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Health Plan–Based Mailed Fecal Testing for Colorectal Cancer Screening Among Dual-Eligible Medicaid/Medicare Enrollees: Outcomes of 2 Program Models

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Abstract

BACKGROUND: Health insurance plans are increasingly offering mailed fecal immunochemical test (FIT) programs for colorectal cancer (CRC) screening, but few studies have compared the outcomes of different program models (eg, invitation strategies).

METHODS: This study compares the outcomes of 2 health plan-based mailed FIT program models. In the first program (2016), FIT kits were mailed to all eligible enrollees; in the second program (2018), FIT kits were mailed only to enrollees who opted in after an outreach phone call. Participants in this observational study included dual-eligible Medicaid/Medicare enrollees who were aged 50 to 75 years and were due for CRC screening (1799 in 2016 and 1906 in 2018). Six-month FIT completion rates, implementation outcomes (eg, mailed FITs sent and reminders attempted), and program-related health plan costs for each program are described.

RESULTS: All 1799 individuals in 2016 were sent an introductory letter and a FIT kit. In 2018, all 1906 were sent an introductory letter, and 1905 received at least 1 opt-in call attempt, with 410 (21.5%) sent a FIT. The FIT completion rate was 16.2% (292 of 1799 [95% CI,

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AUTHOR CONTRIBUTIONS

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14.5%-17.9%]) in 2016 and 14.6% (278 of 1906 [95% CI, 13.0%-16.2%]) in 2018 ($P = .36$). The overall implementation costs were higher in 2016 (\$40,156) than 2018 (\$34,899), with the cost per completed FIT slightly higher in 2016 (\$138) than 2018 (\$126).

CONCLUSIONS: An opt-in mailed FIT program achieved FIT completion rates similar to those of a program mailing to all dual-eligible Medicaid/Medicare enrollees.

LAY SUMMARY:

Health insurance plans can use different program models to successfully mail fecal test kits for colorectal cancer screening to dual-eligible Medicaid/Medicare enrollees, with nearly 1 in 6 enrollees completing fecal testing.

Keywords

colorectal cancer screening; direct mail; dual-eligible Medicaid/Medicare; fecal immunochemical test; health plan

INTRODUCTION

Health systems, clinics, and health insurance plans (henceforth called health plans) are increasingly offering mailed fecal immunochemical test (FIT) programs as a strategy for increasing colorectal cancer (CRC) screening rates among individuals who are due for screening.¹⁻³ These programs can vary in their design features, including the populations chosen for the mailed program, the level of engagement of clinical teams in the programs, and how they are administered (eg, whether they use outside vendors and how they follow up with eligible individuals once they are sent a FIT kit). Few studies have compared outcomes of different program models, and health systems, clinics, and health plans are left to tailor their programs without evidence of which model might work best in their setting.

Health plans in particular can serve as efficient conduits for mailed FIT programs because they provide the opportunity to reach large segments of the population and can target populations with CRC screening disparities, such as Medicaid-insured or dual-eligible Medicaid/Medicare-insured individuals. Health plans are increasingly embracing population health⁴ approaches to care improvement, and managed Medicaid health plans are required to have quality initiatives in place as part of state contracts.⁵ As a result, most health plans have infrastructure in place that can support quality improvement initiatives.

The National Colorectal Cancer Roundtable has acknowledged and supported the role of health plans in promoting CRC screening by publishing a series of case studies from health plans that have successfully implemented member and provider outreach programs aimed at increasing CRC screening rates.³ However, there is a paucity of published research examining the implementation and outcomes of health plan-based programs to improve CRC screening, particularly for Medicaid enrollees. Dietrich et al⁶ worked with 3 Medicaid managed care organizations in New York City, whose outreach staff provided telephone-based CRC education and barrier resolution support to eligible women enrollees not up to date on CRC screening. Mailed FIT outreach was not part of the telephone-based program. Brenner et al⁷ conducted a centralized outreach program from an urban health department to

Medicaid beneficiaries aged 52 to 64 years who were not up to date with CRC screening; they compared the provision of mailed CRC screening reminders alone with mailed CRC screening reminders with a FIT kit, instructions, and a prepaid return mailer. Completed FIT kit returns were significantly higher in the group receiving the FIT kits plus reminders than the group receiving reminder materials only (21.1% vs 12.3%; $P < .01$). Though not administered by a Medicaid health plan, this study suggests that Medicaid beneficiaries are responsive to a centralized mailed FIT program and that such a program is feasible and cost-effective.⁸ The study reported here fills gaps in this literature by comparing the implementation, effectiveness, and cost outcomes of 2 different mailed FIT program models implemented by a health plan with its dual-eligible Medicaid/Medicare enrollees: the first mailed FITs to enrollees due for screening, and the second delivered live calls to enrollees due for screening and mailed FITs only to those who opted to receive the mailing.

MATERIALS AND METHODS

Study Setting

This study was part of BeneFIT, a collaboration between a research team and 2 health plans (called Health Plan Washington and Health Plan Oregon) for the purposes of implementing and evaluating a mailed FIT program.^{9–12} The current analysis is limited to Health Plan Washington, the only health plan that changed its mailed FIT program model in the second year in which the program was conducted. Health Plan Washington operated in multiple states and included coverage for roughly 650,000 Medicaid and/or Medicare enrollees across Washington State. It offered insurance to dual-eligible Medicaid/Medicare enrollees in a limited number of mostly urban counties of Washington State. The research team met regularly with representatives from the health plan (Health Plan Washington) and supported the development of its mailed FIT program models. Research team members served as consultants to the health plan by providing sample materials used in prior mailed FIT programs and research (eg, wordless FIT kit instructions¹³ and an outreach letter example) and by sharing information from the team's own experience and from the research literature on the success of different mailed FIT program design elements. The research team also conducted the evaluation of the mailed FIT programs. The health plan made all design decisions and implemented the programs on the basis of the information that the study team shared, the resources and practices of the vendors working with the health plan, and the health plan's prior experience with mailed FIT programs.

Study Population

The health plan used Healthcare Effectiveness Data and Information Set (HEDIS) criteria to identify dual-eligible Medicaid/Medicare enrollees (henceforth called Medicaid/Medicare enrollees) due for CRC screening in the 2 calendar years that it administered the mailed FIT programs: 2016 ($n = 1799$) and 2018 ($n = 1906$). Using HEDIS criteria, the health plan identified eligible enrollees as those aged 50 to 75 years with claims records showing no colonoscopy in the past 9 years, no sigmoidoscopy in the past 4 years, or no fecal test within each program's calendar year as of the date the eligible enrollee lists were pulled (August 2016 and September 2018). HEDIS criteria also required the exclusion of enrollees with a prior history of CRC or total colectomy. In 2018, HEDIS criteria required

the exclusion of individuals who received hospice or palliative care and individuals 66 years old or older suffering from advanced illnesses or frailty or living in an institution. Health plan staff pulled lists of eligible enrollees in the late summer/fall of each calendar year so that responses to the mailed FIT programs could be included in the health plan's annual, calendar year-based quality initiative reports. In 2016, the study population included only enrollees with a valid address; in 2018, it included enrollees with a valid address and phone number. The University of Washington Human Subjects Division reviewed and approved all research procedures.

Mailed FIT Program Models

The design of the 2016 mailed FIT program has been reported previously.^{9,11} The health plan directed the program, but it was conducted primarily by an outside vendor. The vendor mailed introductory letters (in English and Spanish) on behalf of the health plan to Medicaid/Medicare enrollees that the health plan had identified through its claims data as due for CRC screening (see the Study Population section). These letters emphasized the importance of CRC screening and notified the enrollees that they were due for CRC screening and would be sent a FIT kit through the mail. Three weeks later, the vendor sent FIT kits (2-s ample Insure by Clinical Genomics, Bridgewater, New Jersey) with pictorial instructions; 1 to 2 months later, the vendor conducted live reminder phone calls (in English; up to 6 attempts). Completed FITs were processed at a centralized laboratory, and results were returned to the health plan and each enrollee's primary care provider. Health plan care coordinators phoned enrollees with abnormal FIT results and recommended that they contact their provider to discuss results.

In the 2018 mailed FIT program, the health plan made a substantial adaptation by mailing kits only to enrollees who opted into the program during a live phone call. The health plan contracted with a new vendor able to conduct this opt-in approach. The health plan again generated a list of eligible Medicaid/Medicare enrollees from its claims data, and the vendor mailed introductory letters (in English) on behalf of the health plan. The letter emphasized the importance of CRC screening and informed the enrollees that they would soon receive a phone call offering them a FIT kit for CRC screening. The introductory letters were followed 1 to 3 weeks later by live phone calls (up to 3 attempts; the vendor was able to use health plan interpreters in multiple languages if needed). The vendor staff used a script for the phone calls that referenced the introductory letter and offered a free mailed FIT test from their health plan to screen for CRC. If an enrollee did not answer, a call-back number was provided if a message could be left. The vendor sent FIT kits (1-sample OC-Light by Polymedco, Cortlandt Manor, New York) with instructions in English and Spanish as well as pictorial instructions to enrollees who opted in; this was followed 1 to 4 weeks later by live reminder phone calls (up to 3 attempts). Completed FITs were processed by the vendor's laboratory, and test results were returned to the health plan, each enrollee's provider, and each enrollee. Vendor staff phoned enrollees with abnormal test results and recommended that they contact their provider to discuss results. In both the 2016 and 2018 programs, primary care providers were expected to follow their usual process of contacting their patients with abnormal FIT results and assisting them in obtaining a follow-up colonoscopy.

Outcome Measures

Measures of implementation—We measured implementation as the proportion of eligible Medicaid/Medicare enrollees to whom the health plan delivered each intervention component in each of the 2 programs (eg, introductory letters, calls attempted and completed [2018 only], and mailed FITs sent). Data for implementation measures came from vendor spreadsheets reporting the implementation process and FIT completion.

Measures of effectiveness—Effectiveness outcomes included the completion of FITs and the completion of any CRC screening (ie, FIT, sigmoidoscopy, and colonoscopy) in the 6 months after the introductory letter both overall and by enrollee demographic characteristics and primary care visit utilization. We measured these outcomes via data from either vendor spreadsheets or claims from the health plan. We obtained claims data at least 9 months after introductory letters were mailed to account for lags in claim submission.

Measures of cost—We measured costs of different phases of the development and implementation activities in each of the 2 programs (eg, training, enrollee eligibility, and mailing/tracking). Health plan staff worked with the research team to identify all development and implementation activities. The research team provided a costing spreadsheet to health plan staff engaged in the development and implementation activities and asked them to assign and record estimated labor hours by activity (eg, “health plan generates a list of enrollees due for CRC screening”) at the end of the intervention periods for each program. To increase consistency in cost reporting, we worked with the health plan staff completing the costing spreadsheets to ensure their understanding of the spreadsheets’ terms and concepts. Hours were multiplied by job-specific wage rates, and costs were aggregated into activity phases. Nonlabor costs (ie, vendor and incentive costs) were obtained from the health plan.

Analysis—We used Pearson χ^2 tests to compare the characteristics of the enrollees in the 2 programs as well as the outcomes of the opt-in phone call process in 2018 (eg, never reached or declined a FIT when reached) by enrollee characteristics.

We used multivariate logistic regression models to compare FIT and any CRC screening completion rates between the 2 programs while adjusting for gender, age (50-64 vs 65-75 years), residence (urban vs rural), enrollee preferred language (English vs other; determined as part of the health plan enrollment process), and the presence of any primary care visits in the past year (any vs none). We fit 1 main effects model and 1 interaction model that included all interactions of program year with the covariates. The interaction model allowed us to test the hypotheses that the associations of FIT and any CRC screening completion with program year differed according to the level of each of these characteristics. We did not cluster by health center in the models because there was a very small intraclass correlation coefficient (0.001) in the unconditional model.

For the cost measures, we added the costs of the development and implementation activities in each program to compute a total development cost and a total implementation cost. For each program, we calculated the implementation cost per mailed introductory letter, FIT kit mailed, and completed FIT kit.

All analyses were performed with SAS 9.4 for Windows.

RESULTS

The health plan sent introductory letters to 1799 Medicaid/Medicare enrollees due for CRC screening in 2016 and to 1906 in 2018 (Table 1). In each program, the enrollees were primarily female, were aged 65 to 75 years, and lived in urban areas. A higher percentage of enrollees preferred a non-English language in 2016 (10.3%) versus 2018 (7.1%; $P = .001$). Primary care visits in the year before the introductory letter mailing differed between the 2 programs, with enrollees in 2018 having higher rates of no visits in comparison with those in 2016 (25.3% vs 19.3%; $P = .001$).

Implementation Outcomes

By design, in 2016, all individuals sent an introductory letter ($n = 1799$) also were sent a FIT kit (Table 2). In 2018, all but 1 of the 1906 individuals sent an introductory letter had an opt-in call attempt. Among these 1905 enrollees, 765 (40.2%) had 1 opt-in call attempt, 344 (18.1%) had 2 opt-in call attempts, and 796 (41.8%) had 3 opt-in call attempts (data not shown). Of the total sample of 1906 sent an introductory letter, 52.2% ($n = 995$) were never reached by phone and hence were not sent a FIT kit, 26.3% ($n = 501$) were reached but declined to receive a FIT, and 21.5% ($n = 410$) were sent a FIT kit.

The implementation results for 2018 differed by enrollee characteristics (Supporting Table 1). Younger enrollees (aged 50–64 years) were more likely than older enrollees (aged 65–75 years) to not be reached by phone (56.0% vs 49.3%; $P = .004$). Among those reached by phone ($n = 907$), enrollees who preferred a non-English language ($n = 841$) were significantly more likely than those who preferred English ($n = 66$) to decline a FIT kit (77.3% vs 53.2%; $P = .001$). Women were more likely than men to be sent a FIT kit (23.2% vs 19.3% of the initial cohort of 1906; $P = .04$; data not shown), as were those who preferred English compared with those who preferred a non-English language (22.4% vs 11.0%; $P = .002$).

Effectiveness Outcomes

The unadjusted FIT completion rate was 16.2% (95% CI, 14.5%–17.9%) in 2016 and 14.6% (95% CI, 13.0%–16.2%) in 2018 (Table 3). The unadjusted completion rate for any CRC screening was 19.2% (95% CI, 17.4%–21.1%) in 2016 and 17.1% (95% CI, 15.4%–18.8%) in 2018. The differences in completion rates for FIT and for any CRC screening were not significant after adjustments for covariates. In the interaction models, the associations of FIT and any CRC screening completion with program year did not differ according to the level of each covariate.

In 2018, among the 410 enrollees who agreed to receive and were mailed a FIT kit, 278 (67.8%) completed a FIT in the 6 months after the introductory letter was sent. In 2016, all 1799 eligible enrollees were mailed a FIT kit; 292 of 1799 (16.2%) completed a FIT in the 6 months after the introductory letter was sent.

Cost Outcomes

Development costs for the mailed FIT programs were 42% lower in 2018 (\$21,539) than 2016 (\$37,308; Table 4). These lower costs were largely due to labor costs for development activities (eg, program processes, mailing/tracking, and enrollee eligibility procedures). Implementation labor costs were 37% lower in 2018 (\$9172) than 2016 (\$14,620), largely because of time spent on enrollee eligibility, test processing, and administrative activities in program implementation. Nonlabor costs were roughly equivalent across the 2 programs. The lower program costs in 2018 translated into slightly lower program costs per FIT kit completed in 2018 versus 2016 (\$126 vs \$138; Table 5).

DISCUSSION

We assessed the implementation, effectiveness, and costs of 2 mailed FIT outreach program models delivered to Medicaid/Medicare enrollees. The 2 mailed FIT programs differed in how they were implemented, with one mailing to all eligible enrollees and the other mailing only to enrollees who opted in after a live phone call outreach, yet the 2 programs produced similar completion rates for FIT and any CRC screening. Implementation costs per FIT completed were slightly lower in 2018.

The health plan expected its 2018 opt-in program to boost the FIT completion rate because of its efforts to make personalized contact with enrollees. However, the overall FIT completion rate did not differ between the 2 programs, and the rates were generally below those in previous reports of mailed fecal test outreach.^{2,7,14} Notably, our analysis was limited to dual-eligible Medicaid/Medicare enrollees; it has been reported that dual-eligible enrollees as a population experience significant disability,¹⁵ and disability has been associated with low levels of preventive care utilization.¹⁶

In the health plan's 2018 phone call-based opt-in program, more than half of the enrollees could not be reached, and another quarter declined participation. In this study, the group least likely to be reached for the opt-in phone call was younger adults (aged 50-64 years). Data for adults aged 50 to 64 years indicate a rising CRC incidence of 1% annually from 2011 to 2016¹⁷ and disproportionately low screening rates (63.3% vs 79.2% in adults aged 65-75 years)¹⁸; this suggests that additional effort may be needed to reach this group of younger eligible adults. The recent US Preventive Services Task Force recommendation to begin offering CRC screening at the age of 45 years rather than 50 years (the prior recommendation)¹⁹ further emphasizes the need to effectively promote CRC screening in this younger group. The 21.5% opt-in rate was similar to the rates in 2 other studies of opt-in programs (23.1%-29.3%).^{20,21} Mehta et al's trial²⁰ included an opt-in arm in which only patients responding that they wanted to receive a FIT kit were sent one, and findings were compared with those for an opt-out arm in which all patients were sent a FIT kit unless they responded that they did not want one. Patients in the opt-out arm had a higher FIT completion rate (29.1%) than patients in the opt-in arm (9.6%), and this suggested that some patients who would not have chosen to receive a FIT kit or were not reached with the opt-in strategy would have completed the FIT with the opt-out approach. In contrast, our analysis found similar FIT completion rates between the 2016 program and the 2018 (opt-in)

program, and this suggested that the health plan's opt-in strategy did not adversely affect FIT completion rates.

In the health plan's 2018 phone call-based opt-in program, enrollees who preferred a non-English language were equally as likely to be reached as enrollees who preferred English, but among those reached, adults who preferred a non-English language were significantly more likely to decline a mailed FIT kit. This might be explained by the vendor not offering the introductory letter in languages other than English and the vendor having to take an extra step to contact the health plan's interpreters for opt-in phone calls with enrollees who preferred a non-English language.

In light of similar overall FIT completion rates (number of FITs completed/number of eligible enrollees) in the 2 programs despite the minority of enrollees opting to receive FIT kits in 2018, it is possible that the 2018 program had higher efficiency (ie, savings by not mailing FITs to enrollees not likely to respond). Indeed, the number of FITs completed/number of FIT kits mailed was much higher for the 2018 opt-in program (67.8% [278 of 410]) versus the 2016 program, in which all eligible enrollees were mailed a FIT kit (16.2% [292 of 1799]). Nevertheless, the cost per completed FIT was only slightly lower for the 2018 opt-in program versus the 2016 program. The costs of both programs were in the range of other published studies,^{8,22,23} but additional research could further evaluate the costs and potential efficiencies of opt-in and opt-out mailed FIT programs.

This research has taken advantage of a natural experiment, yet this also has resulted in limitations. The study's design is observational with no usual-care comparison. The 2 programs were implemented in nonsequential years (2016 and 2018), and the health plan personnel responsible for the programs differed in those 2 years.²⁴ Additionally, the 2018 HEDIS criteria added exclusions of enrollees who were frail or ill, who might have had lower FIT completion rates. Also, the health plan used different vendors for each of the 2 programs. Those vendors used different FIT tests: a 2-sample test in the 2016 program and a 1-sample test in the 2018 program. There is evidence from integrated health plans that mailed FIT kit return rates are higher with a 1-sample test than a 2-sample test.²⁵ We are unable to account for this difference in FIT tests between the programs in this study. Study generalizability is limited in 2 ways. First, the health plan did not offer the program in most of Washington's rural counties, and second, because the health plan was pilot-testing these mailed FIT program models with limited budgets, the translation of all materials into multiple languages was not possible. There were also data limitations. The research team was dependent on the health plan's collaborating vendors to keep records of program implementation and was dependent on the health plan to provide outcome data usually used for administrative purposes. Cost accounting data were reliant on accurate retrospective reporting by health plan staff. To maximize cost data accuracy and consistency, we reviewed all cost accounting data after they were submitted. If we had questions about the data, we contacted the health plan staff to clarify and revise the data if needed. Finally, this study was unable to examine the results of sustaining either of the 2 mailed FIT program models into a second year.

This study demonstrates that a health plan can feasibly implement different mailed FIT program models, with vendors used to manage several program elements. Each health plan-based mailed FIT program was associated with nearly 1 in 6 enrollees completing CRC screening fecal test kits. These study findings suggest that scaling up and spreading health plan-based mailed FIT programs could begin to close gaps in CRC screening rates for vulnerable populations. However, mailed FIT programs alone will not reach the 80% in Every Community screening target of the National Colorectal Cancer Roundtable,²⁶ and identifying and implementing the most effective screening strategies to address the needs of the hardest to reach populations is a critical area for future investigation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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CONFLICT OF INTEREST DISCLOSURES

Laura-Mae Baldwin reports support for travel to and presenting at the Accelerating Rural Cancer Control Meeting sponsored by the National Cancer Institute in Bethesda, MD in 2018. Baldwin also was an invited member of the National Cancer Institute's External Advisory Board/Planning Committee for the Accelerating Rural Cancer Control Meeting. Gloria D. Coronado received a grant from the Quidel Corporation awarded to Kaiser Permanente Northwest (September 2017 to June 2018) to compare the clinical performances of an experimental fecal immunochemical test and a fecal immunochemical test approved by the US Food and Drug Administration, and in 2020-21, she also served as a scientific advisor to Exact Science and Guardant Health. Coronado is a member of the Data Safety Monitoring Board for the Veteran Administration's Colonoscopy Versus Fecal Immunochemical Test in Reducing Mortality from Colorectal Cancer (CONFIRM) study. She serves on the Board of Scientific Advisors for the National Cancer Institute and on the Committee on Improving the Representation of Women and Underrepresented Minorities in Clinical Trials and Research for the National Academies of Sciences, Engineering and Medicine. Yogini R. Kulkarni-Sharma reports support from Molina Healthcare. Beverly B. Green has been a National Colorectal Cancer Round Table Steering Committee member (unpaid position). The other authors made no disclosures.

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TABLE 1. Descriptive Characteristics of Medicaid/Medicare Enrollees Sent Introductory Letters for the Mailed FIT Programs in 2016 and 2018

Characteristic	2016 (n = 1799)		2018 (n = 1906)		P Comparing 2016 and 2018 ^d
	%		%		
% female (vs male) ^b	58.1		56.2		.29
% 65-75 y old (vs 50-64 y old) ^{c,d}	55.4		56.1		.68
% urban (vs rural)	97.6		97.0		.27
% of enrollees preferring non-English language (vs English) ^e	10.3		7.1		.001
% with no primary care visits in past year (vs 1 or more visits) ^c	19.3		25.3		.001

Abbreviation: FIT, fecal immunochemical test.

^aP-values were derived from Pearson χ^2 tests.

^bMissing data on gender for 0 in 2016 and 4 in 2018.

^cAs of the 2016 or 2018 introductory letter mailing date.

^dMissing data on age for 0 in 2016 and 7 in 2018.

^eMissing data on enrollee preferred language for 21 in 2016 and 8 in 2018.

TABLE 2.

Implementation Outcomes for the Mailed FIT Programs in 2016 and 2018

Process	2016 Mailing		2018 Mailing	
	No.	%	No.	%
Introductory letter				
Sent an introductory letter	1799	100	1906	100
Opt-in phone call				
At least 1 opt-in call attempt to determine willingness to receive a FIT kit (2018 only) ^a	NA	NA	1905	99.9
Of enrollees sent an introductory letter			1906	
Never reached, were not sent a FIT kit ^b	NA	NA	995	52.2
Reached, declined, and were not sent a FIT kit ^c	NA	NA	501	26.3
FIT kit mailing				
Of enrollees sent an introductory letter	1799		1906	
FIT kit sent ^d	1799	100	410	21.5
Sent an additional FIT kit	140	7.8	54	2.8

Abbreviations: FIT, fecal immunochemical test; NA, not applicable.

^a Additional outreach attempts (up to 3) were made if there was no resolution from the previous call (eg, declined FIT or accepted FIT).

^b Included enrollees who never answered the phone, for whom a message was left, whose number was wrong, or whose phone was disconnected.

^c Included enrollees who declined and were not sent a FIT (n = 456) or asked to be removed from the list (n = 45).

^d Included 9 enrollees whose vendor tracking sheet information did not indicate a willingness to receive a FIT kit: 1 sent a FIT without an outreach call, 1 declined a FIT during the first outreach call, 5 sent a FIT after a message was left during the third outreach call, 1 sent a FIT after no answer to the third outreach call, and 1 declined a FIT during the third outreach call.

Screening Completion Rates for FIT and Any CRC Screening Overall and by Descriptive Characteristics in 2016 and 2018

TABLE 3.

Characteristic	FIT Completion			Any CRC Screening Completion						
	2016		2018	2016		2018				
	No.	% ^a	No.	% ^a	No.	% ^a				
Main effects model^b										
Overall	1799	16.2	1906	14.6	.36	1799	19.2	1906	17.1	.29
Interaction model^c										
Gender^d										
Male	754	14.3	830	13.9	.46	754	17.5	830	16.6	.36
Female	1045	17.6	1072	15.1		1045	20.5	1072	17.4	
Age										
50-64 y	802	15.3	830	12.2	.26	802	19.5	830	14.8	.09
65-75 y	997	17.0	1069	16.5		997	19.1	1069	18.9	
Residence location										
Urban	1755	16.3	1848	14.6	.62	1755	19.4	1848	17.1	.33
Rural	44	13.6	58	15.5		44	13.6	58	19.0	
Enrollee preferred language^f										
English	1592	16.1	1762	14.4	.69	1592	19.1	1762	16.8	.43
Non-English	186	17.7	136	17.7		186	19.9	136	21.3	
Primary care visits in past year^g										
0	347	12.7	483	12.0	.98	347	13.8	483	13.0	.95
1	1452	17.1	1423	15.5		1452	20.5	1423	18.5	

Abbreviations: CRC, colorectal cancer; FIT, fecal immunochemical test.

^a All percentages represent unadjusted values.

^b P-values are for the significance of program year in the logistic regression models that included main effects for gender, age, residence location, enrollee preferred language, and primary care visits in the past year.

^c P-values are for the interactions of each covariate with program year from a logistic model with all 5 interaction terms included.

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- ^dMissing data on gender for 0 in 2016 and 4 in 2018.
- ^eAge at the introductory letter mailing date in each program; missing data for 0 in 2016 and 7 in 2018.
- ^fMissing data on enrollee preferred language for 21 in 2016 and 8 in 2018.
- ^gMeasured with respect to the introductory letter mailing date.

TABLE 4. Health Plan Development and Implementation Costs for the Mailed FIT Programs in 2016 and 2018

Activity	2016		2018	
	Cost, \$	%	Cost, \$	%
Development activities				
Labor				
Training	2252	6.0	780	3.6
Enrollee eligibility	1052	2.8	0	0.0
Mailing/tracking	3944	10.6	2788	12.9
Program processes	14,197	38.1	2122	9.9
Administration/other	15,855	42.5	15,849	73.6
Total development costs	37,308	100.0	21,539	100.0
Implementation activities				
Labor				
Training	446	3.1	1391	15.2
Enrollee eligibility	5039	34.5	2267	24.7
Mailing/tracking	981	6.7	1849	20.2
Program processes	1404	9.6	0	0.0
Administration/other	6750	46.2	3665	40.0
Total implementation labor costs	14,620	100.0	9172	100.0
Nonlabor				
FIT kits and mailing materials ^a	8995	27.3	0	0.0
Payment to vendor for mailing/tracking FITs ^a	6975	26.7	23,400 ^a	91.0
Payment for laboratory claims for completed FITs	6821	10.7	1836	7.1
Incentive payments to enrollees ^b	2745	35.2	480	1.9
Total implementation nonlabor costs	25,536	100.0	25,716	100.0
Total implementation costs	40,156		34,899	

Abbreviation: FIT, fecal immunochemical test.

^aIn 2016, FIT kit and mailing material costs were separated from the vendor costs; in 2018, the vendor payment included the cost of FIT kits and mailing materials.

^bIncentives were offered to all enrollees in 2016 but were offered to enrollees only in the last quarter of 2018.

TABLE 5.
Total Implementation Cost Per Individual for the Mailed FIT Programs in 2016 and 2018

Activity	2016 ^a		2018 ^b	
	No.	Total Implementation Cost per Individual, \$	No.	Total Implementation Cost per Individual, \$
Introductory letter sent	1799	22	1906	18
FIT kit mailed	1799	22	410	85
FIT kit completed	292	138	278	126

Abbreviation: FIT, fecal immunochemical test.

^aBased on a 2016 total implementation cost of \$40,156 (Table 4).

^bBased on a 2018 total implementation cost of \$34,899 (Table 4).