and large minority populations (60–99%). The number of primary care sites within the organizations varied from 1 to 6. The FQHC teams entered approximately 43,000 individuals in their registries through February 2007. Table 2 provides a full description of the populations.

The project demonstrated the feasibility of a regional approach to learning and care process improvement. The 4

organizations established process leaders, implemented changes in their practices, and participated in their RCOP. The teams conducted PDSA cycles, organized their care, and implemented changes. Faculty participation varied in accordance with learning demands. For example, the primary care experts met on most team calls, but the cervical cancer expert only attended calls and meetings related to cervical cancer screening. Two faculty members participated in all the calls and meetings, and all faculty members participated in educational sessions.

The implementation activities undertaken within the FQHCs during the intervention year are summarized in Table 3. Some activities were more difficult to execute than others. For example, one “common sense” activity—“establish the denominator of care”—seemed simple but turned out to be very difficult. Identifying the denominator from the billing system was relatively easy, but most sites resisted the work burden of entering hundreds of people into their automated management system even though it was critical to measurement and other activities. Entering people one-by-one as they were seen seemed easier, but was ultimately inaccurate and created falling cancer screening rates because people were entered into the denominator for those rates faster than they were entered in the numerator. Automated transfer of the whole demographic database for the denominator of care was the challenging but preferred method. Activities sometimes were concentrated on 1 cancer type to address its unique aspects. For example, 1 site developed a same-day appointment system for Pap smears so women could “walk-in” to be seen or be triaged there during the course of care for other conditions. The single unifying theme of the activities were that teams thought about the entire screening process and then identified activities that would clarify problems and/or improve the processes.^{2,3}

For colorectal cancer, sites varied in their activities but all sites “mapped” how a patient moved through the clinic during a routine appointment and then whether each step in the screening process could be improved. For example they redesigned how screening for colorectal cancer was offered so that receptionists and practical nurses presented information on screening, laboratory technicians gave instructions on FOBT (the predominant screening technique), and physicians

TABLE 2. Descriptors of 4 Federally Qualified Health Centers in the Regional Cancer Collaborative

Organization	A		B		C		D	
	N	%	N	%	N	%	N	%
Population size								
Male users	16,401	41.5	9419	39.5	9907	38.3	3494	42.8
Female users	23,164	58.5	14,445	60.5	15,940	61.7	4663	57.2
<i>Total all users</i>	39,565	100.0	23,864	100.0	25,847	100.0	8157	100.0
Encounters in one year*	106,389		74,835		125,658		22,462	
Population demographics								
Race (all users)								
Asian/Pacific Islander	1112	2.8	301	1.3	71		42	
Black/African American (not Hispanic or Latino)	5246	13.3	2034	8.5	3880	15.0	3031	37.2
American Indian/Alaska Native	127	0.3	40	0.2	49	0.2	34	0.4
White (not Hispanic or Latino)	15,662	39.6	4430	18.6	297	1.1	261	3.2
Hispanic or Latino (all races)	16,676	42.1	16,196	67.9	21,131	81.8	3426	42.0
Unreported/refused to report	742	1.9	863	3.6	419	1.6	1363	16.7
<i>Race total</i>	39,565	100.0	23,864	100.0	25,847	99.7	8157	99.5
Estimated size of target population†								
Females—20–44 yr of age	8928	48.1	6491	59.3	5629	45.5	1965	54.1
Females—45 and above	5656	30.5	2834	25.9	4424	35.8	1013	27.9
Males—45 and above	3959	21.4	1618	14.8	2318	18.7	657	18.1
<i>Total target population (approximate)</i>	18,543	100.0	10,943	100.0	12,371	100.0	3635	100.0
Number in cancer registry (January 2007)	16,820		7539		11,072		3182	
Insurance status (all users)								
Private	4190	10.6	1764	7.4	1551	6.0	1261	15.5
Medicaid	23,638	59.7	7010	29.4	17,994	69.6	2125	26.1
Medicare	2665	6.7	1158	4.9	2306	8.9	358	4.4
Uninsured	9072	22.9	10,976	46.0	3513	13.6	4402	54.0
Other	0	0.0	2956	12.4	483	1.9	11	0.1
<i>Total</i>	39,565	100.0	23,864	87.6	25,847	98.1	8157	99.9
Staffing								
No. medical staff‡	72.68	28.9	60.49	34.3	105.29	36.2	22.34	21.1
No. enabling staff§	37.15	14.8	22.32	12.7	31.62	10.9	18.25	17.3
No. other staff¶	141.74	56.3	93.62	53.1	154.32	53.0	65.12	61.6
<i>Total staff</i>	251.57	100.0	176.43	100.0	291.23	100.0	105.71	100.0

*Users include dental and other services. Medical users are from 70% to 96% of all users in these centers.

†Available administrative data does not allow aggregation by the exact age ranges of target populations for screening. Numbers reflect people with at least one visit in a year.

‡Medical staff = Doctors (not psychiatrists), NPs, PAs, CNMs, nurses, other med personnel, laboratory personnel, x-ray personnel.

§Enabling staff = Case Mgr, Educ Spec, outreach, transportation staff, other enabling services.

¶Other staff include = Medical, dental, mental health, substance abuse, other prof, pharmacy, admin & facility staff.

Source: HRSA administrative data.

encouraged its use. The mapping and redefined roles and processes occurred through active discussions within the organizations and clinical teams. Some sites incorporated standing orders for FOBT so staff could identify and refer eligible adults for FOBT. Most sites struggled with clarification of FOBT screening instructions because they were universally recognized to be poorly written. One site received a small grant for professionally designed promotional information with stories and photographs from patients to motivate colorectal cancer screening. They also developed a set of visual instructions for FOBT performance.

Three organizations developed an active LCOP (Fig. 1A). FQHC coordinators convened diverse stakeholders, including hospitals, nonprofits, and city agencies to learn more about working together to improve cancer screening and

follow-up in vulnerable populations like the uninsured. The community-of-practice approach was a major shift for many centers from partnerships with a single organization toward a more inclusive, multilateral strategy with many organizations. Health centers organized community-wide breakfast meetings, for example, in which 10–20 organizations participated in discussions of screening rates and other domain priorities. These sessions generated ideas and participants worked together to implement them. Examples stemming from these meetings included weekend screening sessions, special events, development of new treatment resources, and a redesign of the medical referral process for enrollment in the state breast and cervical cancer screening program. Local leadership, provided mainly by skilled health center coordinators, was a key success factor for LCOP.

TABLE 3. Cancer Screening Implementation Activities

Activity	Description	Health Center			
		A	B	C	D
Senior leadership support and accountability ensured ³⁴⁻³⁷	Senior leader for center gave explicit support for project, gave time for meeting, and was kept up-to-date on progress. Examples of leadership include: participation in team meetings and actively engaging with groups to meet diagnostic and screening needs of the population (D); authorizing creation of a core executive team to coordinate improvement activities among sites (A); arranging regular time to meet with site process leaders (A); and allocating funds to produce a CRC screening brochure and enhanced patient FOBT instruction (B).	✓	✓	✓	✓
Process leader trained*	At least 1 member of the center was trained in the Chronic Care model and change models at a 1-day regional meeting	✓	✓	✓	✓
Establish denominator for care	Used billing records to establish the size of the population of women ages ≥21 and men ≥50 with at least 1 visit in the prior 3 yr. The first step was to identify the population in the billing database. The second step was to find a clinical management system capable of providing screening reminders in the course of care as well as track individuals' screening and follow-up status. The last step was to move the population into that clinical management system. Even if the clinical management system could manage the size of the database, it was either a large data entry task or the more sophisticated teams were able to enter the entire set of individuals electronically	✓	✓	✓	✓
Reminder systems implemented ²¹	Mechanisms to signal a person is due for breast, cervical, or colorectal cancer screening at the time of any encounter. Methods varied from a chart review and note (A) to special screening status cards placed on the chart (C) to an automated encounter form with flagged items printed from computerized management system (B)	✓	✓	✓	✓
Feedback to providers ³⁸	Monthly reviews of team measures. Clinic A also had reports of provider-level measures available to each provider and team	✓	✓	✓	✓
Providers educated on guidelines	Education regarding screening and follow-up guidelines for all providers. All sites reviewed target measures and USPSTF recommendations and one included training by American Cancer Society (ACS) staff (C)	✓	✓	✓	✓
Care processes mapped and gaps identified ^{39,40}	Systematic review of the progression of a patient and screening paperwork, specimens, lab results and clinical reports through their usual course (mapping). This mapping also involved identifying staff responsibilities during the course of this process	✓	✓	✓	✓
Team roles defined and redefined ^{24,30,39}	Discussion among clinical teams to clarify individual responsibilities for introducing, discussing, referring, and following up with patients on each screening test during the course of usual care	✓	✓	✓	✓
Consistent care management personnel identified ^{41,42}	Person(s) was designated to oversee internal and external coordination of care and information flow, and to act as primary contact for patient in screening process (B, D)	✓	✓	✓	✓
Standing orders	Physicians wrote orders and completed necessary referrals in advance so staff could refer for screening tests in all individuals who were age eligible and asymptomatic	✓	✓	✓	✓
Culturally and literacy appropriate patient educational materials obtained or developed ⁴³	Staff wrote single page summaries to document the discussions of each screening test and obtained or wrote materials that explained each screening test. One center developed a set of wordless instructions for FOBT testing and a promotional photo brochure (B). Others adopted ACS materials by contacting the ACS representative they met through the community of practice (A, C, D)	✓	✓	✓	✓
Greater access to diagnostic and follow up care established via community linkages	Leadership from the Health Centers established contacts with specialists to assure diagnostic and follow-up care would occur. Arrangements varied from formal relationships marked by agreed fee schedules and support by HCAP grants, to informal networks of willing providers. Specific examples include local specialists performing mammography twice a month on "Screening Saturdays" (C) and free or low-cost colonoscopies (A); a dedicated day at a local hospital for health center patients to receive colonoscopies (D), and policy changes in National Breast and Cervical Cancer Early Detection Program (NBCCEDP) program to facilitate enrollment and access (B)	✓	✓	✓	✓
Community stakeholders identified and engaged on ongoing basis in a community of practice ²⁵	Teams began meeting with groups of community contacts together to establish a local community of practice. These communities of practice varied from creating a county-wide coalition of organizations including representatives from the NBCCEDP, the ACS, professional organizations and clubs, and the health center (B) to breakfast meetings with relevant groups in an urban setting (C) to the creation of various task forces to address pressing issues (advocacy for under and uninsured, insurance and finance, clinical guidelines, data collection and tracking). One group contacted relevant University and Specialty Groups but did not establish an ongoing forum (A).	✓	✓	✓	✓

Source: Abstracted from monthly team reports, online team planning documents, and summary discussions.
 *Additional background information and a description of the process leader training may be found at: <http://www.healthdisparities.net/hdc/html/collaboratives.topics.cancer.aspx>.

TABLE 4. Population Screening Measurements

Population Screening Measurements	Baseline			Follow-up			Before/After* P
	Eligible Population	No. Meeting Guideline November 2005	% Meeting Guideline	Eligible Population	# Meeting Guideline February 2007	% Meeting Guideline	
Self-management goal setting	38,492	777	2.0%	40,732	6215	15.3%	<0.001
Screening rates for:							
Breast cancer	15,054	3034	23.2%	16,999	6738	39.0%	<0.001
Cervical cancer	33,711	15,481	25.2%	38,016	19,124	37.2%	<0.001
Colorectal cancer	13,849	1479	8.6%	15,836	30,13	21.2%	<0.001
Notification of results	7249	2176	30.0%	10,523	7410	70.4%	<0.001
Evaluation of abnormality or treatment within appropriate time frame	646	188	29.1%	667	156	23.4%	0.072

Eligible population = individuals in the target age group with at least 1 visit in the prior 3 years.
Source: team monthly data deposits to a central reporting site from automated information systems.

Percent of Adults with Colorectal Cancer Screening (Time Appropriate)

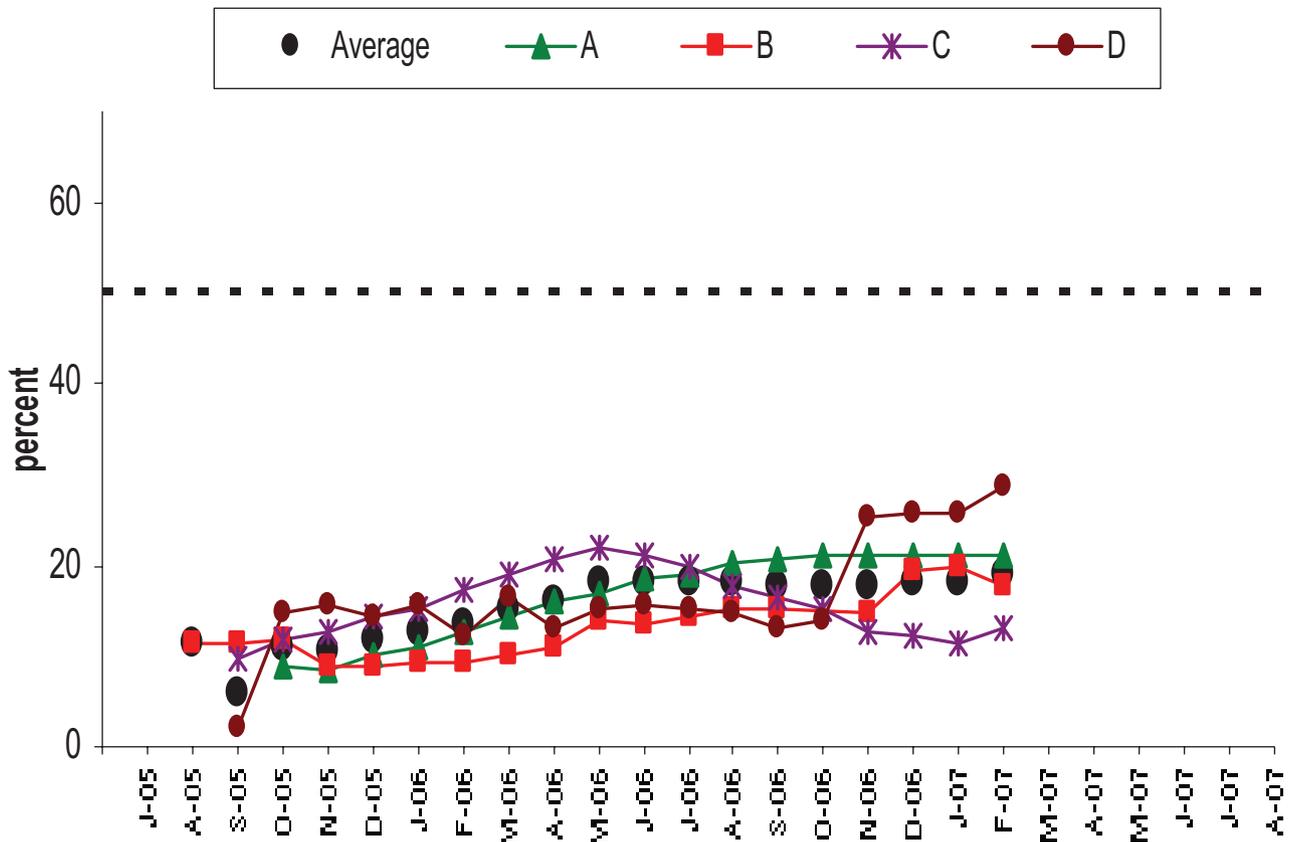


FIGURE 2. Four organization’s colorectal cancer screening rates over time.

Since 2005, the RCC has showed increases in self-management goal setting, the number and proportion of people with documented screening for colorectal, breast, and cervical cancer screening (Table 4). The general process of identifying eligible patients, discussing and changing screen-

ing processes, and tracking changes in screening measures was implemented for all 3 cancers. Overall, colorectal cancer screening rates have improved, although trends have differed across the 4 organizations, with 3 sites showing improvements and 1 site’s rates appearing to drop (Fig. 2). Docu-

mented notification of screening results within appropriate time frames also has improved significantly, but 1 site was unable to report this measure. Follow-up within 90 days has had a nonsignificant decline.

DISCUSSION

This demonstration project represented a comprehensive and intensive effort to increase colorectal, breast, and cervical cancer screening. Through its implementation, we demonstrated the feasibility of teaching the collaborative care process using teleconferences and regional meetings to enable organizations to improve their cancer screening. This effort depended upon committed FQHC leadership, organizational change, process leaders, and measurement of the activity's impact upon health care processes.

Consistent with other work done within the collaborative framework, this effort shows changes in the processes of care.^{12,26} This regional collaborative was built on the national HDC model. The latter showed improvement in health care processes for diabetes, asthma, and hypertension, and was cost effective compared with centers without collaboratives, but it had some limitations.^{12,15,26–28} Because primary care involves large populations, making changes focused on a few specific disease conditions could not address the health care that affects most people. Through the RCC, we demonstrated how it was possible to address care that affects large populations and redesign the traditional collaborative learning model. Despite the demonstration of its feasibility, we recognize that it took considerable effort. The level of effort should be recognized at the outset by anyone interested in implementing or testing comprehensive change in primary care practice, but evidence from other settings indicates that the investment is worth the effort.²⁹

We recognize that this report has limitations. First, at the time of the demonstration, we intervened in only 4 FQHCs, though we showed the viability of the approach and demonstrated improvements in screening in the populations served by these centers. A full test of the RCC as a dissemination method would analyze the results across many FQHCs and include control populations. This demonstration project did not have adequate power or resources for that level of intervention and evaluation, but provides the basis for such a test.

We also recognize that these were highly motivated teams who met specific eligibility criteria and volunteered to join the project. Addressing changes in screening practice can be tedious work that requires motivation and tenacity that other teams may not have.³⁰ Our findings may be generalized to organizations and teams selected in a similar manner. Screening documentation processes undoubtedly improved as a result of the collaborative and this activity may explain some of the improvement in results. Because we did not have the resources to validate submitted measures, we relied on the team's self-reported data. Nonetheless, self-collected data is the information used for internal feedback in many health care organizations, as well as national quality improvement systems so our results have some potential external validity. Finally, we did not have detailed information about individual activities adopted by centers. Such

information could increase our understanding of why screening rates did not increase uniformly at every site.

We also note that follow-up within a timely period decreased, but not significantly. It is not clear whether this reflects improved documentation, regression to the mean, or a truly negative trend. Teams reported that the time frame for receiving cervical cancer reports and evaluating patients within 90 days was unrealistic because laboratories were often delayed in their reporting. This measure of timeliness demonstrated the challenge of care that was dependent upon coordination and communication across specialties, laboratories, and organizations. We did not have data that allowed us to identify differences in follow-up by cancer site, though the teams themselves could. Although an aggregate measure is good for reporting, the measures by individual cancer may be more useful for process improvement within a health center because it would allow them to examine their processes for each cancer.

The development of the COPs was not the same across all 4 organizations. Each undertook different activities, and 1 did not develop any local linkages. Furthermore, when the intervention period ended, the RCOP stopped although LCOPs continued. Sustaining RCOPs needs commitment and sponsorship that have yet to develop; perhaps these types of collaborations could be considered in the context of state cancer plans.

Even though the self-reported screening rates increased, they seem low compared with self-reported rates from national studies. Part of this appearance is artifact: Actual measures of care from medical records are typically lower than self-reported measures^{31,32} but the rates reported here are further lowered by a denominator including people with only 1 visit in the prior 3 years. This denominator includes inactive center users and therefore lowers the apparent rates. We chose this denominator because it encompassed the 3-year time period associated with the longest interval for the screening tests (Pap, FOBT, mammography). Some screening tests involved a longer interval (eg, colonoscopy) but they were rarely used in the population. The optimal denominator for screening is an important issue that reflects one of the challenges for FQHCs. Screening denominators may be restricted to those people seen within a year but that would exclude the rare users of the health centers who may be healthy. The goal of the collaborative was to increase screening among those at highest risk and that would include rare users of health care. However, even the denominator used did not identify individuals who never used the FQHCs. In fact a low proportion of uninsured individuals actually know about FQHCs.³³ These uninsured who have not been seen in an FQHC will benefit most from screening because they are least likely to be screened, and people who have not been screened at all are most likely to develop late-stage cancers.^{7,8}

Based on the feasibility of the RCC, HRSA has incorporated the planned approach to cancer screening into its national effort to systematically address health disparities and improve health care delivery. Primary care associations are a key aspect of this strategy because of their regional influence. Their ability to influence screening will depend upon their ability to enable local health centers to implement planned cancer screening by training process leaders, creating the information system infrastructure, and actively encouraging

shared approaches to care. Although the RCC demonstrated a viable learning model and increased screening, colorectal cancer screening rates remained low and did not improve in all organizations. More evaluation is needed to understand what aspects of the collaborative approach contribute to the success and why success is not universal.

ACKNOWLEDGMENTS

The authors acknowledge the dedication of the many primary care team members who contributed and collaborated in this work. Special thanks to the regional and national faculty including: Ada Determan, Kristen diDonato, Anne Camp MD, Elizabeth Magenheimer APRN FNP, David Rollason PA-C, Michael Pignone MD (U North Carolina), Tom Cox MD (UC Santa Barbara), and Durado Brooks MD (American Cancer Society) who gave hours, expertise, and encouragement throughout this work.

REFERENCES

- Asch SM, Kerr EA, Keesey J, et al. Who is at greatest risk for receiving poor-quality health care? *N Engl J Med*. 2006;354:1147–1156.
- Hurley RE, Pham HH, Claxton G. A widening rift in access and quality: growing evidence of economic disparities. *Health Aff (Millwood)*. 2005; Suppl Web Exclusives:W5–76.
- Swan J, Breen N, Coates RJ, et al. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. *Cancer*. 2003;97:1528–1540.
- Lawson HW, Henson R, Bobo JK, et al. Implementing recommendations for the early detection of breast and cervical cancer among low-income women. *MMWR Morbid Mortal Wkly Rep*. 2000;49:35–55.
- Seeff LC, Shapiro JA, Nadel MR. Are we doing enough to screen for colorectal cancer? Findings from the 1999 Behavioral Risk Factor Surveillance System. *J Fam Pract*. 2002;51:761–766.
- Edwards BK, Brown ML, Wingo PA, et al. Annual report to the nation on the status of cancer, 1975–2002, featuring population-based trends in cancer treatment. *J Natl Cancer Inst*. 2005;97:1407–1427.
- Taplin SH, Ichikawa L, Yood MU, et al. Reason for late-stage breast cancer: absence of screening or detection, or breakdown in follow-up? *J Natl Cancer Inst*. 2004;96:10–20.
- Leyden WA, Manos MM, Geiger AM, et al. Cervical cancer in women with comprehensive health care access: attributable factors in the screening process. *J Natl Cancer Inst*. 2005;97:675–683.
- Pignone M, Rich M, Teutsch SM, et al. Screening for colorectal cancer in adults at average risk: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med*. 2002;137:132–141.
- Saslow D, Runowicz CD, Solomon D, et al. American Cancer Society guideline for the early detection of cervical neoplasia and cancer. *CA Cancer J Clin*. 2002;52:342–362.
- Humphrey LL, Helfand M, Chan BKS, et al. Breast cancer screening: a summary of the evidence for the U.S. Preventative Services Task Force. *Ann Intern Med*. 2002;137:347–360.
- Landon BE, Hicks LS, O'Malley AJ, et al. Improving the management of chronic disease at community health centers. *N Engl J Med*. 2007; 356:921–934.
- Pearson ML, Wu S, Schaefer J, et al. Assessing the implementation of the chronic care model in quality improvement collaboratives. *Health Serv Res*. 2005;40:978–996.
- Chin MH, Cook S, Drum ML, et al. Improving diabetes care in midwest community health centers with the health disparities collaborative. *Diabetes Care*. 2004;27:2–8.
- Wagner EH. Quality improvement in chronic illness care: a collaborative approach. *Jt Comm J Qual Saf*. 2001;27:63–80.
- Asch SM, Baker DW, Keesey JW, et al. Does the collaborative model improve care for chronic heart failure? *Med Care*. 2005;43:667–675.
- Glasgow RE, Orleans CT, Wagner EH. Does the chronic care model serve also as a template for improving prevention? *Milbank Q*. 2001; 79:579–612.
- Varkey P, Reller KM, Resar RK. Basics of quality improvement in health care. *Mayo Clin Proc*. 2007;82:735–739.
- Wagner EH. Improving chronic illness care: translating evidence into action. *Health Affairs*. 2001;20:64–78.
- Stone EG, Morton SC, Hulscher ME, et al. Interventions that increase use of adult immunization and cancer screening services: a meta-analysis. *Ann Intern Med*. 2002;136:641–651.
- Mandelblatt JS, Yabroff KR. Effectiveness of interventions designed to increase mammography use: a meta-analysis of provider-targeted strategies. *Cancer Epidemiol Biomarkers Prev*. 1999;8:759–767.
- Yabroff KR, Mandelblatt JS. Interventions targeted toward patients to increase mammography use. *Cancer Epidemiol Biomarkers Prev*. 1999; 8:749–757.
- Zapka JG, Taplin SH, Solberg LI, et al. A framework for improving the quality of cancer care: the case of breast and cervical cancer screening. *Cancer Epidemiol Biomarkers Prev*. 2003;12:4–13.
- Taplin SH, Galvin MS, Payne T, et al. Putting population-based care into practice: real option or rhetoric? *J Am Board Fam Pract*. 1998;11:116–126.
- Wenger EC, Snyder WM. Communities of practice: the organizational frontier. *Harv Bus Rev*. 2000;78:139–145.
- Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. *JAMA*. 2002;288:1909–1914.
- Huang ES, Zhan Q, Brown SE, et al. The cost-effectiveness of improving diabetes care in US federally qualified community health centers. *Health Serv Res*. 2007;42:2174–2193.
- McCulloch DK, Price MJ, Hindmarsh M, et al. A population-based approach to diabetes management in a primary care setting: early results and lessons learned. *Eff Clin Pract*. 1998;1:12–22.
- Yano EM, Simon BF, Lanto AB, et al. The evolution of changes in primary care delivery underlying the Veterans Health Administration's quality transformation. *Am J Public Health*. 2007;97:2151–2159.
- Carney PA, Dietrich AJ, Keller A, et al. Tools, teamwork, and tenacity: an office system for cancer prevention. *J Fam Pract*. 1992;35:388–394.
- King ES, Rimer BK, Trock B, et al. How valid are mammography self-reports? *Am J Public Health*. 1990;80:1386–1388.
- Gordon NP, Hiatt RA, Lampert DI. Concordance of self-reported data and medical record audit for six cancer screening procedures. *J Natl Cancer Inst*. 1993;85:566–570.
- Cunningham PJ, Hadley J, Kenney G, et al. Identifying affordable sources of medical care among uninsured persons. *Health Serv Res*. 2007;42(1 Pt 1):265–285.
- Dietrich AJ, Tobin JN, Sox CH, et al. Cancer early-detection services in community health centers for the underserved. A randomized controlled trial. *Arch Fam Med*. 1998;4:320–327.
- Lukas CV, Holmes SK, Cohen AB, et al. Transformational change in health care systems: an organizational model. *Health Care Manage Rev*. 2007;32:309–320.
- Keroack MA, Youngberg BJ, Cerese JL, et al. Organizational factors associated with high performance in quality and safety in academic medical centers. *Acad Med*. 2007;82:1178–1186.
- Goldzweig CL, Parkerton PH, Washington DL, et al. Primary care practice and facility quality orientation: influence on breast and cervical cancer screening rates. *Am J Manage Care*. 2004;10:265–272.
- Jamtvedt G, Young JM, Kristoffersen DT, et al. Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*. 2006;19:CD000259.
- Hudson SV, Ohman-Strickland P, Cunningham R, et al. The effects of teamwork and system support on colorectal cancer screening in primary care practices. *Cancer Detect Prev*. 2007;31:417–423.
- Chuang YT, Ginsburg L, Berta WB. Learning from preventable adverse events in health care organizations: development of a multilevel model of learning and propositions. *Health Care Manage Rev*. 2007;32:330–340.
- Battaglia TA, Roloff K, Posner MA, et al. Improving follow-up to abnormal breast cancer screening in an urban population. A patient navigation intervention. *Cancer*. 2007;109(suppl 2):359–367.
- Dohan D, Schrag D. Using navigators to improve care of underserved patients: current practices and approaches. *Cancer*. 2005;104:848–855.
- Weiss BD, Mays MZ, Martz W, et al. Quick assessment of literacy in primary care: the newest vital sign. *Ann Fam Med*. 2005;3:514–522.