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Characterizing Clinics With Differential Changes in the Screening Rate in the Colorectal Cancer Control Program of the Centers for Disease Control and Prevention

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Abstract

BACKGROUND: The Centers for Disease Control and Prevention (CDC) funds the Colorectal Cancer Control Program (CRCCP) to increase colorectal cancer (CRC) screening rates in primary care clinics by implementing evidence-based interventions (EBIs). This study examined differences in clinic characteristics and implementation efforts among clinics with differential changes in screening rates over time.

METHODS: CRCCP clinic data collected by the CDC were used. The outcome was the clinic status (highest quartile [Q4] vs lowest quartile [Q1]), which was based on the absolute screening rate change between the first and second program years. Five clinic characteristic variables and 12 clinic-level CRCCP variables (eg, EBIs) were assessed in bivariable analyses, and logistic regression was used to determine significant predictors of the outcome.

RESULTS: Each group included 78 clinics (N = 156). Clinics with a Q4 status saw a 14.9 percentage point increase in the screening rate, whereas clinics with a Q1 status experienced a 9.1 percentage point decline. Q4s were more likely than Q1s to have a CRC champion, implement 4 EBIs versus fewer EBIs, implement at least 1 new EBI, and increase the number of implemented EBIs. The adjusted odds of Q4 status were 5.3 times greater (95% confidence interval [CI], 1.9–14.9) if a clinic implemented an additional EBI. The adjusted odds of Q4 status increased to 7.1 (95% CI, 2.2–23.1) if a clinic implemented 2 to 4 additional EBIs.

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AUTHOR CONTRIBUTIONS

Krishna P. Sharma: Conceptualization, investigation, methodology, supervision, validation, writing–original draft, and writing–review and editing. **Steven Leadbetter:** Data curation, formal analysis, investigation, software, validation, writing–original draft, and writing–review and editing. **Amy DeGroff:** Conceptualization, project administration, resources, supervision, and writing–review and editing.

CONFLICT OF INTEREST DISCLOSURES

The authors made no disclosures.

CONCLUSIONS: Implementing new EBIs or enhancing existing ones improves CRC screening rates. Additionally, clinics with lower screening rates had greater rate increases and may have benefited more from the CRCCP.

Keywords

colorectal cancer screening; colorectal neoplasms; early detection of cancer; evidence-based medicine; primary health care; US Centers for Disease Control and Prevention

INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer deaths among cancers affecting both men and women in the United States.[1] In 2016, the most recent year for which data are available, there were 141,270 new diagnoses of CRC and 52,286 deaths.[1] CRC mortality has been trending continuously downward since 1992,[2] largely because of changes in risk factors; increased screening, which can prevent CRC or detect it early when treatment is more effective; and improvements in treatment.[3] The US Preventive Services Task Force recommends screening for CRC for average-risk adults aged 50 to 75 years.[4] In 2018, for which the most recent data are available, only 68.8% of adults were up to date with screening, and this suggests the need for public health interventions focused on increasing screening rates.[5]

The Centers for Disease Control and Prevention (CDC) funded the Colorectal Cancer Control Program (CRCCP) in 2015 for 5 years.[6] Thirty awardees, primarily state health departments, were funded to partner with health system clinics with low CRC screening rates to implement evidence-based interventions (EBIs) recommended in the Community Guide.[7] CRCCP partner clinics provided primary care to low-income, medically underserved populations. The CDC's outcome measure of interest was clinic-level CRC screening rates among patients aged 50 to 75 years.

By July 2019, the program had partnered with more than 700 clinics to implement EBIs, including patient and provider reminders, provider assessment and feedback, and reductions of structural barriers. In an evaluation of the first program year, CRC screening rates increased an average of 4.3 percentage points, and the increase was associated with EBI implementation.[8] In the community context, studies involving federally qualified health centers (FQHCs) and low-income populations have shown strategies such as mailed outreach offering a fecal test, client reminders, and provider-ordered in-clinic distribution of tests to be as effective.[9,10] However, we do not know the clinic characteristics that lead to favorable outcomes from the CRCCP or the program elements that were critical to the success in increasing screening rates. The literature examining outcomes associated with different CRC screening strategies is limited, especially for populations reached through the CRCCP. Improved understanding of the processes and outcomes associated with the program may inform program implementation and improve CRCCP resource allocation. In this article, we seek to understand the critical differences in the characteristics and implementation efforts of clinics with differential changes in the screening rate (ie, the outcome status). This is

defined as clinics falling into the highest quartile (Q4) or the lowest quartile (Q1) in terms of the absolute change in the screening rate over time.

MATERIALS AND METHODS

Study Population and Data

Our study population included clinics participating in the CRCCP, mainly FQHCs or community health centers (CHCs). All participating clinics served low-income, medically underserved populations and included both urban and rural areas. All awardees provided CRCCP data at the clinic level. These data were submitted at the time of clinic enrollment into the program (ie, baseline records) and after each year of program participation (ie, annual records) as required by the CRCCP. These clinic-level data records included information on clinic and health system characteristics, program implementation, and the CRC screening rate, and they have been described in detail elsewhere.[8] We used the clinic-level data for this analysis of Q4s and Q1s. Clinic Data collection tool was approved by Office of Management and Budget prior to the program evaluation studies.

Study Variables and Analyses

The outcome variable for this study was the clinic CRC screening rate change (SRC) between program year 1 (PY1; July 2015 to June 2016) and program year 2 (PY2; July 2016 to June 2017). We defined Q4s as those clinics ranking in the highest SRC quartile and Q1s as those clinics ranking in the lowest SRC quartile. In addition, we analyzed the PY1 and PY2 screening rates for Q4s and Q1s. We assessed various clinic variables to characterize participating CRCCP clinics. The 5 reported descriptive characteristics for each clinic did not change during the study period because these data were reported only at the baseline: 1) urbanicity,[11] 2) clinic type, 3) health system size, 4) clinic size based on the number of patients aged 50 to 75 years, and 5) percentage of clinic patients aged 50 to 75 years who were uninsured. Two of the 12 total clinic-level CRCCP variables that we assessed were also fixed over time: 1) free CRC screening fecal test kits (yes/no) and 2) the primary CRC test type used at the clinic (eg, fecal occult blood test/fecal immunochemical test or colonoscopy). The remaining 10 clinic-level CRCCP variables that we assessed to determine those characteristics distinguishing Q4s from Q1s were specific to PY2. These included the following: 1) whether the clinic had a written CRC screening policy; 2) whether there was a champion who promoted CRC screening; 3) whether there was a provider delivery strategy (ie, EBIs intended to increase provider delivery of screening services) in place; 4) the EBI focus (ie, patient or provider focus only, a mix of both patient focus and provider focus, or no EBIs); 5) the number of implemented EBIs (ie, EBIs in place, including existing or newly implemented EBIs); 6) the number of enhanced EBIs (ie, EBIs were already in place in PY1, and CRCCP resources were allocated toward improving EBIs in PY2); 7) the number of newly implemented EBIs (ie, EBIs were first implemented during PY2); 8) the change in the number of implemented EBIs between PY1 and PY2; 9) the change in the number of enhanced EBIs between PY1 and PY2; and 10) the frequency of CRCCP implementation support provided to the clinic (weekly or monthly vs quarterly, semiannually, or annually). We included clinic-level CRCCP variables from PY2 under the assumption that they were directly associated with CRCCP variables of change between PY1 and PY2.

We assessed the 5 clinic characteristic variables and 12 total clinic-level CRCCP variables by the outcome status variable in bivariable analyses, in which a chi-square P value ≤.05 indicated a significant difference by the clinic outcome status variable. The underlying assumption for the analysis was statistical independence among clinics. The assumption was based on the fact that FQHCs serve different service areas, although there may be some overlapping.[12] Next, we conducted multivariable logistic modeling and applied the backward elimination approach to determine the significant predictors ($P \leq .2$) of the Q4/Q1 status outcome based on the PY1-to-PY2 SRC. We specified the 12 clinic-level CRCCP variables as predictors in the full model. We also included as model control variables the categorized clinic size (<500, 500 to ≤1500, or >1500 screen-eligible clinic patients) and the PY1 CRC screening prevalence (<25%, 25% to <35%, 35% to <45%, 45% to <55%, or ≥55%). The logistic modeling jointly accounted for clinic size and PY1 CRC screening prevalence differences among clinics while simultaneously evaluating predictors of Q4/Q1 status. We used the Hosmer and Lemeshow goodness-of-fit test to assess the adequacy or fit of the reduced, final model, which included only the specified control variables and significant model predictors of the Q4/Q1 outcome status. All CRC screening rates and changes in screening rate means were weighted by the number of clinic patients eligible for CRC screening.

Sensitivity Analysis

We conducted a sensitivity analysis to assess the validity and generalizability of our analysis to all CRCCP clinics. In the sensitivity analysis, we used the median SRC as the threshold to define 2 clinic status outcome groups. Those clinics with SRCs at or above the median SRC were the higher SRC clinics, whereas those clinics with SRCs below the median SRC were the lower SRC clinics.

RESULTS

Table 1 provides the 5 clinic variables that describe all study clinics. Most study clinics were located in metropolitan areas (69.9%) and were CHCs or FQHCs (80.8%). Study clinics were most likely to be members of health systems with 5 to 24 clinics (49.4%) and to be medium in size with 500 to 1500 patients aged 50 to 75 years (42.3%). Most clinics (60.2%) served patient populations aged 50 to 75 years that were uninsured at a rate of 5% or more, with 30.1% of the clinics serving populations uninsured at a rate > 20%. Table 1 also provides a summary of the 12 clinic-level CRCCP variables. Most clinics (75.5%) did not have free fecal test kits available, but a majority of the clinics (57.9%) used a fecal occult blood test/fecal immunochemical test as the primary CRC test type. A majority of the clinics had a CRC screening policy in place (78.1%) and a CRC champion (87.8%) during PY2. In PY2, 92.3% of the clinics had a provider delivery strategy implemented, and 86.5% had a mix of patient- and provider-focused EBIs implemented. In the same PY2, 57.7% of the clinics had all 4 EBIs implemented, approximately half of the clinics (45.5%) enhanced 1 or 2 EBIs, and 31.4% had at least 1 newly implemented EBI. Between PY1 and PY2, 41.0% of the clinics increased the number of implemented EBIs, and similarly, 41.7% of the clinics increased the number of enhanced EBIs. Finally, 80.6% of the clinics received weekly or

monthly implementation support in PY2, whereas the rest had quarterly or less frequent support.

There were 78 clinics in each of the Q4 and Q1 groups of the total clinic population (N = 156). The average screening rates of Q4s and Q1s were 39.6% and 40.8%, respectively, in PY1, but they changed to 53.7% and 32.0%, respectively, in PY2 (Table 2). From PY1 to PY2, the average increase in the screening rate for Q4s was 14.9 percentage points. In contrast, the Q1s saw an average reduction in their screening rate of 9.1 percentage points.

Assessing the clinic status by descriptive clinic characteristics (Table 3), we found no significant differences between Q4s and Q1s based on urbanicity, health system size, clinic size, or percentage of uninsured patients. Although 80.8% of both Q4s and Q1s were FQHCs/CHCs, Q4s were significantly more likely ($P < .001$) than Q1s to be in a health system or hospital setting. Assessing the clinic status by clinic-level CRCCP variables (also Table 3), we found that Q4s were more likely than Q1s to 1) have a CRC champion, 2) implement 4 EBIs during PY2, 3) implement at least 1 new EBI during PY2, and 4) increase the number of implemented EBIs between PY1 and PY2. Q4s were less likely than Q1s to use colonoscopy as the primary CRC test type used. We found no significant differences between Q4s and Q1s with respect to free fecal test kits, the CRC screening policy during PY2, the provider delivery strategy implemented during PY2, the EBI focus during PY2, the number of enhanced EBIs implemented during PY2, the change in the number of enhanced EBIs between PY1 and PY2, and the implementation support frequency during PY2.

The final logistic regression model had an overall P value of .002, whereas the goodness-of-fit test ($P = .308$) indicated a nonsignificant model lack of fit. The final model determined 2 significant predictors of clinic status: 1) the change in the number of implemented EBIs between PY1 and PY2 ($P = .001$) and 2) the number of enhanced EBIs during PY2 ($P = .040$; Table 4). The adjusted odds of Q4 status were 5.3 times greater (95% confidence interval [CI], 1.9–14.9) if a clinic implemented an additional EBI between PY1 and PY2 in comparison with those clinics making no changes in the number of implemented EBIs. The adjusted odds of Q4 status increased to 7.1 (95% CI, 2.2–23.1) if a clinic implemented 2 to 4 additional EBIs between PY1 and PY2.

The adjusted odds of Q4 status were also 4.1 times more likely (95% CI, 1.4–12.0) among clinics that implemented 1 or 2 enhanced EBIs during PY2 in comparison with those clinics that did not enhance any EBIs. Similarly, the adjusted odds of Q4 status were 3.5 times greater (95% CI, 1.0–11.7) if a clinic implemented 3 or 4 enhanced EBIs. The adjusted odds of Q4 status were 5.1 times more likely (95% CI, 1.2–22.9) among clinics with PY1 CRC screening rates under 25% than clinics with PY1 CRC screening rates of at least 55.0%. The final model clinic size control was not significant, but the categorized PY1 CRC screening rate control was significant ($P = .020$).

By restricting our analyses to the clinics with the highest and lowest SRCs, we excluded half of the CRCCP clinic data (ie, data from those clinics with SRCs ranked in the second and third quartiles). However, the sensitivity analysis allowed us to assess the generalizability of our main study findings. There were no significant differences among clinic characteristics

by performance status in the sensitivity analysis. SRC and screening rate study findings by outcome status in the sensitivity analysis were consistent with the main study findings, although differences between Q4s and Q1s were larger in the main analysis than the clinic group differences in the sensitivity analysis. For example, the main analysis found that the mean CRC SRC between PY1 and PY2 was 24.0 percentage points higher among Q4s than Q1s, whereas the difference in SRCs between the 2 groups was 14.7 percentage points in the sensitivity analysis. We found that among the 5 clinic-level CRCCP variables identified as significantly different by outcome status in the main analysis, 2 CRCCP variables (the number of newly implemented EBIs during PY2 and the change in the number of newly implemented EBIs between PY1 and PY2) were also identified as significant in the sensitivity analysis, whereas a third CRCCP variable (the primary CRC test type) was not significant ($P = .076$). The logistic regression results in the sensitivity analysis were also generally consistent with our main study findings, although significant adjusted odds ratios were smaller. For example, increasing by 1 the number of implemented EBIs between PY1 and PY2 resulted in an adjusted odds ratio of 2.5 for higher SRC clinics in the sensitivity analysis versus 5.3 in the main-analysis Q4s (Table 4). The number of enhanced EBIs during PY2 was not significant in the sensitivity analysis ($P = .097$).

DISCUSSION

This study characterizes the differential changes in screening rates among CRCCP clinics and sheds light onto factors that might support increases in CRC screening. The design of the study allowed us to understand important and useful patterns in the data that are usually hidden in commonly used metrics. We more clearly observed differences between clinics by drawing a sharp contrast between the clinics within the highest quartile and the clinics within the lowest quartile in terms of changes in the CRC screening rate, and insights were gained into whether the program is making a difference in outcomes and what factors matter most. These insights can inform future implementation of the CRCCP. The CDC released a new 5-year CRCCP funding opportunity that requires awardees to implement multiple EBIs in each partner clinic, develop and follow a protocol for the delivery of rigorous EBI implementation support, and identify screening champions.

Two key findings emerge from our analysis. First, differential changes in the clinic screening rate, defined by the SRC from PY1 to PY2, were driven by new implementation of EBIs or enhancements of existing EBIs. These results are consistent with our PY1 findings,[8] where we found that clinics with 3 to 4 EBIs implemented were associated with higher screening rates. Both studies demonstrated that implementing EBIs in clinics serving high-need patient populations contributed to increased screening rates.[8] This most recent study adds further support to the analysis by the Community Preventive Services Task Force demonstrating that multicomponent interventions led to greater increases in CRC screening.[13] Increasing the number of EBIs may be accomplished through the integration of some EBIs such as provider reminders, patient reminders, and provider assessment and feedback into electronic health record systems. Although an upfront investment of time and resources may be needed to accomplish this, resource needs would then diminish, and the sustainability of the EBIs would be enhanced. Clinic champions, also found to be more common in Q4 clinics, can play an important role in facilitating EBI implementation. Finally, the literature supports the

importance of focusing on high-quality implementation of interventions, not only quantity.[14] The EBIs used in the CRCCP can be implemented differently, and practitioners can benefit from ensuring that the interventions are appropriate for their unique clinic population and context.

The second finding demonstrated that clinics with low screening rates in the prior year (at the end of PY1) were able to achieve greater increases during PY2 than those clinics starting with higher screening rates. Clinics with lower screening rates have a higher percentage of unscreened patients and are, therefore, important to prioritize for public health intervention because of the potential for valuable impact.

The large number of clinics and the inclusion of clinic-level factors are strengths of this study. Our results are robust and demonstrate that introducing interventions that are evidence based can increase CRC screening rates in clinics. EBIs are implemented in health systems and integrated with existing clinic processes. The successful implementation of EBIs in primary care clinics is dependent on other activities such as quality improvement initiatives, effective electronic health systems, and good referral and patient tracking systems for colonoscopy.[15]

We acknowledge the limitations of this study, including the varied quality and approaches in implementing EBIs across clinics. The CRCCP is a public health program, not a research study, and we determined that routine collection of detailed information on how EBIs are implemented would be burdensome to participating clinics. Next, the clinic data are reported by awardees, and records sometimes have missing variables that are relevant for the analysis. There is a possibility of social desirability bias. We focused on the clinics with the highest and lowest SRCs and thus excluded half the CRCCP clinics. However, the sensitivity analysis provided comparable results, although outcome differences and effects were muted as one would expect. Using the restrictive definitions of clinics by outcome status allowed us to draw the sharp contrast needed to address our evaluation questions and uncover otherwise hidden information in the data. This analysis contained many statistical tests, and we made no adjustment for multiple comparisons. There was no accounting for ceiling/floor effects. The assumption of statistical independence among clinics may not be true because clinic service areas can overlap. Finally, the data used for this study do not provide insight into how the EBIs were implemented or whether clinic factors can act synergistically with EBIs to accelerate screening rate increases.

In conclusion, the CRCCP is a public health program shown to be associated with increased CRC screening rates in clinics with medically underserved populations. Our results demonstrate that newly implementing EBIs or enhancing existing ones in primary care clinics improves CRC screening rates. Additionally, clinics with lower screening rates had greater rate increases and may have benefited more from the program. The results might be useful to other public health programs working with primary care clinics.

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TABLE 1.

Descriptive Characteristics and CRCCP Variables of Study Clinics: Restricted to High- and Low-Performing Clinics

	No.	%
Descriptive characteristic		
Urbanicity		
Metropolitan	107	69.9
Urban/nonmetropolitan	35	22.9
Rural	11	7.2
Clinic type		
FQHC/CHC	126	80.8
Health system/hospital	15	9.6
All other	15	9.6
Health system size		
<5 clinics	36	23.4
5 to <25 clinics	76	49.4
≥25 clinics	42	27.3
Clinic size		
<500 patients	50	32.1
500 to ≤1500 patients	66	42.3
>1500 patients	40	25.6
% of uninsured patients		
<5%	49	31.4
5% to ≤20%	47	30.1
>20%	47	30.1
Unknown	13	8.3
CRCCP variable		
Free fecal test kits		
Yes	36	24.5
No	111	75.5
Primary CRC test type		
FOBT/FIT	88	57.9
Colonoscopy	4G	26.3
Varies/unknown	24	15.8
CRC screening policy during PY2		
Yes	121	78.1
No	34	21.9
CRC champion during PY2		
Yes	137	87.8
No	19	12.2
Provider delivery strategy implemented during PY2		
Yes	144	92.3

	No.	%
No	12	7.7
EBI focus during PY2		
Patient or provider only	13	8.3
Mixed	135	86.5
No EBIs	8	5.1
No. of EBIs implemented (newly implemented or existing) during PY2		
0	8	5.1
1 or 2	28	17.9
3	30	19.2
4	90	57.7
No. of existing EBIs enhanced during PY2		
0	27	17.3
1 or 2	71	45.5
3 or 4	58	37.2
No. of newly implemented EBIs during PY2		
0	107	68.6
1	39	25.0
2–4	10	6.4
Change in No. of EBIs implemented between PY1 and PY2		
−1 or −2	14	9.0
0	78	50.0
+1	32	20.5
+2 to +4	32	20.5
Change in No. of enhanced EBIs between PY1 and PY2		
−1 or −2	9	5.8
0	82	52.7
+1	29	18.6
+2 or +3	36	23.1
Frequency of implementation support during PY2		
Weekly or monthly	125	80.6
Quarterly, semiannually, or annually	30	19.4

Abbreviations: CHC, community health center; CRC, colorectal cancer; CRCCP, Colorectal Cancer Control Program; EBI, evidence-based intervention; FIT, fecal immunochemical test; FOBT, fecal occult blood test; FQHC, federally qualified health center; PY1, program year 1; PY2, program year 2.

TABLE 2.

CRC Screening Rates by Clinic Outcome Status

CRC Screening Rate by Clinic Outcome Status	No.	Minimum, %	Maximum, %	Mean, %[a]
PY1 CRC screening rates				
Q4	78	4.4	71.4	39.6
Q1	78	8.7	80.0	40.8
PY2 CRC screening rates				
Q4	78	21.9	82.9	53.7
Q1	78	1.1	73.9	32.0
PY1-to-PY2 CRC SRC				
Q4	78	+9.7	+39.0	+14.9
Q1	78	−32.9	−0.6	−9.1

Abbreviations: CRC, colorectal cancer; PY1, program year 1; PY2, program year 2; Q1, lowest quartile; Q4, highest quartile; SRC, screening rate change.

[a]All CRC screening rate means are weighted by the number of clinic patients eligible for CRC screening.

TABLE 3.

Descriptive Characteristics and CRCCP Variables by Clinic Outcome Status

	Q4s		Q1s		
	No.	%[a]	No.	%[a]	*P*
Descriptive characteristic					
Urbanicity					.094
Metropolitan	57	75.0	50	64.9	
Urban/nonmetropolitan	12	15.8	23	29.9	
Rural	7	9.2	4	5.2	
Clinic type					<.001
FQHC/CHC	63	80.8	63	80.8	
Health system/hospital	14	17.9	1	1.3	
All other	1	1.3	14	17.9	
Health system size					.721
<5 clinics	16	20.8	20	26.0	
5 to <25 clinics	40	51.9	36	46.8	
≥25 clinics	21	27.3	21	27.3	
Clinic size					.527
<500 patients	27	34.6	23	29.5	
500 to ≤1500 patients	34	43.6	32	41.0	
>1500 patients	17	21.8	23	29.5	
% of uninsured patients					.821
<5%	27	34.6	22	33.9	
5% to ≤20%	27	34.6	20	30.8	
>20%	4	30.8	23	35.4	
CRCCP variable					
Free fecal test kits					.594
Yes	16	22.5	20	26.3	
No	55	77.5	56	73.7	
Primary CRC test type					.021
FOBT/FIT	44	58.7	44	57.1	

	Q4s		Q1s		
	No.	%[a]	No.	%[a]	*P*
Colonoscopy	14	18.7	26	33.8	
Varies/unknown	17	22.7	7	9.1	
CRC screening policy during PY2					.667
Yes	62	79.5	59	76.6	
No	16	20.5	18	23.4	
CRC champion during PY2					.028
Yes	73	93.6	64	82.1	
No	5	6.4	14	17.9	
Provider delivery strategy implemented during PY2					.229
Yes	74	94.9	70	89.7	
No	4	5.1	8	10.3	
EBI focus during PY2					.055
Patient or provider only	5	6.4	8	10.3	
Mixed	72	92.3	63	80.8	
No EBIs	1	1.3	7	9.0	
No. of EBIs implemented during PY2					.044
0	1	1.3	7	9.0	
1 or 2	11	14.1	17	21.8	
3	14	17.9	16	20.5	
4	52	66.7	38	48.7	
No. of enhanced EBIs implemented during PY2					.090
0	10	12.8	17	21.8	
1 or 2	42	53.8	29	37.2	
3 or 4	26	33.3	32	41.0	
No. of new EBIs implemented during PY2					.006
0	45	57.7	62	79.5	
1	28	35.9	11	14.1	
2 or 4	5	6.4	5	6.4	
Change in No. of EBIs implemented between PY1 and PY2					<.001
−1 or −2	4	5.1	10	12.8	

	Q4s		Q1s		
	No.	%[a]	No.	%[a]	*P*
0	29	37.2	49	62.8	
+1	22	28.2	10	12.8	
+2 to +4	23	29.5	9	11.5	
Change in No. of enhanced EBIs between PY1 and PY2					.591
−1 or −2	3	3.8	6	7.7	
0	40	51.3	42	53.8	
+1	17	21.8	12	15.4	
+2 or +3	18	23.1	18	23.1	
Frequency of implementation support during PY2					.439
Weekly or monthly	61	78.2	64	83.1	
Quarterly, semiannually, or annually	17	21.8	13	16.9	

Abbreviations: CHC, community health center; CRC, colorectal cancer; CRCCP, Colorectal Cancer Control Program; EBI, evidence-based intervention; FIT, fecal immunochemical test; FOBT, fecal occult blood test; FQHC, federally qualified health center; PY1, program year 1; PY2, program year 2; Q1, lowest quartile; Q4, highest quartile.

[a]The column percentages do not necessarily sum to 100.0% because of rounding.

TABLE 4.

Summary of the Final Logistic Regression Model Predicting Q4 Status

Predictor and Control Variables	No.	Adjusted Odds Ratio	95% CI	*P*
Predictor variables				
Change in No. of implemented EBIs between PY1 and PY2				.001
−1 or −2	14	1.5	0.3–6.4	.622
0	78	1.0	Referent	
+1	32	5.3	1.9–14.9	.002
+2 to +4	32	7.1	2.2–23.1	.001
No. of enhanced EBIs implemented during PY2				.040
0	27	1.0	Referent	
1 or 2	71	4.1	1.4–12.0	.012
3 or 4	58	3.5	1.0–11.7	.046
Control variable				
PY1 CRC screening rate				.020
<25%	32	5.1	1.2–22.9	.032
25% to <35%	33	4.8	1.3–18.0	.022
35% to <45%	35	1.5	0.4–5.4	.565
45% to <55%	34	1.4	0.3–5.5	.665
>55%	22	1.0	Referent	

Abbreviations: CI, confidence interval; CRC, colorectal cancer; EBI, evidence-based intervention; PY1, program year 1; PY2, program year 2; Q4, highest quartile.

The final logistic model also included clinic size as a control variable, which was not significant