

Increasing Colorectal Cancer Screening: Multicomponent Interventions

Community Preventive Services Task Force Finding and Rationale Statement Ratified August 2016

Table of Contents

Intervention Definition	2
CPSTF Finding	2
Rationale	2
Basis of Finding	2
Applicability and Generalizability Issues	4
Data Quality Issues	4
Other Benefits and Harms	5
Economic Evidence	5
Considerations for Implementation	5
Evidence Gaps	6
References	7
Disclaimer	8

CPSTF Finding and Rationale Statement

Intervention Definition

Multicomponent interventions to promote colorectal cancer screening combine two or more intervention approaches reviewed by the Community Preventive Services Task Force (CPSTF). Combinations may include the following.

- Two or more [intervention approaches from the following strategies](#):
 - Interventions to increase community demand: client reminders, client incentives, small media, mass media, group education, one-on-one education
 - Interventions to increase community access: reducing structural barriers, reducing client out-of-pocket costs
 - Interventions to increase provider delivery of screening services: provider assessment and feedback, provider incentives, provider reminders
- Two or more intervention approaches to reduce different structural barriers

Multicomponent interventions to increase cancer screening may be coordinated through healthcare systems, delivered in community settings, or both.

CPSTF Finding (August 2016)

The Community Preventive Services Task Force recommends multicomponent interventions to increase screening for colorectal cancers on the basis of strong evidence of effectiveness in increasing screening with colonoscopy or fecal occult blood test (FOBT).

Findings suggest greater effects result from interventions that combine approaches to increase community demand and access, and the greatest effects come from interventions that combine these two approaches with interventions to increase provider delivery of services. When designed for and implemented among underserved populations, multicomponent interventions can increase screening use in these populations. If access to appropriate follow-up care and treatment are provided, these interventions may improve health for these groups.

The Community Preventive Services Task Force finds that multicomponent interventions to increase screening for colorectal cancers are cost-effective.

Rationale

Basis of Finding

The CPSTF recommendation is based on evidence from a systematic review of 88 studies (search period January 2004 - November 2013) that evaluated intervention effects on breast (33 studies), cervical (20 studies) or colorectal (56 studies) cancer screening use—services recommended by the U.S. Preventive Services Task Force (USPSTF 2016a, 2016b, 2012).

Compared with no intervention, multicomponent interventions increased colorectal cancer screening by a median of 15.4 percentage points (interquartile Interval [IQI]: 6.0 to 21.6; 39 study arms). See table for effect estimates by test type.

Table 1. Colorectal Cancer Screening Use by Test Type

Outcome	Summary Effects
Any test* (39 study arms)	Median increase of 15.4 percentage points (IQI: 6.0 to 21.6 percentage points)
Colonoscopy (9 study arms)	Median increase of 10.2 percentage points (IQI: 5.0 to 12.5 percentage points)
FOBT (21 study arms)	Median increase of 7.7 percentage points (IQI: 2.3 to 21.1 percentage points)
Flexible Sigmoidoscopy (5 study arms)	Median decrease of 0.5 percentage points (IQI: -0.9 to 1.8 percentage points)

*Clients screened by having any of the following tests: colonoscopy, FOBT, or flexible sigmoidoscopy
 FOBT = Fecal occult blood testing
 IQI = interquartile interval

Given that multicomponent interventions can include approaches within the strategies of increasing community demand, increasing community access, or increasing provider delivery of screening, many of these interventions are also multilevel interventions that address needs across the individual, provider, community, or system levels.

Multicomponent interventions vary in the number and type of approaches or strategies used. The review team conducted stratified analyses to understand the influence of these factors on cancer screening use. Studies across breast, cervical, and colorectal cancers were considered for these analyses.

The most commonly used intervention approaches were those that aimed to increase community demand for cancer screening. The largest screening increases were seen among multicomponent interventions that combined approaches from each of the three strategies (median increase of 24.2 percentage points [IQI: 8.8 to 39.0 percentage points]; 5 study arms) or that combined approaches to increase community demand and access (median increase of 11.2 percentage points [IQI: 5.3 to 18.2 percentage points]; 48 study arms).

Studies included in this review employed many different combinations of intervention approaches. Increases in screening use were seen across multicomponent interventions with different numbers of intervention approaches, though those with five or more intervention approaches showed a larger median increase. This was particularly true for multicomponent interventions aimed at increasing colorectal cancer screening.

Increases in cancer screening use were seen across multicomponent interventions, regardless of which individual approaches were used. One exception was multicomponent interventions that included provider assessment and feedback, which did not demonstrate an increase in screening across all three cancer types. Further examination revealed this finding was driven by two cervical cancer screening studies. For both breast and colorectal cancer

screening, multicomponent interventions with provider assessment and feedback resulted in increases in screening use comparable to multicomponent interventions with other approaches.

When multicomponent interventions included approaches to reduce structural barriers, increases in screening were found for each type of structural barrier addressed, although none of the included studies provided child care. The largest increases in cancer screening rates were reported by when transportation barriers were addressed (median increase 18.4 percentage points, IQI: 8.5 to 30.2 percentage points; 11 studies) or language translation services were provided (62.7 percentage points, range 11.6 to 71.2 percentage points; 4 studies).

Most studies that provided information about incremental effects evaluated the addition of 1 or 2 intervention approaches to single component interventions. When an intervention approach to increase community demand was added to a single component intervention, cancer screening use increased by a median of 4.9 percentage points (IQI: 0.4 to 12.0 percentage points; 14 study arms). When an intervention approach to increase community access was added to a single component intervention, cancer screening use increased by a median of 17.1 percentage points (range: 4.6 to 18.7 percentage points; 2 study arms).

Applicability and Generalizability Issues

The CPSTF finding is considered applicable to a range of settings and populations within or outside the United States; in healthcare or community-based settings; and in urban or rural communities. Studies were conducted in the U.S. (51 studies), Australia (1 study), Canada (2 studies), Italy (1 study), and Singapore (1 study). Studies evaluated interventions implemented in community and healthcare settings, including community health centers and Federally Qualified Health Centers, and in urban and rural environments.

Multicomponent interventions were effective for populations with different baseline screening use, and in groups that were age-eligible for screening. For colorectal cancer screening, findings should be applicable to men and women. Findings should also be applicable to different racial and ethnic groups. Many studies focused on one racial or ethnic group, and several studies provided within-study information about effects by race or ethnicity. No studies included only American Indian/Alaska Native populations and few had samples that were majority Native Hawaiian/Pacific Islander.

Many of the studies did not report enough information to conclude whether most participants were low-income. Other studies, however, reported increases in cancer screening use among participants who were likely low-income or who had no, or inadequate, insurance. Findings, therefore, are likely applicable to these populations.

Findings should be applicable across intervention characteristics, including the number and type of intervention approaches included. Findings should also be applicable across types of intervention deliverers, including patient navigators, community health workers, and clinician educators.

Data Quality Issues

Study designs included randomized control trials (30 studies), non-randomized trials (12 studies), pre-post (11 studies), cohort (2 studies), and time series (1 study) designs. Stratified analyses found increases across different study designs, indicating robust findings.

Other Benefits and Harms

No additional benefits or harms were reported in included studies. One possible benefit of multicomponent interventions involving community health workers, however, is the potential for community health workers to address healthcare coverage.

Economic Evidence

A systematic search for economic evidence (search period January 2004–January 2018) identified 53 studies, 33 of which focused on colorectal cancer screening. Two studies focused on both breast and colorectal cancer screening. The majority of these studies were conducted in the United States, while the remaining nine studies were conducted in other high-income countries. Studies evaluated interventions that used FOBT (26 studies), colonoscopy (8 studies), and flexible sigmoidoscopy (1 study).

Included studies focused on increasing community demand (4 studies), increasing provider delivery (2 studies), increasing both community access and provider delivery (1 study), increasing community demand and access (26 studies), and increasing community demand, community access, and provider delivery (1 study).

All monetary values are reported in 2016 U.S. dollars. Foreign currencies were converted to U.S. dollars using the Purchasing Power Parity Index from the World Bank (The World Bank, 2016). Cost and cost-effectiveness estimates were adjusted for inflation using the Consumer Price Index (U.S. Bureau of Labor Statistics, 2016).

Across all studies, the median cost per participant was \$36.63 (IQI: \$ 7.70 to \$139.23; 42 study arms). The median cost per participant was \$44.07 (IQI: \$31.92 to \$46.83; 3 study arms) for interventions that increased community demand. The mean cost per participant was \$366.51 (2 study arms) for interventions that increased provider delivery. The median cost per participant was \$30.82 (IQI: \$7.27 to \$94.68; 33 study arms) for interventions that increased both community demand and access.

Across all studies, the median incremental cost per additional person screened was \$582.44 (IQI: \$91.10 to \$1452.12; 15 study arms). The median incremental cost per additional person screened was \$582.44 (IQI: \$51.27 to \$1281.91; 11 study arms) for interventions that increased both community demand and community access. There was no consistent relationship between the baseline-screening rate (median: 44%; IQI: 27% to 60%; 9 estimates) and the incremental cost per additional woman screened.

Two of the included studies reported incremental cost per quality-adjusted life year (QALY) gained. A patient navigation program to increase colorectal cancer screening by colonoscopy among Hispanic men in Texas who were 50 years and older reported a decline in incremental cost of \$3,817 per QALY gained (Wilson, 2015). An intervention to increase colorectal cancer screening by FOBT among 50 year olds in Korea reported a decline in incremental cost of \$1,651 per QALY gained (Lee, 2016). Both of these were good-quality, modeled studies with a societal perspective. The findings indicate multicomponent interventions to increase colorectal cancer screening are cost-effective. Additionally, the two studies showed that the QALYs gained from screening were associated with treatment cost savings that outweighed the intervention costs.

Considerations for Implementation

Included studies of multicomponent interventions to increase breast, cervical, and colorectal cancer screening evaluated a large number of interventions with a heterogeneous mix of components. Decision makers should consider the local

population, needs, and context when selecting interventions to implement. Cost and resource requirements may also be considerations when implementing multicomponent interventions, particularly for intensive or large-scale interventions.

The current body of evidence shows that effects for colorectal cancer screening were often larger than those for breast or cervical cancer screening. This may be due in part to lower colorectal cancer screening uptake in the general population (Sabatino et al., 2015). It also may be that participants in colorectal cancer screening studies have lower baseline screening rates compared with participants in breast or cervical cancer screening studies.

Evidence suggests that it is important to address needs related both to community demand for, and access to, screening services, and that multicomponent interventions are most effective when they address both of these needs and provider delivery.

The large effect estimate for interventions that included language translation services for non-English speaking study participants was based on 4 studies. All 4 of the studies included predominantly Asian American populations, and three of them evaluated similar interventions. In addition to these 4 studies, a number of included studies involved language translation activities, including translation of intervention components (e.g., education). These studies also showed an increase in screening use, although smaller in magnitude. Interventions that addressed transportation barriers also resulted in large increases in screening use. Most of the studies that addressed transportation or language needs recruited majority low-income study participants, suggesting that these may be effective intervention approaches for low-income groups.

People with low incomes or lacking insurance are less likely to be up-to-date with cancer screening (Sabatino et al., 2015; Brown et al., 2014). Targeting multicomponent interventions to these populations can increase their screening use. It is important, however, to ensure access to timely and appropriate follow-up and treatment for all populations. Lack of available and financially accessible, appropriate follow-up care could lead to missed opportunities to improve health and potentially reduce the benefits of screening.

Many interventions in this review were targeted to population subgroups. For interventions targeted to specific populations, appropriateness of materials is important (Slater et al., 2005). Technology infrastructure may be a consideration for some intervention approaches. Technology may increase efficiency and reduce maintenance costs (Flight et al., 2012; Mosen et al., 2010), but it also may require upfront costs and resources (Taplin et al., 2008; Leffler et al., 2011). In addition, some groups may not have equal access to or use of these technologies (Flight et al., 2012).

Evidence Gaps

Several areas were identified as having limited information. Additional research would help answer remaining questions or strengthen findings in these areas.

- What are intervention effects on repeat cancer screening rates?
- How effective are interventions that only include strategies to increase community access and provider delivery?
- What is the magnitude of effect for multicomponent interventions that provide language translation services, and does it vary across population subgroups?
- What are effects of specific combinations of intervention approaches?
- How well do interventions work among people who have low health literacy?

More consistent terminology and reporting of study details would improve future assessments of intervention effectiveness. For example, more detailed reporting about intervention activities, barriers addressed, study participants (including income and health insurance status), and those delivering interventions would improve understanding and characterization of intervention approaches and intervention effectiveness in different populations.

References

- Brown ML, Klabunde CN, Cronin KA, White MC, Richardson LC, McNeel TS. Challenges in meeting Healthy People 2020 objectives for cancer-related preventive services, National Health Interview Survey, 2008 and 2010. *Prev Chronic Dis* 2014;27:E29.
- Flight IH, Wilson CJ, Zajac IT, Hart E, McGillivray JA. Decision support and the effectiveness of web-based delivery and information tailoring for bowel cancer screening: an exploratory study. *JMIR Res Protoc* 2012;1(2):e12.
- Leffler DA, Neeman N, Rabb JM, Shin JY, Landon BE, Pallav K, Falchuk ZM, Aronson MD. An alerting system improves adherence to follow-up recommendations from colonoscopy examinations. *Gastroenterology* 2011;140(4):1166-73.
- Mosen DM, Feldstein AC, Perrin N, Rosales AG, Smith DH, Liles EG, Schneider JL, Lafata JE, Myers RE, Kositch M, Hickey T, Glasgow RE. Automated telephone calls improved completion of fecal occult blood testing. *Med Care* 2010;48(7):604-10.
- Sabatino SA, White MC, Thompson TD, Klabunde CN. Cancer Screening Test Use – United States, 2013. *MMWR* 2015;64(17):464-8.
- Slater JS, Henly GA, Ha CN, Malone ME, Nyman JA, Diaz S, McGovern PG. Effect of direct mail as a population-based strategy to increase mammography use among low-income underinsured women ages 40 to 64 years. *Cancer Epidemiol Biomarkers Prev* 2005;14(10):2346-52.
- Taplin SH, Haggstrom D, Jacobs T, Determan A, Granger J, Montalvo W, Snyder WM, Lockhart S, Calvo A. Implementing colorectal cancer screening in community health centers: addressing cancer health disparities through a regional cancer collaborative. *Med Care* 2008;46(9 Suppl 1):S74-83.
- U.S. Bureau of Labor Statistics. Consumer Price Index. U.S. Department of Labor; 2016. Available at URL: <https://www.bls.gov/cpi/> [cited 5/9/18].
- “Purchasing Power Parity Index Conversion.” *The World Bank*, World Bank Group, 2016, <https://data.worldbank.org/indicator/PA.NUS.PPP>.
- U.S. Preventive Services Task Force. Breast Cancer: Screening. Bethesda (MD): January 2016a. Accessed on 12/23/16. Available at URL: <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/breast-cancer-screening1>.
- U.S. Preventive Services Task Force. Colorectal Cancer: Screening. Bethesda (MD): June 2016b. Accessed on 12/23/16. Available at URL: <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/colorectal-cancer-screening2>.

U.S. Preventive Services Task Force. Cervical Cancer: Screening. Bethesda (MD): March 2012. Accessed on 12/23/16. Available at URL: <https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/cervical-cancer-screening>.

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

Document last updated October 8, 2019