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Active Choice and Financial Incentives to Increase Rates of Screening Colonoscopy—a Randomized Controlled Trial

Shivan J. Mehta, MD, MBA, MSHP[1,2,3], **Jordyn Feingold**[1], **Matthew Vandertuyn, MID**[2], **Tess Niewood**[1], **Catherine Cox, MPH**[1,4], **Chyke A. Doubeni, MD, MPH**[4], **Kevin G. Volpp, MD, PhD**[1,2,3,5], and **David A. Asch, MD, MBA**[1,2,3,5]

[1]Department of Medicine, Perelman School of Medicine, University of Pennsylvania

[2]Penn Medicine Center for Health Care Innovation

[3]Center for Health Incentives and Behavioral Economics, Leonard Davis Institute of Health Economics, University of Pennsylvania

[4]Department of Family Medicine and Community Health, Perelman School of Medicine, University of Pennsylvania

[5]Center for Health Equity Research and Promotion, Philadelphia VA Medical Center

Abstract

Behavioral economic approaches could increase uptake for colorectal cancer screening. We performed a randomized controlled trial of 2245 employees to determine whether an email containing a phone number for scheduling (control), an email with the active choice to opt in or opt out (active choice), or the active choice email plus a $100 incentive (financial incentive) increased colonoscopy completion within 3 months. Higher proportions of participants in the financial incentive group underwent screening (3.7%) than in the control (1.6%) or active choice groups (1.5%) (P=.01 and P <.01). We found no difference in uptake of screening between the active choice and control groups (P=.88). The $100 conditional incentive modestly but significantly increased colonoscopy use. ClinicalTrials.gov no: NCT02660671.

Keywords

CRC; early detection; behavioral economics; clinical

Correspondence: Shivan J. Mehta, MD, MBA, MSHP, 14-174 PCAM South Tower, 3400 Civic Center Blvd., Philadelphia, PA 19104, 215-898-9807 (phone); 215-573-8778 (fax), shivan.mehta@uphs.upenn.edu.

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Routine screening is an established cost-effective approach for reducing mortality from colorectal cancer (CRC), the second leading cause of cancer death. Screening is low despite efforts to increase uptake.[1] Behavioral economics offers the potential to increase screening by harnessing predictable biases to encourage people to make more rational choices.[2] Behavioral economic approaches have been shown to improve health behaviors in a variety of settings,[3–5] and they may be particularly applicable to CRC screening.[6]

Providing an “active choice” leads people to actively choose or decline, thus making the screening decision more salient and mitigating the tendency to put off the decision until later.[7] “Enhanced active choice” favors one of the options by highlighting the losses associated with the non-preferred choice. Financial incentives can also provide immediate and certain benefits that might encourage participation among those insufficiently motivated by the future health benefits of screening.

The majority of large employers in the US offer financial incentives, typically greater than a hundred dollars, for employees to adopt healthier behaviors. This study evaluated if an enhanced active choice prompt with or without patient financial incentives increased participation in screening colonoscopy.

2,250 employees between ages 50–64 were randomly allocated to receive an email containing a phone number to schedule screening colonoscopy (control), an email with the active choice to opt in or opt out to scheduling (active choice), or the active choice email plus an offer of a $100 conditional incentive to participate (financial incentive). 2,245 were included in the analyses, as 5 participants had undeliverable emails (Table 1, Supplementary Figure 1). The primary outcome was the percentage of participants who completed colonoscopy within 3 months. See Supplementary Materials and Methods section for details.

There was no statistically significant difference in colonoscopy completion between the active choice (1.5%) and control arms (1.6%) (P-value =.88). The financial incentive arm had a higher colonoscopy completion rate (3.7%) than both the control and active choice arms (P=.011, .006). Appointment scheduling had comparable rates for the control (2.1%), active choice (2.0%), and financial incentive (4.8%) arms. There was a greater proportion of participants who said ‘yes’ to screening in the financial incentive arm (15.5%) as compared to the active choice arm (8.7%) (P < .01). The additional 16 screened individuals in the financial incentive arm (as compared to control) cost $2,800 in incentives, which translates to an incremental cost of $175 each.

This study evaluated behavioral economic approaches to increasing employee participation in screening colonoscopy. The active choice approach did not increase participation, but the $100 conditional incentive led to a statistically significant, but small in magnitude, increase in colonoscopy completion at a cost of $175 for each additional employee screened.

Active choice has been used to make decision-making more immediate to participants.[7] In this study, the choice of selecting ‘no’ required endorsing a statement emphasizing the harms of that choice, which is called enhance active choice.[7] We found greater initial response rates in the active choice arm than the control arm, but the rate of scheduling was the same, since it was often difficult for the scheduling representatives to reach the

participant on the phone. The benefits of active choice may have been offset by the requirement for two separate touchpoints, increasing the friction of scheduling for what is already a complex event.

Financial incentives have been shown to increase participation in health promoting behaviors such as smoking cessation, medication adherence, and weight loss.[3–5] In the case of stool testing for CRC screening, $5 and $10 incentives did not increase rates, but a lottery with a 1 in 5 chance of winning $50 was effective.[8, 9] No published studies have evaluated if financial incentives could increase screening colonoscopy rates. Indeed, the most substantial financial approach has been the elimination of patient cost-sharing for CRC screening under the Affordable Care Act, which in some populations included a reduction of $500.[10] However, no increase in CRC screening followed the elimination of cost-sharing.[10, 11]

The success of the financial incentive in this study might be due to the magnitude or design of the incentive. Colonoscopy is challenging for patients, requiring a day off from work, a bowel cleansing preparation, and transportation, in addition to non-financial costs of anxiety and discomfort. Smaller incentives may be insufficient to overcome those challenges. Although a $100 incentive seems relatively large, this amount is comparable to what employers offer for completion of health risk assessments or biometric screening activities, which in the absence of behavior change interventions, arguably have smaller health benefits. Colonoscopy navigator programs can range in cost from $50 to $500 per patient.[12, 13] Screening colonoscopy is also widely considered cost-effective as compared to other screening activities.[14] Since the intervention used email communication and existing call center operations, it would require minimal additional staff resources. Finally, this incentive was offered through the employer (who was also the health care provider) and was situated in the context of scheduling, which increased the trust and convenience of the activity, but may limit generalizability to other settings.

This study has limitations. First, it was conducted in an employee population, so we did not have access to clinical or claims data, and could not target only those who were not up to date with screening. This dilutes the impact of the intervention, but this applies to all arms in the randomization, and the call center asked screening questions before scheduling the procedure. Second, the intervention was less of a true active choice where participants cannot progress until they make a selection, so they could still choose not to respond at all. Third, the effect of the financial incentive was modest in impact, but because the target population included a significant portion who had already been screened, those response rates are artificially low. For example, 20–22% of the target population responded to the email as being already screened, and internal analysis estimated about a 60% screening rate before this intervention, from which we could extrapolate a 9% response rate in the financial incentive arm among those that were due for screening. Fourth, we only offered colonoscopy and not the choice of stool testing, which has been shown to increase response to colon cancer screening outreach.[15]

Strengths include its prospective design and patient-level randomization to account for unobserved variables. As a pragmatic trial, the results demonstrate real world effectiveness for a pressing problem. Additionally, the intervention deployed insights from behavioral

economics in a way that is within reach of large employers and health systems—the majority of whom already use financial incentives to promote healthy activities among their employees.

In conclusion, this study shows that behavioral economic incentives can modestly increase screening colonoscopy rates. The approach can be deployed by employers or insurers to improve existing efforts to reduce the burden of colorectal cancer.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographic Characteristics by Group Assignment

Characteristic	Control (n = 749)	Active Choice (n = 748)	Financial Incentive (n = 748)
DEMOGRAPHICS			
Female, n (%)	552 (73.7)	556 (74.3)	562 (75.1)
Average median household income **	$67,787	$66,412	$66,553
Residing in zip code >80% white n (%)	463 (61.8)¶	438 (58.6)§	451(60.3)†
Average distance from primary endoscopy sites (miles)	11.3	11.3	11.5

** According to 2014 census data

¶ 5 participants from zip codes with unknown values, percent adjusted

§ 6 participants from zip codes with unknown values, percent adjusted

† 4 participants from zip codes with unknown values, percent adjusted

Table 2

Response to email outreach, appointment scheduling, and colonoscopy completion

Characteristic	Control (n = 749)	Active Choice (n = 748)	Financial Incentive (n = 748)	p value
Email Outreach				
Responded to Email Campaign, n (%)	--	**234 (31.3)**	**275 (36.8)** *	P=.03 P=.0001
Yes ('Sign up now')	--	**65 (8.7)**	**116 (15.5)** *	
No ('I do not wish to reduce my chances of dying from colon cancer')	--	3 (0.4)	7 (0.9)	
Already Screened ('I have already been screened')	--	166 (22.2)	152 (20.3)	
Colonoscopy				
Scheduled an appointment, n (%)	**16 (2.1)**	**15 (2.0)**	**36 (4.8)** *	P=.89 (C vs. AC) P = .004 (C vs. FI) P = .003 (AC vs. FI)
Completed colonoscopy, n (%)	**12 (1.6)**	**11 (1.5)**	**28 (3.7)** *	P=.88 (C vs. AC) P = .011 (C vs. FI) P = .007 (AC vs. FI)

* p value < .05

C- Control, AC- Active Choice, FI- Financial Incentive