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Practice Adaptive Reserve and Colorectal Cancer Screening Best Practices at Community Health Center Clinics in Seven States

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Abstract

Background—Enhancing the capability of community health centers to implement best practices may mitigate health disparities. We investigated the association of Practice Adaptive Reserve (PAR) to implementation of Patient Centered Medical Home (PCMH) colorectal cancer (CRC) screening best practices (BPs) at community health center clinics in seven states.

Methods—A convenience sample of clinic staff participated in a self-administered online survey. We scored eight PCMH CRC screening BPs as a composite ranging from 0–32. The PAR composite score was scaled from 0 to 1 then categorized into three levels. Multilevel analyses examined the relationship between PAR and self-reported implementation of the PCMH BPs.

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Conflict of Interest.

None of the authors have any financial disclosures to make, and all authors declare that they have no competing interests of any kind.

Results—Out of 296 respondents, 59% reported 6 or more PCMH BPs at their clinics. The mean PAR score was 0.66 (s.d. 0.18) and PCMH BP mean scores were significantly higher for respondents who reported higher clinic PAR categories. Compared to the lowest PAR level, adjusted PCMH BP means were 25.0 percent higher at the middle PAR level (Difference = 3.2, SE = 1.3, $t = 2.44$, $p = 0.015$) and 63.2 percent higher at the highest PAR level (Difference = 8.0, SE = 1.9, $t = 4.86$, $p < 0.0001$).

Conclusion—Higher Adaptive Reserve, as measured by the PAR score, is positively associated with self-reported implementation of PCMH CRC screening BPs by clinic staff. Future research is needed to determine PAR levels most conducive to implementing CRC screening and to develop interventions that enhance PAR in primary care settings.

Keywords

Adaptive reserve; primary care; implementation; best practices; disparities

In 2014, an estimated 50,310 people in the United States (US) will die from colorectal cancer (CRC), the second leading cause of cancer-related deaths.¹ When CRC is detected at an early stage, five-year survival rates exceed 90% for those with localized disease.² The US Preventive Services Task Force (USPSTF) recommends CRC screening for average-risk individuals 50 to 75 years old using: annual high-sensitivity fecal occult blood test (FOBT), sigmoidoscopy every 5 years combined with FOBT every 3 years, or colonoscopy every 10 years.³ However, according to the 2010 National Health Interview Survey, CRC screening rates were 58.6%, well below the Healthy People 2020 goal of 70.5%.⁴

Because of advances in screening and treatment, CRC incidence and mortality have been declining over the last 25 years.^{5,6} Unfortunately, this decline has not been shared equally, resulting in a growing racial and ethnic survival gap over the same 25-year period.^{6–8} CRC screening rates for Whites (59.8%) are consistently higher than those of minority populations: African Americans (55%); American Indians and Alaskan Natives (49.5%); Asian Americans (46.9%); and Hispanics (46.5%).⁴

Community health centers are vanguard providers of primary care for vulnerable populations, serving 20 million Americans across the US.^{9–12} Located in areas where care is needed but scarce, community health centers improve access to care for Americans regardless of their insurance status or ability to pay.^{13,14} With health care reform, community health centers are critical to the expansion of access through a primary care portal.¹³

Ample literature however has identified the challenges of time constraints to implementing changes in primary care practices.^{15–26} Among the conceptual frameworks assessing organizational change,^{27–31} the Practice Change and Development model was developed from studies of primary care practices.^{30,32,33} A comparison of high-improvement practices with those of low-improvement practices identified the four domains of the Practice Change and Development model and their reciprocal relationships: Inside Motivators, Capability for Development, Outside Motivators, and Opportunities for Development.³⁰

The Capability for Development domain includes the qualities and resources that allow a practice to alter its operations and its beliefs/values. Within this domain, Practice Adaptive Reserve (PAR) comprises the intangible elements that provide flexibility and resilience in times of change.³³ As illustrated in Figure 1, PAR centers around seven characteristics of successful work relationships. Under inquiry-centered leadership and a learning culture, these characteristics promote action and reflection³⁴ that lead to teamwork, improvisation and sensemaking,³⁵ as well as the accumulation of stories that enhance positive change.

A model of primary care transformation, the Patient-Centered Medical Home (PCMH) seeks to improve patient and staff experiences, outcomes, safety and system efficiency.^{36–38} The National Demonstration Project (NDP) evaluated implementation of the PCMH model in 36 highly motivated primary care practices and found that PAR was essential to practices' ability to manage change.³⁹ To our knowledge, PAR has not been studied at community health centers where it is especially important to understand because of high personnel turnover and the demanding work environment.^{40,41}

The Cancer Prevention and Control Research Network (CPCRN) is a national network of academic, public health, and community partners who work together to reduce the burden of cancer. In this report we describe our novel research, a collaboration with community health centers in seven states, examining the association of PAR with PCMH CRC screening best practices (BPs).

This study's CRC screening BPs were guided by the 2011 National Committee for Quality Assurance PCMH standards.⁴² We selected standards that enhance access and continuity, specifically PCMH 1G that focuses on the practice team: a) holding regular team meetings and communication processes; and b) using standing orders for services. We also selected tracking and follow-up of tests (PCMH 5A) as well as referrals (PCMH 5B). Although our outcome measure has not been validated and not all of the BPs shown to improve CRC screening rates or quality, our community health center partners were interested to collaborate on a project consistent with national efforts to transform primary care through the PCMH model.

METHODS

A convenience sample of providers and staff at participating clinics completed our CPCRN survey between January through May 2013. All study procedures were approved by each site's Institutional Review Boards, the Coordinating Center at University of North Carolina at Chapel Hill, and the Centers for Disease Control and Prevention.

Recruitment

CPCRN sites in WA, SC, TX, GA, and CO partnered with their Primary Care Association (PCA) to identify potential sites with four PCAs directly emailing their community health centers to explore their interest. Five CPCRN sites (TX, GA, CA, CO, MO) contacted community health centers directly via email, telephone calls, or in person meetings. In most cases, one individual from each community health center served as the main contact and sent

an introductory email to eligible staff members encouraging their participation. One PCA (SC) also directly recruited participants at a meeting of staff members.

At two, four, six and eight weeks post-invitation, reminder emails were sent to potential participants. Some sites offered \$25 gift cards to participants, other sites offered incentives to participating community health centers, and one site declined any incentives.

Based on the available funds for incentives and to ensure broad representation across clinical roles, our online survey was programmed to allow a maximum of 10 staff from each clinic to complete the survey: up to three providers (physicians, nurse practitioners, and physician assistants), three nurses or quality improvement staff, and four medical assistants.

Survey content

We designed the survey to be completed in 20 minutes. Section A consisted of the 23 item PAR Scale^{43,44} with the word “practice” changed to “clinic”, additional items from the Clinician Staff Questionnaire, and another key informant study.⁴⁵ Section B assessed the primary CRC screening modality recommended at the clinic. Section C covered four evidence-based approaches to increase CRC screening. Section D inquired whether the clinic had eight CRC screening BPs and how often the respondent performed the CRC screening best practices in the past month. To examine regular team meetings and communication processes, our survey inquired about daily “huddles”, a strategy borrowed from football and increasingly adopted in primary care.⁴⁶ Section E included demographic questions and work history (number of hours and years worked at the clinic).

Statistical analysis

To understand the relationship between PAR and staff implementation of PCMH CRC screening BPs, we examined differences in the PCMH BP (our dependent variable) means at three different PAR levels. The PAR composite score (an independent variable) was scaled from 0 to 1 with higher values representing greater agreement with PAR items (i.e., 0.00 = complete disagreement and 1.00 = perfect agreement) and categorized into three levels (0.00–<0.60, 0.60–<0.80, and 0.80–1.00). These categories represent respondents in the lowest, highest and middle 2 PAR quartiles. With eight PCMH CRC screening BPs each scored from 0 to 4 (never/rarely/occasionally/usually/always), the PCMH BPs score ranged from 0 to 32.

We examined unadjusted PCMH BP means and means adjusted for these independent variables or fixed effects: state, staff role, age group, number of years employed at the clinic, and number of hours worked per week. The PCMH BP means were calculated using multilevel general linear mixed models.^{47,48} The random variable was clinic. Given an intraclass correlation of 0.18, we included clinic-specific random intercepts to account for interdependencies of survey responses due to clinic staff nested within clinics. Analyses were performed in SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

Out of 327 staff members who took the survey, 31 did not complete the demographic section yielding 296 respondents from 75 clinics for this analysis. Providers, quality improvement/operations/clinic managers, nurses, and medical assistants were all represented on the survey, with 59% reporting 6 or more PCMH CRC screening BPs for age eligible patients at their clinics. Table 1 notes the majority of respondents was non-Hispanic, female, had a college degree, and provided services in a language(s) other than English.

The mean PAR score was 0.66, ranging from 0.02 to 1.00 (Table 2). Table 3 shows the responses to each PCMH BPs. Of interest, less than half of the participants reported these two BPs: 1) daily huddles, huddle sheets or checklists, and 2) standing orders/orders prepared by the nurses/medical assistants for providers to sign. Over 40% reported that they did not track CRC screening orders and completion of CRC screening.

Table 4 demonstrates that higher PAR scores were associated with greater implementation of PCMH BPs: respondents in the lowest PAR category had lower mean PCMH BPs scores and respondents in the highest PAR category had higher mean PCMH BPs scores. Additionally, PCMH BP means in higher PAR categories were significantly higher than means in lower PAR categories ($p < 0.03$). This relationship persisted after statistically controlling for other independent variables that were related to the outcome.

Evidence our model fits the data is supported by the pseudo r-square of 36% with a proportional reduction in error of 18% and a proportional reduction in variance of 9% at level 1 relative to the unconditional model.^{48,49}

DISCUSSION

Findings from this multi-state survey suggest that higher Adaptive Reserve, as measured by the PAR score, is associated with greater implementation of PCMH CRC screening BPs. Our results are consistent with the NDP findings that practices with strong Adaptive Reserve were able to make the most far reaching changes.^{39,50} Wagner et al. also underscored that meaningful practice change is unlikely unless an organization has Adaptive Reserve.⁵¹

To our knowledge, this is one of the first studies to examine PAR at community health center clinics, which are expected to serve 20 million new patients under the Affordable Care Act.^{13,52} Our sample of community health center clinics had a PAR score (mean 0.66, s.d. 0.18) comparable to the NDP practices (mean baseline PAR score 0.69; s.d. 0.35), selected for being highly motivated and having significant capability for change.

Medical care is a complex, highly interdependent process influenced by relationships and motivation between and among individual professionals, group level microsystem team processes, culture, leadership, decision-support systems, and incentives.⁵³ Efforts to conceptualize the implementation of evidence-based interventions have converged to a set of multi-level factors.^{54,55} A systematic review yielded 33 measures that assessed one or more of these levels: structural, organizational, provider, patient, and innovation.⁵⁶ Of interest, the PAR scale was not included in this systematic review⁵⁶ because practice-based research and

PCMH³⁹ were not among the common keywords identified in the implementation science literature.⁵⁷

Systematic reviews also suggest that educational or knowledge-based interventions targeting individual providers to improve quality of care have been largely unsuccessful.^{58–61} Instead, system-level changes that address the complexities of health care delivery show greater promise. A clinic-level, population-based PCMH redesign resulted in slightly better clinical outcomes of coronary heart disease, fewer ambulatory-care sensitive hospitalizations, fewer total inpatient admissions, 17% lower inpatient costs, and 7% lower total health care costs.⁶² Liss et al. attributed these positive results to the effective provision of whole-person care facilitated by: 1) enhanced care team staffing (including reductions in physicians' patient panels from an average of 2327 to 1800 patients); 2) pairing longer office visits (lengthened from 20 to 30 minutes) with promotion of virtual medicine use; and 3) outreach for patients' chronic and acute needs. The impact of enhanced care team staffing and longer office visits on Adaptive Reserve warrants further study. Conversely, identification of Adaptive Reserve levels most conducive to implementing and sustaining change is also needed.

Given the limited resources and personnel time, we surveyed a convenience sample of clinics and clinic staff and we did not standardize incentives across all the participating clinics. These potential limitations may lead to selection bias and higher PAR scores. The community health center clinics we studied were also geographically limited and cannot be generalized to other clinics in the same states or in other states. Our survey analyses focused on Adaptive Reserve, only one aspect of the Practice Change and Development domains. We also conducted individual level analyses (i.e., staff-reported scores) instead of clinic level analyses (operations/clinic manager reported scores). Lastly, prospective studies are needed to determine causality.

CONCLUSIONS

With health care reform, expansion of primary care through community health centers will be dramatic. As the primary care portal to vulnerable populations, community health centers serve a critical role in promoting CRC screening to populations that are disproportionately under-screened. Findings from this study inform the implementation of CRC screening BPs as well as the many foreseen and unforeseen changes necessitated by the expansion of primary care through community health centers. Given the complexities of health care delivery, interventions need to move beyond individual providers and address the practice team as well as the systems that these teams deliver care in. Future research is needed to determine PAR levels most conducive to implementing change and to develop interventions that enhance PAR in the clinical setting.

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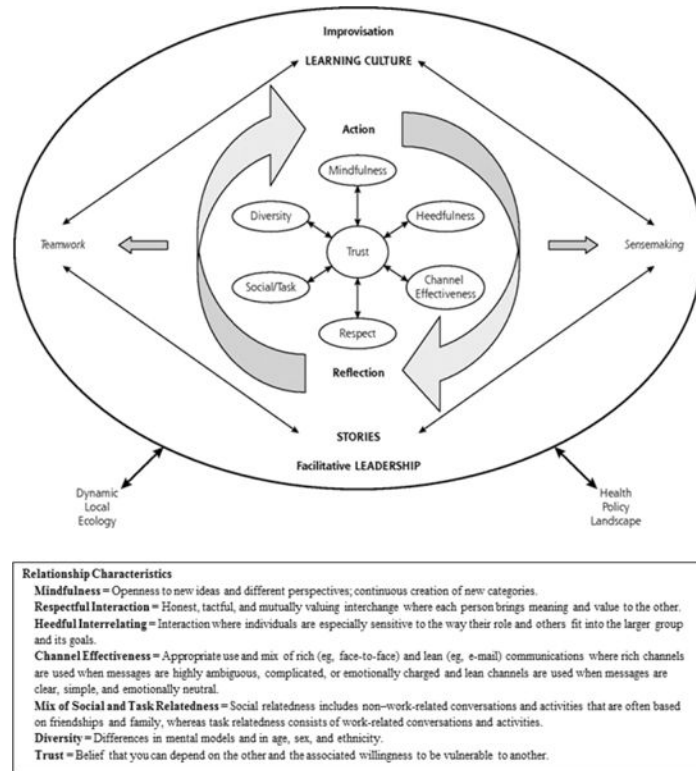


Figure 1.
Relationship-centered Practice Adaptive Reserve Model

Table 1

Characteristics of Community Health Center Clinic Staff Respondents

Respondents (n=296)	n (%)
Female	234 (79.0)
Race *	
White	189 (70.3)
Black, African, African-American	30 (10.1)
Asian	34 (11.4)
Native Hawaiian or Other Pacific Islander	0 (0.0)
Native American, American Indian or Alaska Native	9 (3.0)
Other	41 (13.9)
Ethnicity	
Non-Hispanic	189 (63.8)
Staff role	
Provider-Physician	33 (11.2)
Provider-Nurse Practitioner/Physician Assistant	43 (14.5)
Quality Improvement/ Operations/Clinic Manager	26 (8.8)
Nurse	103 (34.8)
Medical assistant	107 (36.1)
Age (years)	
20–29	52 (17.6)
30–39	96 (32.4)
40–49	71 (24.0)
50 plus	77 (26.0)
Highest level of education completed	
High school or less/GED	13 (4.4)
Associates degree/some college or trade school	136 (45.9)
Bachelor's degree	37 (12.5)
Graduate degree	110 (37.2)
Years employed at clinic	
0 – 2	129 (43.6)
3 – 4	52 (17.6)
5 – 9	71 (24.0)
10 plus	44 (14.8)
Number of hours worked each week	
Less than 40 hours	55 (18.6)
40 hours	179 (60.5)
Greater than 40 hours	62 (20.9)

Respondents (n=296)	n (%)
Provide services in language(s) other than English	
Yes*	177 (59.8)
Spanish	158 (53.4)
Chinese (e.g., Cantonese, Mandarin, or other dialects)	115 (38.9)
Vietnamese	8 (2.6)
Other	28 (9.1)

* Total exceeds 100% as respondents were allowed to specify more than category.

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Table 2

Practice Adaptive Reserve (PAR) Scores by State

State	N	Mean	SD	Min	Q1	Q2	Q3	Max
California	28	0.60	0.23	0.02	0.46	0.65	0.78	0.96
Colorado	52	0.66	0.18	0.26	0.52	0.66	0.78	1.00
Georgia	25	0.71	0.19	0.24	0.63	0.73	0.83	1.00
Missouri	4	0.65	0.06	0.58	0.61	0.65	0.69	0.73
South Carolina	19	0.68	0.17	0.21	0.60	0.65	0.77	1.00
Texas	79	0.66	0.18	0.07	0.54	0.70	0.79	0.98
Washington	89	0.66	0.15	0.21	0.57	0.68	0.75	0.95
Combined	296	0.66	0.18	0.02	0.55	0.67	0.77	1.00

Scores are scaled from 0.00 to 1.00, with 1.00 being a perfect score of agreement; Q = Quartiles

Table 3
 PCMH Colorectal Cancer Screening Best Practices Reported by Survey Respondents

	Never n (%)	Rarely n (%)	Occasionally n (%)	Usually n (%)	Always n (%)
Daily huddles, huddle sheets or checklists to go over scheduled patients who need CRC screening.	175 (59.1)	8 (2.7)	16 (5.4)	54 (18.3)	43 (14.5)
Standing CRC screening orders or orders prepared by nurses/medical assistants then signed by providers.	167 (56.4)	3 (1.0)	17 (5.7)	62 (21.0)	47 (15.9)
Tracking of patients who had CRC screening orders.	140 (47.3)	20 (6.8)	22 (7.4)	59 (19.9)	55 (18.6)
Tracking of patients who completed CRC screening tests.	129 (43.6)	15 (5.1)	23 (7.8)	64 (21.6)	65 (21.9)
Tracking of abnormal CRC screening tests.	104 (35.1)	12 (4.0)	13 (4.4)	68 (23.0)	99 (33.5)
Referrals for diagnostic work-up of abnormal CRC screening tests.	57 (19.3)	6 (2.0)	23 (7.8)	66 (22.3)	144 (48.6)
Tracking of diagnostic work-up completed by patients with abnormal CRC screening tests.	96 (32.4)	9 (3.1)	21 (7.1)	69 (23.3)	101 (34.1)
Referrals to specialists* for patients with abnormal colonoscopies.	52 (17.5)	10 (3.4)	26 (8.8)	55 (18.6)	153 (51.7)

PCMH = Patient Centered Medical Home; CRC = colorectal cancer screening

* Referrals may range from follow-up with gastroenterologists, evaluation and treatment by surgeons and/or oncologists, to consultation from palliative care specialists.

PCMH Best Practices Score Means by PAR Level

Table 4

PAR Score	Unadjusted		Adjusted*			
	Score (0–32)		Score (0–32)		Difference**	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
0.00 – < 0.60	12.85	10.70 – 14.99	12.67	9.90, 15.44	NA	NA
0.60 – < 0.80	15.79	14.04 – 17.54	15.84	13.31, 18.36	3.16	0.61, 5.72
0.80 – 1.00	20.25	17.61 – 22.88	20.68	17.51, 23.86	8.01	4.76, 11.26

PCMH = Patient Centered Medical Home

PAR = Practice Adaptive Reserve

* Adjusted for state, age, staff role, years worked at the clinic, hours worked each week

** Difference between mean and lowest category mean