

Facilitators and Barriers of a Health Department-based Mailed Fecal Testing Program

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BACKGROUND Mailed at-home stool testing offers a promising strategy for overcoming barriers to colorectal cancer (CRC) screening in vulnerable populations. This paper evaluates the facilitators and barriers of successful implementation of a mailed fecal testing program among Medicaid populations within a health department setting.

METHOD Interviews were conducted with key informants involved in intervention start-up and implementation tasks. The Consolidated Framework for Implementation Research (CFIR) was used to design the interview guide and structure the analysis. Axial coding was used to connect the themes to each other under the major categories of facilitators and barriers.

RESULTS Overall, the process evaluation suggests that with strong partnerships, effective champions, and existing infrastructure, a large county health department can successfully implement a mailed fecal testing program targeted at Medicaid beneficiaries. The identified facilitators and challenges to implementation provide important information for similar emerging programs.

LIMITATIONS The sample size of this evaluation is small. Additionally, we are unable to discern whether participating stakeholders' responses represent the feelings of non-interviewed staff, program implementers, or participants. We were not able to collect data on patient perspectives of the intervention. The nursing staff and interns were not able to be included in the process evaluation. Lastly, the information taken from this process evaluation may not be applicable to organizations and systems with different attributes.

CONCLUSION The process evaluation suggests strong partnerships, effective champions, and elegant program designs were key contributors to successful implementation of a CRC screening program targeted at Medicaid beneficiaries in a large county health department.

Colorectal cancer (CRC) is currently the third most common cancer diagnosis for men and women and the second leading cause of cancer death in the United States [1, 2]. Currently, the United States Preventive Task Force (USPTF) recommends that average-risk adults be screened for colorectal cancer starting at age 50 [3]. Despite this recommendation, screening is underutilized for age-eligible adults, with only 62% up to date with screening in the United States and about 49% up to date in North Carolina [4, 5]. In departments of public health, Federally Qualified Health Centers (FQHC), and other community health care settings that serve primarily low-income, uninsured, and vulnerable patients, the screening rates are particularly low, with less than 35% of patients aged 51 to 74 screened for CRC in 2014 [6]. Community health care settings often serve a higher percentage of Medicaid beneficiaries, who have lower screening rates than other insured populations in North Carolina and nationally [5, 7, 8]. To increase CRC screening in vulnerable populations, the Community Guide to Preventive Services recommends the use of interventions that reduce structural barriers to screening. Mailed, at-home fecal immunochemical testing (FIT) kits are one approach that offers promise for effectively overcoming structural barriers [9-13]. In one safety net health system in Texas, CRC screening increased by about 30 percentage points with the incorporation of mailed FIT kits [10].

Medicaid populations may be a good target for a mailed FIT (MFIT) outreach program, but it is unclear how to best reach these individuals. Having a health insurer mail FIT kits has not demonstrated effectiveness [14]. A clinic-based MFIT program might be effective but would have limited reach. We recently established a MFIT program with the Mecklenburg County Public Health Department to examine its effectiveness in reaching all of Mecklenburg County's Medicaid beneficiaries.

The aim of this process evaluation of a CRC screening program in Mecklenburg County is to describe the processes used and examine the facilitators and barriers of implementing two mailed outreach strategies among Medicaid populations from a health department setting. The facilitators and barriers of implementing these strategies in the health department are based on post-implementation interviews, using the Consolidated Framework for Implementation Research (CFIR) to design the interviews and structure the

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analysis. The findings can inform the future implementation of MFIT programs in health departments.

Methods

Setting

We worked with the Mecklenburg County Public Health Department (MCPHD), the Community Care Network of North Carolina (CCNC), and Community Care Partners of Greater Mecklenburg (CCPGM). MCPHD is a county-level health department in southwestern North Carolina, serving more than 1 million residents [15]. The CCNC is a medical home system that aims to improve patient engagement, quality of care, return on investment, and organizational efficiencies among community partners in North Carolina [16]. The CCPGM is a National Committee for Quality Assurance (NCQA)-accredited, community-based case-management organization that aims to improve care coordination in North Carolina [17].

Conceptual Framework

CFIR is a conceptual framework that can be used to advance understanding of implementation across a range of settings and intervention types [18]. CFIR provides a pragmatic structure for approaching complex and interacting constructs in real-world settings, encompassing 39 constructs under five domains: intervention characteristics, outer setting, inner setting, individual characteristics, and process [18]. CFIR provides a comprehensive framework of multilevel and multifunctional components that may influence program implementation. CFIR can be particularly helpful for pre-implementation assessment or process evaluations to evaluate the barriers and facilitators of achieving implementation goals [18, 19]. One study used CFIR to guide an evaluation of 21 primary care practice transformation sites, in which the framework helped guide the analysis of the data and produce rapid, actionable findings [20].

Study Methods

The program design, outcome measures, and main results are summarized by Brenner and coauthors [2]. This program compared two mailed outreach strategies designed to increase CRC screening among Medicaid beneficiaries in Mecklenburg County (Figure 1). The first strategy involved mailing a packet with a letter encouraging screening completion, a FIT kit with instructions for completion, and reminder phone calls. The second strategy included the aforementioned letter and reminder phone calls and instructions for obtaining a FIT kit from the health department. The MFIT program was developed based on the medical neighborhood model, where clinical and community partnerships provide medical and social support to enhance health [16]. The program identified and leveraged existing community resources, including unscreened Medicaid population identification at CCNC, FIT kit processing capacity at MCPHD, and patient navigation at CCPGM.

Process Evaluation Methods

To evaluate the MFIT program, we conducted semi-structured, one-on-one interviews with six key stakeholders from each participating organization and from different program roles. These key stakeholders were the most critical to program start-up and implementation. Purposive sampling was used to maximize variation among interviewees according to their role within their organizations and this intervention.

Interview guides were developed using CFIR and addressed the following CFIR construct domains and items: inner setting (structural characteristics and compatibility); outer setting (external policies and incentives and patients' needs and resources); intervention characteristics (design quality and packaging and complexity); and process (champions and planning) [18]. Given the small sample size, in order to reach saturation we collapsed codes based upon how often they appeared in the transcripts. Other items that were considered as facilitators but not included were cost, networks and communications, implementation climate, relative priority, readiness for implementation, and reflecting and evaluating. Adaptability was also considered as a barrier, but not included. See Table 1 for a list of interview questions by topic and role. Interview questions were tailored based on the respondent's role, with questions for implementation leaders being more macro focused and questions for implementation staff being more micro focused on the day-to-day program activities.

FIGURE 1. Mailed FIT Program Flow Diagram for Two Study Conditions: Reminder Letter and Reminder Letter Plus FIT Kit (N = 2144)

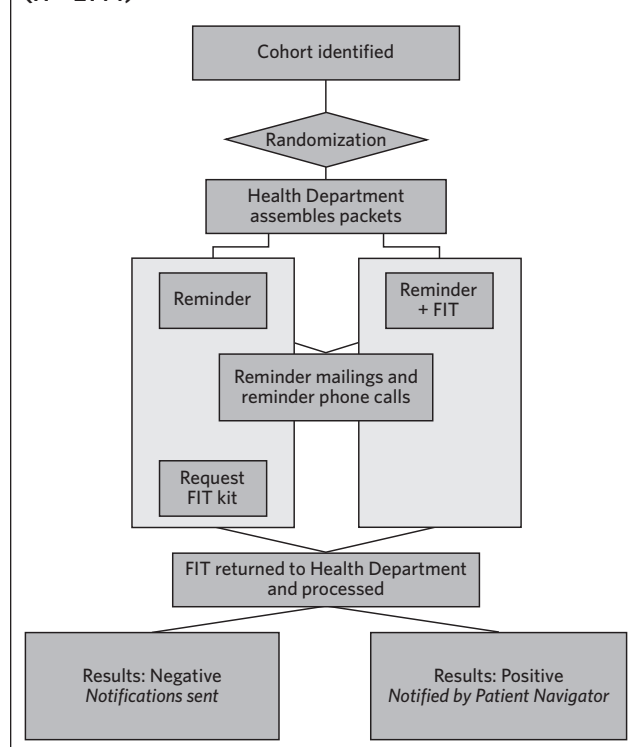


TABLE 1.
CFIR-Interview Guide

CFIR Construct	CFIR Item18	Interview Question(s)	Question for:
Intervention Characteristics	Design Quality and Packaging - "the perceived excellence in how the intervention is presented to an organization."	How do you feel about the quality of the supporting materials, packaging, and bundling of the intervention for implementation? Why?	Implementation staff
Outer Setting	External Policies and Incentives - the "external strategies, recommendations, or guidelines to spread interventions."	What kind of local, state, national performance measures, policies, regulations, or guidelines influenced the decision to implement the intervention?	Implementation leader
		What kind of financial or other incentives influenced the decision to implement the intervention?	
Inner Setting	Structural Characteristics - refers to "social architecture, age, maturity, and size of an organization."	How did the infrastructure of your organization (social architecture, age, maturity, size, or physical layout) affect the implementation of the program?	Implementation staff
		What infrastructure changes would you make to help the program run more effectively?	
Intervention Characteristics	Compatibility - the extent to which the intervention operates well within existing systems.	How well did the intervention fit with existing work processes and practices in your setting?	Implementation leader
			Implementation staff
Intervention Characteristics	Complexity - the perceived difficulty of implementation.	How complicated is the intervention? Please consider the following aspects of the intervention: duration, scope, intricacy and number of steps involved, and whether the intervention reflects a clear departure from previous practices.	Implementation staff
Process	Champions - "individuals who dedicate themselves to supporting, marketing, and 'driving through' an implementation, overcoming indifference or resistance that the intervention may provoke in an organization."	Who are the people in your organization that went above and beyond what was expected for the intervention?	Implementation staff
		How did they help with the intervention?	Implementation leader
	Planning - the extent to which a plan for implementing intervention tasks is developed in advance.	Can you describe the internal plan you followed to implement the intervention?	Implementation staff

Data were collected two months post intervention delivery, in September 2017. Interviews were conducted by a masters-level trained research team member involved in the development and implementation of the program. Interviews were transcribed verbatim and uploaded into Atlas.ti (Atlas.ti, Scientific Software Development GmbH, Berlin, Germany) for analysis.

All transcripts were dual coded. The codebook was developed using a deductive approach, based on CFIR constructs and definitions. Codebooks were initially tested by two team members (JR and SJ), who coded two transcripts independently and met several times to refine and finalize code definitions and use. The remaining transcripts were dual coded (JR and SJ) and discrepancies were resolved by consensus for the final codes. Axial coding was used to

connect themes to each other under the major categories of facilitators and barriers. Thematic analysis was used to make inferences from the data. The program was classified as not human subjects research by the University of North Carolina Institutional Review Board (IRB 17-1788).

Results

Researchers conducted interviews with six key stakeholders, including staff from the MCPHD, CCNC, and CCGM, ranging from executive leadership to managerial roles. The interviews averaged 21 minutes in length.

Analyses identified six factors that facilitated implementation and two factors that were barriers to program implementation. Facilitating factors were 1) design quality and packaging, 2) patients' needs and resources,

3) external policies and incentives, 4) structural characteristics, 5) compatibility, and 6) champions. Barriers were 1) complexity and 2) planning.

Facilitators to MFIT Implementation

Intervention Characteristics Domain

In the intervention characteristics domain, the design quality and packaging construct demonstrated how the intervention filled a programmatic need through thoughtful design and comprehensive case management.

Design quality and packaging. Respondents noted that the “elegant,” comprehensive design of the program, strong partnerships, and shared passion for promoting CRC screening in their community helped to facilitate program implementation. One program patient navigator mentioned the importance of the follow-up navigation to colonoscopy and its potential effect of the intervention:

I don't know if patients didn't have navigation how many would follow up with having a colonoscopy done because I had to remind a lot of these patients, 'Hey, did you get this done?' Just being sure that it was followed through with just because they may have forgot or something came up and it goes to the back of their mind.

Another respondent reiterated the importance of the robust case management component of the program:

Well the key thing with this project was that we were able to engage Community Care of Greater Mecklenburg County. If that hadn't been there, I probably would've been reluctant to do it because I would've been worried about having the resources and staff, capabilities, and knowledge to really make sure that robust follow-up is done.

Overall, both leadership and program staff responded well to the materials and resources that were provided for the intervention by the University of North Carolina research team.

Outer Setting Domain

Two outer setting constructs—patients' needs and resources and external policies and incentives—helped facilitate commitment to the intervention among respondents.

Patients' needs and resources. Overall, respondents recognized that their current methods for colon cancer screening weren't working and that there is a need to test innovative strategies for colon cancer screening in their communities:

Just looking at the overall population health, we know that colon cancer screening is relatively small, especially in the Medicaid population. So again, just from the patient side, we felt it was important to see that our patients get screened appropriately.

External policies and incentives. Key stakeholders identified several examples of external policies and incentives to participating in the intervention. The North Carolina Colorectal Cancer Roundtable (NCCRCRT) is an advocacy

coalition committed to reducing the incidence of and mortality from CRC in North Carolina. NCCRCRT has pledged to help North Carolina reach the “80% by 2018” CRC screening goal [21]. The momentum built by the NCCRCRT around improving CRC screening in North Carolina has stimulated respondents' excitement to test innovative strategies:

It would be a benefit to the community, and particularly the Medicaid patients in the community, to be able to offer this as a way to get people more engaged and participating in colon cancer screening.

Inner Setting Domain

Two inner setting constructs—structural characteristics and compatibility—were clear facilitators of MFIT implementation success.

Structural characteristics. The MCPHD is a large health department with a variety of preexisting resources that helped engage and facilitate program implementation, including on-site FIT kit processing capability. The patient navigator noted a number of existing resources for follow-up navigation including trained staff, secured office space, telephone, and fax machine.

Compatibility. Overall, respondents felt that program tasks fit well within their current workflow structure or required minor adjustments. MCPHD's previous experience with a breast cancer screening program that also offered FIT testing provided a foundation for this mailed FIT program. Although mailing FIT kits was a non-traditional role for the health department, respondents said the program fit well with the current goals and strategic direction of the organizations involved:

We were strategically and purposely trying to move the health department into ways to be more effective around noncommunicable diseases and chronic diseases, since those are really the more significant public health issues in our population. So it was kind of consistent with some of our new strategic directions to try to get involved in things like this.

Process Domain

Within the process domain, the champions construct was a key facilitator of implementation. Champions at several levels of leadership facilitated program adoption and implementation.

Champions. The health department director was viewed by respondents as the overall program champion. The director's comprehensive understanding of the program and clinical expertise helped incorporate relevant health department stakeholders to support program tasks.

You need one person that is willing to expend a lot of energy, whatever, on the actual making it happen, but you've got to have a leader like XX that says this is important and we're going to make this happen for the community. So even if I was enthusiastic about the program, I could never have made this happen without a leader at XX's level to understand the worthwhileness of the program.

The health department director was a strong advocate for, and successful at, getting the MCPHD reimbursed by Medicaid for FIT processing, making this program a cost-neutral solution to increasing CRC screening. Other important champions were found at the implementation level at the health department and CCPGM. The lab manager ensured that day-to-day operations of the program were implemented with fidelity by creating internal logging systems. The patient navigator ensured that patients with positive FITs were connected to colonoscopy services. The navigator incorporated flow charts and enhanced communication with referral providers. All champions demonstrated vital leadership, high self-efficacy, and commitment toward the success of the MFIT program.

Program Implementation Barriers

Intervention Characteristics Domain

Within the intervention characteristics domain, the complexity of this intervention was a barrier for the respondents who were directly implementing the intervention.

Complexity. Administrative aspects of the program, including the multiple cohort mailings and reminder callbacks, proved to be challenges for MCPHD. Respondents identified the process of mailing FIT kits as a barrier. However, during the course of the intervention, champions adapted the mailing to include pre-stamped and pre-labeled envelopes. Respondents also noted that callbacks to patients required a substantial amount of effort, due to the large amount of out of-service telephone numbers and full voicemail boxes. The lack of sustained staff (school health nurses and student interns) led to high turnover, which resulted in extra hours dedicated to training. One respondent suggested that the staff for the mailed FIT program should be a long-term employee whose job responsibilities include providing programmatic support. Before the intervention began, the program protocol included a mailed informational letter about the program to patients' providers. There was a wide time lapse between when the letter was sent and when navigation for positive FITs was needed, resulting in difficulties for the patient navigator in reaching primary care providers' offices. As a solution, the patient navigator sent a copy of the positive FIT test and the original program letter to the provider.

Process Domain

The planning construct, under the process domain, demonstrated the difficulty in changing organizational systems.

Planning. The final barrier to MFIT implementation involved electronic medical record (EMR) adaptation. Adapting the public health department's EMR was a major step toward processing Medicaid reimbursements, which required registering MFIT participants as patients within the EMR. Setting up the EMR infrastructure was challenging due to a timely approval process that involved coordinating with multiple units in the health department.

Discussion

This process evaluation identified several important facilitators for program implementation using CFIR constructs. Although CFIR is a commonly used framework in implementation science, only a few studies have used CFIR to evaluate CRC screening interventions. Liang and coauthors used CFIR to conduct a secondary analysis to identify factors that affected implementation of a cancer screening initiative across safety net systems [22]. This program found that implementation leaders were strong facilitators to successful project implementation [22]. Another program in an FQHC used CFIR to inform an adaptation of an evidence-based program to increase CRC screening [23]. However, neither of these studies conducted an evaluation to inform future iterations of a CRC screening program.

The findings of this process evaluation are important because CRC screening is underutilized in the general US population, especially in low-income populations. Local health departments are an important potential venue for increasing awareness and participation in screening. It is widely encouraged that public health departments engage more in prevention and control of non-communicable disease, and potentially expand to provide CRC screening.

Two main findings were the importance of having strong champions at every level of the implementation process and having recognized need to test new approaches to CRC screening. The director of the health department was integral in engaging with stakeholders, maintaining partnerships, articulating common goals, and facilitating change at the broad system level. These results are consistent with evidence that supports the importance of leadership within organizations broadly and within health care organizations to implement new innovations in system-level interventions [22, 25-27]. Effective leadership is important for setting a positive climate for the implementation of evidence-based practices during large-scale efforts [25].

In addition to the importance of champions at the executive leadership level, a champion at the implementation level was a determining factor in successful program implementation. In this program, the lab manager was instrumental in day-to-day coordination of the program and displayed high self-efficacy in identifying and remedying inefficient program elements through the development of flow charts and a refined mailing system. These findings are consistent with research demonstrating that systems with strong coordinators who serve as implementation leaders have a higher level of implementation [22].

The strong partnerships between the health department and Medicaid case management organization also helped facilitate the successful implementation of the MFIT program. Follow-up of abnormal FIT requires colonoscopy, which is a complex, poorly accepted, and expensive diagnostic test. Local health departments must have strong navigational capacity to meet these challenges and avoid

significant risk and liability. Because of the elegant design of the intervention, coordination between the sites was relatively simple. Both the health department and managed care organization had previously worked together and were in continued partnership with common goals of CRC screening. Specifically, the health department had taken the pledge to help North Carolina reach the 80% by 2018 CRC screening goal [28]. This demonstrates the importance of establishing lasting partnerships to facilitate program sustainability.

The findings also highlight challenges regarding certain complex processes within the health department. Mailings, follow-up calls, and EMR integration were considered time-intensive tasks by staff. In designing similar programs, leadership should be aware of the intensiveness of these tasks and allocate adequate time and staffing to prevent turnover and delays. This is consistent with previous studies and programs that have also identified turnover as a substantial barrier to implementation [25-27, 29]. Further, changes at the leadership level specifically may destabilize an organization to the extent that initiatives previously endorsed are less prioritized [24]. These factors may change the level of fidelity to which the intervention is maintained, which reinforces the need for detailed programmatic documentation of program barriers and adaptations [30].

Limitations

Several limitations should be considered when evaluating the implementation of the MFIT intervention. The sample size of this evaluation is small. However, we believe we reached saturation, and respondents had few discrepancies in their responses. Another limitation is the potential for selection bias. We are unable to discern whether participating stakeholders' responses represent the feelings of non-interviewed staff, program implementers, or participants. Due to privacy and patient health information concerns, we were not able to collect data on patient perspectives of the intervention. The nursing staff and interns were not able to be included in the process evaluation due to the high turnover and busy schedules. Lastly, the information taken from this process evaluation may not be applicable to organizations and systems with different attributes, such as small health departments and organizations with non-established partnerships and no FIT kit processing capacity on site.

Conclusions

The process evaluation suggests strong partnerships, effective champions, and elegant program designs were key contributors to successful implementation of a CRC screening program targeted at Medicaid beneficiaries in a large county health department. These findings suggest that with similar emphasis on stakeholder engagement and shared resources, the implementation of additional MFIT CRC screening programs may be feasible in similar settings. Future interventions aiming to increase CRC screening in similar settings should focus on strengthening the factors

in their organization found to be facilitators and reducing barriers to program implementation, as well as establishing continual implementation processes to provide formative process evaluations of their program. Reporting findings in a consistent manner with specific frameworks, such as CFIR, can contribute to a greater understanding of implementation processes and outcomes [18]. *NCMJ*

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