



Published in final edited form as:

*Health Promot Pract.* 2020 November ; 21(6): 891–897. doi:10.1177/1524839920954164.

## Cost and Effectiveness of Reminders to Promote Colorectal Cancer Screening Uptake in Rural Federally Qualified Health Centers in West Virginia

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### Abstract

The purpose of this study is to evaluate the effectiveness of the West Virginia Program to Increase Colorectal Cancer Screening in implementing patient reminders to increase fecal immunochemical test (FIT) kit return rates in nine federally qualified health centers (FQHCs). Using process measures and cost data collected, the authors examined the differences in the intensity of the phone calls across FQHCs and compared them with the return rates achieved. They also reported the cost per kit successfully returned as a result of the intervention. Across all FQHCs, 5,041 FIT kits were ordered, and the initial return rate (without a reminder) was 41.1%. A total of 2,201 patients received reminder phone calls; on average, patients received 1.61 reminder calls each. The reminder interventions increased the average FIT kit return rate to 60.7%. The average total cost per FIT kit returned across all FQHCs was \$60.18, and the average cost of only the reminders was \$11.20 per FIT kit returned. FQHCs achieved an average increase of 19.6 percentage points in FIT kit return rates, and costs across clinics varied. Clinics with high-quality health information systems that enabled tracking of patients with minimal effort were able to implement lower cost reminder interventions.

### Keywords

colorectal cancer; rural; West Virginia; screening; FQHC; economic evaluation

### BACKGROUND

In 2015, West Virginia University (WVU) was funded by the Centers for Disease Control and Prevention (CDC) Colorectal Cancer Control Program. (Additional detail on the program is provided in a companion article in this journal, Tangka et al., 2020). With the

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funding, WVU launched the West Virginia Program to Increase Colorectal Cancer Screening (WVPICCS). Its focus was to increase colorectal cancer (CRC) screening to 80%, or at least 10% from baseline screening rates in each participating federally qualified health center (FQHC). Data indicate that West Virginia has a higher incidence of CRC than the United States overall: 45.8 per 100,000 compared with 36.8 per 100,000, respectively (U.S. Cancer Statistics Working Group, 2020). In addition, 19 of 55 counties in West Virginia have been deemed CRC hot spot areas (areas of the United States with increased CRC mortality rates) by the American Association for Cancer Research (Siegel et al., 2015).

FQHCs that participated in WVPICCS implemented evidence-based interventions (EBIs) recommended by *The Community Guide* (Community Preventive Services Task Force, 2012). Per the request of WVPICCS, the FQHCs implemented provider assessment and feedback and at least two other EBIs: patient reminders, provider reminders, and interventions that reduce structural barriers. For the purpose of this study, we focused on evaluating the effectiveness of patient reminders for increasing fecal immunochemical test (FIT) kit return rates in WVPICCS clinics that implemented them. We reviewed the reminder processes implemented in selected FQHCs and compared the return rate achieved and the cost per FIT kit returned.

## METHOD

### CRC Screening Implementation Process

West Virginia is a largely rural state and the only state that is entirely within Appalachia. The focus of WVPICCS was to change protocols within rural health care systems in order to increase referral and completion of CRC screening. WVPICCS used a competitive partnership process application to identify FQHC partners. The application consisted of questions about FQHCs' current CRC screening processes and rates and the organizational capacity of the health systems to implement EBIs and partner with WVPICCS. Independent reviewers assigned a score based on responses to the applications, and they awarded priority scoring points to FQHCs with screening rates below 50% and to those serving counties identified as having higher rates of late-stage CRC diagnosis. The independent reviewers then ranked the total scores to determine the health systems to participate in the project. In total, WVPICCS partnered with 12 FQHCs during 2016 and 2017.

Once the FQHCs were selected, WVPICCS worked with each for a 2-year period. During the first year, WVPICCS actively assisted each health clinic in implementing its EBIs. WVPICCS provided technical assistance, professional development training, and practice facilitation for quality improvement. FQHC partner clinic sites assessed their CRC screening practices and systematically reviewed their current use of electronic health records to identify improvements. Each health clinic chose the EBIs they implemented. Year 2 was considered the health clinics' maintenance phase. WVPICCS lessened its involvement with the health clinic to allow health clinic staff to take ownership in implementing the EBIs to make them sustainable.

FQHC partner clinics' approach to CRC screening involved a conversation between provider and patient to assess risk status and determine screening options. Patients who selected FIT

received the test kit at their appointment and were instructed by a nurse or medical/laboratory assistant on how to complete the test and return it to the clinic. Most clinics had patients return the test in person; however, some did have an option to mail the test back. If the test was not returned within 7 to 21 days, clinics initiated an enhanced client reminder call protocol using the stages of change (transtheoretical) model (Menon et al., 2007). Stages of change is a health theory, which clinic staff used to identify where patients were in the process of creating and adopting change in their lives. Staff then tailored messages to the patients to motivate them to take action (e.g., take FIT, return FIT kit), depending on where they were in the process of change. Staff who conducted the reminder call were trained by WVPICCS on stages of change health theory and communication techniques. When placing the calls, staff used a series of simple questions and an algorithm to help assess the patient's stage of change in completing the FIT. After determining the patient's stage of change, they delivered a tailored stage-specific message to motivate the patient to complete the screening. If the test was not returned within approximately 3 weeks, which varied by clinic workflow, another reminder call was placed.

### **Evaluation of the Reminder Intervention to Increase FIT Kit Returns**

In this study, we examine the use of patient reminders to increase FIT kit return rates in the FQHCs supported by WVPICCS. For patients who did not return a FIT kit within a certain time frame, determined by FQHCs, staff would make phone calls and/or send a reminder letter to encourage them to return the test. The actual sequence of the reminders differed by FQHC; some FQHCs only made phone calls and did not use mailings. Of the 12 FQHCs supported by WVPICCS, three did not have complete data and were excluded from this study analysis. For the remaining nine FQHCs, we compare the FIT kit return rates achieved and report the cost per kit successfully returned as the result of the reminder intervention. We conducted significance testing by health system using *t* tests, comparing whether the changes from the initial rate of compliance to the final FIT return rate were significant.

To facilitate this in-depth analysis, WVPICCS collected data on process measures (e.g., number of FITs kit distributed, FITs kit returned, reminder calls made) from the FQHCs. The FQHCs did not maintain records on the number of reminder letters mailed, so we made the conservative assumption that all noncompliant individuals received reminder mailings. WVPICCS also retrospectively collected the average amount of time per tracking (identifying patients who received a FIT kit but did not return within specified time periods determined by FQHC) and reminder activity (mailing reminder letters and making reminder phone calls) at each FQHC. Using this information and the average hourly wage (derived from salaries received) of the staff who conducted these activities, we calculated the cost of tracking, cost of reminder calls, cost of mailings, and total cost.

## **RESULTS**

To remind patients to return FIT kits, most of the health clinics conducted telephone reminders within 14 days of the patients receiving the kits, followed by a second call and reminder letter, if necessary (Table 1). The total number of calls made by FQHCs ranged from 73 to 1,177, which reflected the size of the program interventions and the period of

performance (10–17 months). The cost of identifying and tracking patients varied across the FQHCs from \$515.52 to \$18,043.20. The total cost of reminder phone calls ranged from \$131.40 to \$1,972.08, and cost of mailing reminders ranged from \$130.34 to \$3,022.50.

Across all FQHCs, 5,041 FIT kits were ordered (Table 2). Overall, the average initial rate of compliance was 41.1% (16.1%–70.7%) before any reminders. A total of 2,201 patients received reminder phone calls. On average, patients received 1.61 reminder calls (1.00–2.27). The reminder interventions achieved an average return rate of 41.2% (14.8%–61.0%), which resulted in an overall average return rate of 60.7% (38.9%–81.6%). Therefore, the reminder interventions increased the average FIT kit return rate by 19.6 percentage points (5.9%–41.2%). With the exception of one health system, all increases in average return rates were significant. A total of 539 patients had positive FIT kit results across eight FQHCs (one FQHC did not report), with a positivity rate ranging from 7.1% to 32.1% (data not shown in table).

In Figure 1, we report the average cost per FIT kit returned as a result of the reminder intervention (both telephone calls and mailings) in each FQHC. Overall, the average total cost of tracking and mailings per FIT kit returned across all FQHCs was \$60.18 (\$8.99–\$352.78). The average cost of only reminders (telephone calls and letters) per FIT kit returned was \$11.20 (\$3.13–\$25.47).

## DISCUSSION

In this study, we evaluated the role of patient reminders, using telephone calls and mailings, to increase FIT kit return rates in FQHCs serving rural populations in West Virginia. Across all the FQHCs, the reminder interventions increased the FIT kit return rate, and hence the CRC screening rate, by 19.6 percentage points. This is higher than the median increase reported in a review by the Community Prevention Services Task Force on client reminders for fecal occult blood tests. Across the four studies included in the review, the median increase was 11.5 percentage points (Sabatino et al., 2012). In the FQHCs included in our analysis, all but one were able to achieve rate increases that were 11 percentage points or higher.

The average cost per FIT kit returned was \$60.18 (not including cost of FIT kits or lab processing fees) when tracking and implementing reminders were considered and \$11.20 for just the telephone and mailed reminders. Cost varied widely, especially for tracking, as two FQHCs had extremely high costs per FIT kit returned (more than \$200). Both these FQHCs are potential outliers and experienced temporary challenges that increased the staff time required to track patients who were given FIT kits. One FQHC experienced problems with the electronic health record, and the other FQHC had difficulty getting completion reports from the laboratory processing the FIT kits. Additionally, given that these are rural FQHCs serving small populations (all but one FQHC provided FIT kits to less than 1,000 patients during the study), we would anticipate that their costs would be generally higher than high-volume centers, as they are unable to reap benefits from economies of scale (Subramanian et al., 2017; Trogdon et al., 2014). Despite this, the cost per FIT kit returned estimated in this study is in the range reported by other studies in different settings. For example, a study

implemented in the Iowa City Veterans Affairs Health Care System to increase FIT screenings reported cost per FIT kit returned to be \$27 or \$45 (includes cost of FIT kit [\$5.00]), depending on the intensity of the mail and telephone interventions (Schlichting et al., 2014). In another study that conducted simulations based on prior randomized trials, the cost per completed FIT kit ranged from \$45 to \$74 (includes cost of FIT kit [\$5.03] and processing of returned kits [\$2.20]; Liss et al., 2016). An innovative feature of this study was that only those who did not return their FIT kits within a specified time frame (7–21 days) were selected to receive reminders.

An important consideration was the cost of the FIT kit itself. With the higher return rate, the loss to the FQHCs from the unreturned FIT kits was substantially reduced. In other words, FQHCs assume that not all FIT kits will be returned. Therefore, when more FIT kits are returned than FQHCs estimated, monetary loss is reduced. These “found” funds can then be used to offset the expenditure related to the implementation of the reminder intervention and further incentivize the FQHCs to introduce approaches to increase CRC screening rates.

Several methodological limitations need to be acknowledged in this study. First, this study was conducted in selected FQHCs, and there was no random assignment of the intensity of the interventions; the FQHCs selected the model they wanted to implement. Second, although every effort was made to track the FIT kits handed out and returned, there could be some inaccuracies in reporting that we were unable to verify independently. The health systems were mandated to submit data to WVPICCS on a semiannual basis, and we believe that any discrepancies were minor and did not affect the overall results presented in this article. Third, all cost data were collected retrospectively, and so the cost estimates and the reminder-based cost assignments could be subject to recall bias. The intervention implementation teams provided the estimates for each clinic independently, and we feel confident that these costs have been captured accurately. Fourth, we were able to report only the combined effect of using telephone and mailed reminders. Future studies could identify the independent effects of these two types of client reminders.

## IMPLICATIONS FOR PRACTICE AND/OR POLICY AND RESEARCH

The findings from this study provide estimates of the resources required to implement FIT kit reminder interventions and the level of increase in uptake that can be expected among individuals seeking care at FQHCs. Results suggest that rural FQHCs can use reminder systems as part of a multilevel strategy to increase their FIT kit return rates. A key lesson learned was the importance of having high-quality electronic systems in place that can support tracking patients in real time to avoid the need for large amounts of staff time to manually track patients for CRC screening programs. In this study, FQHCs with efficient tracking processes were able to implement client reminders that are likely to be highly cost-effective.

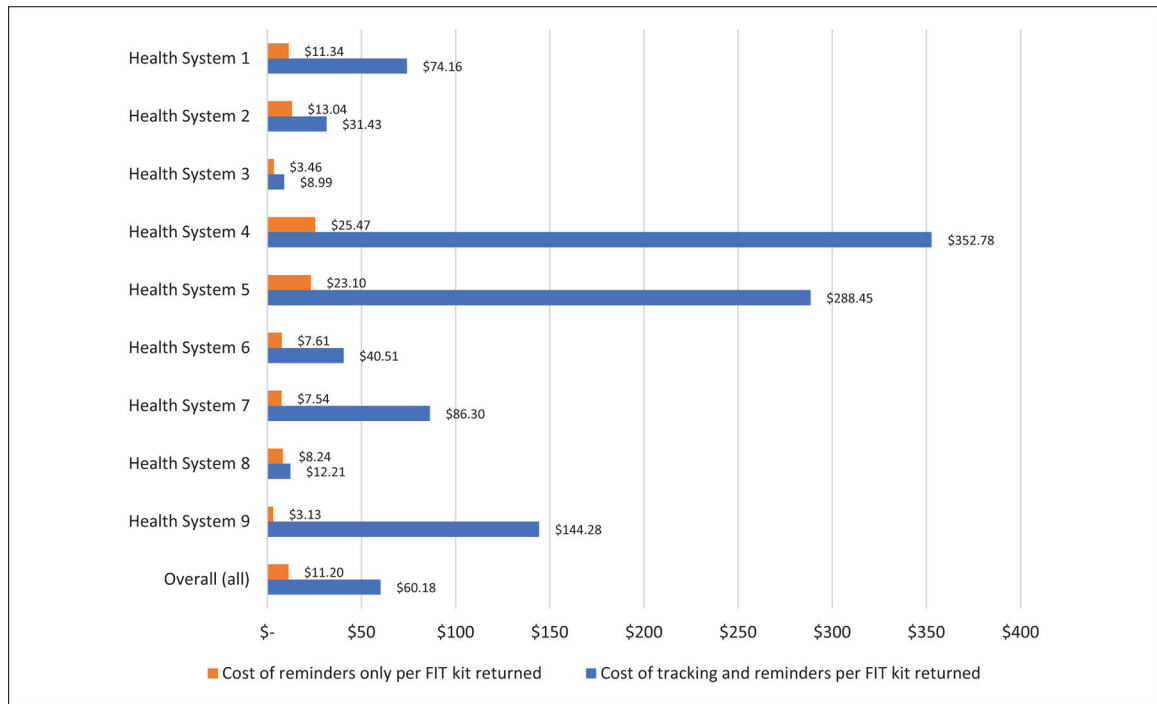
## Acknowledgments

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC). Funding support for RTI International was

provided by the CDC (Contract No. 200-2014-61263 Task 4, to RTI International). The provision of data by West Virginia University was supported through funding under a cooperative agreement with CDC.

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**FIGURE 1.**  
 Total Cost per FIT Kit Returned and Cost of Reminders per FIT Kit Returned by Health System  
*Note.* Reminders included telephone calls and mailings. FIT = fecal immunochemical test.

**Table 1**  
 Process and Cost of Implementing Reminders by Federally Qualified Health Center

Federally qualified health center	Brief description of intervention	No. of calls made	Mailings	Time frame	No. of months	Cost of identifying and tracking patients (\$)	Cost of reminder calls (\$)	Cost of letters (\$)	Total cost (\$)
1	First reminder call by Day 14; total of 2 reminder calls and then 1 letter	302	Yes	February 2016–June 2017	17	5,842.56	554.66	499.79	6,897.00
2	First reminder call by Day 14; total of 2 reminder calls and then 1 letter	1,177	Yes	March 2016–June 2017	16	2,611.97	1,972.08	3,022.50	7,606.55
3	First reminder call by Day 9; total of 2 reminder calls	260	No	March 2016–December 2016	10	547.74	342.05	—	889.79
4	First letter by Day 21, then 1 phone call	222	Yes	March 2016–December 2016	10	6,873.60	257.97	276.90	7,408.47
5	First reminder call by Day 7; total of 2 reminder calls and then 1 letter	474	Yes	March 2016–June 2017	16	18,043.20	762.57	808.50	19,614.27
6	First reminder call by Day 7; total of 2 reminder calls and then 1 letter	160	Yes	January 2017–December 2017	12	1,546.56	172.80	184.80	1,904.16
7	First reminder call by Day 10; total of 2 reminder calls and then 1 letter or electronic health record message	240	Yes	January 2017–December 2017	12	3,544.20	209.16	130.34	3,883.70
8	First reminder call by Day 10; total of 2 reminder calls and then 1 letter	480	Yes	January 2017–December 2017	12	515.52	518.40	553.04	1,586.96
9	First reminder call by Day 10; total of 3 reminder calls	73	No	January 2017–December 2017	12	5,928.48	131.40	—	6,059.88



FIT Return Rate by FQHC

Table 2

FQHC	Initial				With reminders				Final	
	No. of FITs ordered	No. of FITs returned without a reminder	Initial rate of compliance (%)	No. who received follow-up calls <sup>a</sup>	Calls per person	No. of FITs returned after calls <sup>b</sup>	FIT return rate (%)	Total no. of FITs returned	FIT return rate (%)	Increase in average return rate
1	541	293	54.2	233	1.70	93	39.9	386	71.3	17.2 <sup>***</sup>
2	1,683	271	16.1	762	1.51	383	50.3	654	38.9	22.8 <sup>***</sup>
3	911	644	70.7	260	1.00	99	38.1	743	81.6	10.9 <sup>***</sup>
4	355	119	33.5	142	1.56	21	14.8	140	39.4	5.9
5	508	145	28.5	231	2.27	68	29.4	213	41.9	13.4 <sup>***</sup>
6	114	37	32.5	77	2.08	47	61.0	84	73.7	41.2 <sup>***</sup>
7	253	75	29.6	178	1.35	45	25.3	120	47.4	17.8 <sup>***</sup>
8	438	190	43.4	248	1.94	130	52.4	320	73.1	29.7 <sup>***</sup>
9	238	146	61.3	70	1.04	42	60.0	188	79.0	17.6 <sup>***</sup>
Total	5,041	1,920	41.1	2,201	1.61	928	41.2	2,848	60.7	19.6 <sup>***</sup>

Note. FQHC = federally qualified health center; FIT = fecal immunochemical test.

<sup>a</sup>We made the conservative assumption that all noncompliant individuals received reminder letters too, except for individuals in FQHCs 3 and 9, which did not send reminder letters.

<sup>b</sup>Some FQHCs also sent one reminder letter.

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p < .001.