Community Preventive Services Task Force

Cancer Screening: Patient Navigation Services to Increase Breast, Cervical, and Colorectal Cancer Screenings and Advance Health Equity

Community Preventive Services Task Force
Finding and Rationale Statement
Ratified July 2022

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CPSTF Finding and Rationale Statement

Context

Screenings for breast, cervical, and colorectal cancers, combined with appropriate follow-up, diagnosis and treatment, can reduce cancer mortality, and in some cases reduce cancer incidence (USPSTF 2016 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening], 2018 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening], 2021 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening]). In 2018, cancer screening rates in the United States were below the Healthy People 2020 targets, and Healthy People 2030 [https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer/increase-proportion-adults-who-get-screened-colorectal-cancer-c-07] adjusted their targets based on 2018 data. Rates were even lower among people from historically disadvantaged racial and ethnic groups, people who qualified for Medicaid, and people who did not have health insurance (Sabatino et al. 2021). Identifying and expanding the use of evidence-based interventions to increase screening could help reduce some of these screening disparities.

Patient navigation services aim to eliminate barriers and promote access to timely diagnosis and treatment of cancer (Freeman et al. 2011). These services guide patients through a healthcare system from screening through all phases of cancer treatment (Freeman et al. 2011). Barriers may be financial or structural, or they may be related to communication or access to information (CDC 2021). Barriers may also include patients' mistrust of the healthcare system or fear of possible cancer diagnoses (CDC 2021 [https://www.cdc.gov/screenoutcancer/patient-navigation.htm]; Freeman et al. 2011).

Intervention Definition

Patient navigation services provided through healthcare systems help patients overcome barriers to accessing breast, cervical, and colorectal cancer screenings. Services are offered to populations experiencing greater disparities in cancer screening, including people from historically disadvantaged racial and ethnic populations and people with lower incomes. Patient navigation services do one or more of the following:

- Provide client reminders [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#client-oriented]
- Reduce structural barriers [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#client-oriented] (e.g., modify administrative processes; assist with appointment scheduling, transportation, translation, or childcare; arrange alternative screening sites or hours)
- Reduce patients' out-of-pocket costs [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#client-oriented]

Services may also provide one-on-one [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#client-oriented] or group education [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#client-oriented] to inform patients' understanding of cancer and cancer screening.

Services may be delivered by community health workers [https://www.thecommunityguide.org/pages/task-force-findings-cancer-prevention-and-control.html#cancerscreening], healthcare professionals, nurses, patient navigators, social workers, or others. They are often designed to be culturally- and language-appropriate.

CPSTF Finding (July 2022)

The Community Preventive Services Task Force (CPSTF) recommends patient navigation services for historically disadvantaged racial and ethnic populations and people with lower incomes to increase

- Breast cancer screening by mammography based on strong evidence of effectiveness
- Cervical cancer screening by Pap test based on sufficient evidence of effectiveness
- Colorectal cancer screening by colonoscopy, fecal occult blood test (FOBT), or fecal immunochemical test (FIT) based on strong evidence of effectiveness

Patient navigation services are expected to advance health equity when implemented among historically disadvantaged racial and ethnic populations and people with lower incomes, who often have lower screening rates (Sabatino et al. 2021). With timely and appropriate follow-up care and treatment, patient navigation services may improve health and reduce cancer-related disparities for these groups.

CPSTF finds patient navigation services to increase breast cancer screening are cost-effective. Systematic review evidence shows estimates of cost per quality-adjusted life year (QALY) gained are below a conservative threshold of $50,000.

Rationale

Basis of Finding

The CPSTF recommendation is based on a systematic review of 34 studies. Studies were identified from a published systematic review (Nelson et al. 2020, 29 studies; search period January 1, 1996, to July 6, 2019) and an updated search (5 studies; search period July 1, 2019, to November 30, 2021). Included studies evaluated intervention effects on breast (11 studies), cervical (3 studies), or colorectal (27 studies) cancer screening use—services recommended by the U.S. Preventive Services Task Force (USPSTF 2016 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening], 2018 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening], 2021 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening]).

The systematic review team conducted a random effects meta-analysis to evaluate intervention effectiveness for breast and colorectal cancer screenings. The team also calculated medians and interquartile intervals (IQI) to support the interpretation of results (Tables 1 and 3). There were not enough studies to conduct a meta-analysis for cervical cancer screening, so the team calculated the median and range (Table 2). One study reported narrative results with a favorable colorectal cancer screening outcome that could not be included in the summary effect estimate calculation.

Table 1. Summary of Findings for Breast Cancer Screening

Analysis Methods	Number of Studies	Results	Direction of Effect
Meta-analysis	10	RR: 1.32 95% CI: 1.08 to 1.62	Favors intervention

Analysis Methods	Number of Studies	Results	Direction of Effect
Median and IQI	11	Absolute difference or change: 12.0 pct pts IQI: 9.7 to 24.2 pct pts Relative difference or change: 54.5% IQI: 14.5% to 75.3%	Favors intervention

CI: confidence interval
IQI: interquartile interval
Pct pts: percentage points
RR: risk ratio

Table 2. Summary of Findings for Cervical Cancer Screening

Analysis Methods	Number of Studies	Results	Direction of Effect
Median and range	3	Absolute difference or change: 22.5 pct pts Range: 7.0 to 33.8 pct pts Relative difference or change: 64.5% Range: 9.9% to 67.6%	Favors intervention

Pct pts: percentage points

Table 3. Summary of Findings for Colorectal Cancer Screening

Test Used	Analysis Methods	Number of Studies	Results	Direction of Effect
Any test*	Meta-analysis	26	RR: 1.82 95% CI: 1.50 to 2.21	Favors intervention
Any test*	Median and IQI	26	Absolute difference or change: 13.6 pct pts IQI: 7.9 to 31.8 pct pts Relative difference or change: 76.2% IQI: 26.0% to 188.0%	Favors intervention
Colonoscopy	Meta-analysis	11	RR: 1.97 95% CI: 1.34 to 2.89	Favors intervention
Colonoscopy	Median and IQI	12	Absolute difference or change: 13.9 pct pts IQI: 9.5 to 26.1 pct pts Relative difference or change: 109.9% IQI: 34.6% to 296.2%	Favors intervention
FOBT or FIT	Meta-analysis	12	RR: 1.65 95% CI: 1.38 to 1.99	Favors intervention

Test Used	Analysis Methods	Number of Studies	Results	Direction of Effect
FOBT or FIT	Median and IQI	12	Absolute difference or change: 12.4 pct pts IQI: 4.9 to 18.8 pct pts Relative difference or change: 57.3% IQI: 37.5% to 126.8%	Favors intervention

*Received colorectal cancer screening based on most recent USPSTF [https://uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening] guidelines
CI: confidence interval
IQI: interquartile interval
Pct pts: percentage points
RR: risk ratio
FOBT: fecal occult blood test
FIT: fecal immunochemical test

The remaining sections of the finding and rationale statement are based on analysis of all included studies across breast, cervical, or colorectal cancer screenings.

Applicability and Generalizability Considerations

Intervention Settings

All included studies were conducted in the United States (34 studies). Studies were conducted in clinic (22 studies) or clinic and community (12 studies) settings; and in urban (26 studies), rural (5 studies), or a mix of urban and rural areas (2 studies). Review findings are considered applicable across these settings.

Population Characteristics

Twenty-five studies reported participants' mean age with an overall median age of 59.5 years. Five of the 25 studies focused on breast cancer screening, and the median age for recruited participants was 54.5 years. Seventeen of the 25 studies focused on colorectal cancer screening, and the median age for recruited participants was 60.3 years. No study solely focused on cervical cancer screening. Eight studies reported age groups that could not be summarized, and one study did not report on age. Cancer screenings increased for all adults.

Of the 27 studies that assessed intervention effectiveness for colorectal cancer screening, 23 recruited both females (median 59%) and males (median 41%). Five studies performed stratified analyses and reported similar increases in colorectal cancer screening for both sexes.

Twenty-five studies only recruited participants who were not up to date with their breast (5 studies), cervical (1 study), or colorectal (22 studies) cancer screenings. Screening increased regardless of participants' baseline screening status, though a greater increase was observed for participants who were not up to date at baseline.

Thirty-one studies reported racial and ethnic distributions. Participants self-identified as American Indian or Alaska Native (42%; 1 study), Asian (median 3%; 4 studies), Black or African American (median 31%; 15 studies), Hispanic or Latino (median of 40%; 11 studies), Native Hawaiian (42%; 1 study); White (median 47%; 14 studies), or other or

unknown race or ethnicity (median 8%; 16 studies). Some studies exclusively recruited participants who were American Indian (1 study), Asian (3 studies), Black or African American (5 studies), or Hispanic or Latino (2 studies); one study recruited immigrants from Serbia or Croatia. Three studies did not report on race or ethnicity. Increases in screenings were observed across all racial and ethnic groups.

Sixteen studies reported the majority of study participants had annual incomes below $40,000, which is 150% of the federal poverty level (FPL) for a family of four in 2022. One study reported 32% of study participants had incomes less than 150% of FPL, and 19 studies did not report income. Eight studies reported a median of 41% of participants were employed; one study recruited only participants who were employed; and 25 studies did not report employment status. Nineteen studies reported participants' educational attainment. Participants had less than high school education (median 39%; 16 studies), graduated from high school (31%; 11 studies), or had more than high school education (37%; 13 studies); 15 studies did not report on education. Four studies performed stratified analyses and reported similar increases in screenings for participants with different income, employment, or education levels.

Studies that reported insurance type showed a median of 79% of participants had health insurance (20 studies) from private companies (median 37%; 14 studies), Medicaid (median 25%; 11 studies), or Medicare (23%; 10 studies). Eight studies recruited only participants with insurance, and five studies did not report on participants' insurance status. Increases in screenings were observed regardless of insurance status (5 studies), with slightly larger increases observed for participants with public insurance (2 studies) or without insurance (3 studies).

Participants preferred to use English (median 55%; 15 studies) or Spanish (median 41%; 11 studies) at home. Sixteen studies did not report on preferred language. Increases in screenings were observed regardless of participants' preferred language, with slightly larger increases observed for participants whose preferred language was not English (3 studies).

Intervention Characteristics

Interventions were implemented to increase screenings for breast cancer (6 studies), colorectal cancer (21 studies), or a mix of breast, cervical, and colorectal cancer (7 studies). Screenings increased whether interventions were focused on one or more cancer types.

Patient navigation services reduced structural barriers by assisting with appointment scheduling (20 studies), transportation (13 studies), or childcare (2 studies); reducing administrative barriers (23 studies); or providing alternative screening hours (1 study) or translation services (1 study). Two studies did not specify the services provided. Patient navigation services also included client reminders (10 studies); reduced patient out-of-pocket costs (mostly by providing stamped return envelopes for FIT or FOBT kits; 6 studies); provided one-on-one (24 studies) or group education (4 studies); distributed small media (6 studies); or provided client incentives (1 study). Screenings increased across all services offered.

Interventions included one (4 studies), two (5 studies), three (10 studies), or four or more (16 studies) services. One study with two study arms offered three or four services. Screening rates increased regardless of the number of services offered.

Services were provided by patient navigators who worked alone (14 studies) or as part of a team (5 studies), by community health workers who worked alone (6 studies) or as part of a team (3 studies), or by others such as nurses or case managers (5 studies). One study engaged both patient navigators and community health workers as members of a team. Screening rates increased regardless of the deliverer used.

Services were delivered remotely (15 studies) or both remotely and face-to-face (18 studies). One study did not report methods of communication. Screening rates increased when services were delivered through either method.

Data Quality Issues

Study designs included randomized control trials (27 studies), pre-post with concurrent comparison groups (4 studies), a retrospective cohort (1 study), and single group pre-post (2 studies). The most common study limitation was lack of description of participant selection.

Other Benefits and Harms

One included study identified an additional benefit, reporting patients were referred to services to address other health issues (Hardin et al. 2020); no harms were identified in the included studies.

Economic Evidence

Economic evidence shows patient navigation services to increase breast cancer screening are cost-effective. There were not enough economic studies to determine the cost-effectiveness of this intervention to increase cervical cancer screening.

The economic review (search period through December 2022) included studies of screening for breast cancer (3 studies), cervical cancer (2 studies), and multiple cancers (2 studies). The multiple cancer studies screened each patient for breast, cervical, and other cancers. All studies were conducted in the United States.

Studies reported intervention cost, change in healthcare cost, and cost per quality-adjusted life year (QALY) gained. Economic estimates were judged to be of good quality based on Community Guide methods for adequate capture of components known to be drivers of the estimate and the quality of measurement methods used. All monetary values were adjusted to 2022 U.S. dollars.

Intervention Cost

The three breast cancer screening studies reported intervention costs per person were $109, $3,251, and $10,245. There were large cost differences across studies because each considered different costs as part of the services. The study with the lowest cost only included the personnel cost for six community health educators and a small expenditure for mailing, transportation, and nonmonetary incentives. The study with the highest cost evaluated the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) and included screening, diagnostic, and treatment costs. The lowest and highest cost programs estimated costs specific to patient navigation services and reported a patient navigation cost per person of $100 and $147 respectively. Two studies reported the incremental cost per additional person screened to be $154 and $740.

The two studies that considered patient navigation services to increase cervical cancer screening reported intervention costs per person were $103 and $794 and costs per additional person screened were $533 and $56. The studies did not report patient navigation costs separately.

A study that evaluated patient navigation services to increase breast, cervical, and colorectal cancer screenings reported an intervention cost of $355 per person. Another study that aimed to increase breast, cervical, colorectal, lung, and prostate cancer screenings reported a median intervention cost per person of approximately $5,000 across six sites funded by Medicare. The median patient navigation cost per person for this study was $590.

Economic Benefit

An increase in screenings would increase healthcare cost initially through increases in diagnostic tests and follow up treatment costs. Economic benefits are achieved over time through treatment cost savings associated with early detection of cancer.

Two breast cancer screening studies reported changes in healthcare cost per person were $202 and $2,437.

The studies of cervical cancer screening programs did not report estimates of change in healthcare cost per person.

One study that aimed to increase screenings for multiple cancers reported a median change in healthcare cost per person to be $35 with an interquartile interval of -$1,242 to $468.

Cost-Effectiveness

Two of the three studies that evaluated breast cancer screening interventions used microsimulation models to calculate and report a cost per QALY gained of $3,852 and $39,159 with a lifetime horizon.

The third study used results from their program evaluation to provide a cost per life year gained. Based on diagnostic follow-up tests of 3.4% for all abnormal screening results, a cancer detection rate of 0.8%, and a mortality reduction of 25% through prevention of terminal cancer, the intervention led to a cost per life year gained (LYG) of $22,889. A LYG can be converted to QALY after multiplication by the health utility score associated with a disease. A recent meta-regression analysis estimated utility scores from patients' responses for early and late-stage breast cancers using different utility assessment methods and found these were all above 0.5 (Gong et al. 2020). Based on this evidence, $22,889 per LYG would be below $45,778 per QALY gained.

One of the cervical cancer screening studies reported a cost per QALY of $924. The other cervical cancer study and the studies that addressed multiple cancer screenings did not report information about cost-effectiveness.

The systematic economic review finds patient navigation services to increase breast cancer screening are cost-effective with all three estimates of cost per QALY gained falling below the conservative threshold of $50,000. Cost-effectiveness of this intervention to increase cervical cancer screening could not be determined because of limited body of evidence.

Considerations for Implementation

Evidence from the systematic review suggests patient navigation services adjusted to fit local needs and resources can increase cancer screenings among people from historically disadvantaged racial or ethnic groups and people with lower incomes. Evidence suggests programs with different intervention characteristics implemented in different settings will be effective.

Many of the included studies examined patient navigation services delivered to patients in both community and clinic settings. Programs may want to implement strategies to foster community and clinic collaboration. Ma et al. (2019) reported on-going clinic engagement improved delivery of screening tests and follow-up care and suggested long-term community engagement could help raise awareness about cancer screenings and available services and increase community members' motivation to get screened.

Integrating patient navigation services into existing healthcare systems requires coordination (Freeman et al. 2011). Programs might consider designating a navigation coordinator to oversee service delivery (Freeman et al. 2011). They

might also assess whether they have adequate staff to provide services (Reuland et al. 2017) and electronic health record systems and tools in place to identify patients who would benefit from services (Coronado et al. 2018).

Patient navigation services examined in this review were delivered by a wide array of deliverers, including community health workers, trained lay patient or professional navigators, nurses, case managers, or clinic staff. Studies suggested delivery could be enhanced when deliverers had local knowledge, provided language-appropriate and culturally competent services, had flexible working hours to better fit patients' schedules, and worked closely with healthcare providers (Braun et al. 2015; Lasser et al. 2011; Ma et al. 2009; Percac-Lima et al. 2012). One study reported that wordless instructions for FOBT or FIT kits helped address language barriers (Haverkamp at al. 2020). Patient navigation services examined in this review were delivered by a wide array of deliverers, including community health workers, trained lay patient or professional navigators, nurses, case managers, or clinic staff. They worked alone or as part of a team.

Patient navigation services can be delivered remotely, which might help in rural areas or other settings where transportation is difficult. Remote services are especially useful for colorectal cancer screening interventions that mail out FOBT and FIT kits and use automated voice calls or text reminders to patients to return them (Baker et al. 2014, Coronado et al. 2018; Goldman et al. 2015). Programs may combine face-to-face and remote interactions based on the unique needs of the deliverers and patients.

The cancer care continuum begins with prevention and appropriate screening and extends through follow-up diagnostic testing and treatment as appropriate (Freeman et al. 2011). Patients may face barriers to follow-up diagnostic testing or treatment including lack of privacy for bowel preparation prior to colonoscopy, competing health concerns, or lack of transportation (Freeman et al. 2011; Haverkamp et al. 2020; Nadel et al. 2019). Patient navigation services can be provided at every stage on the continuum to guide patients through the healthcare system and reduce cancer mortality, and in some cases, incidence (Freeman et al. 2011).

Evidence Gaps

CPSTF identified several areas that have limited information. Additional research and evaluation could help answer the following questions and fill existing gaps in the evidence base.

CPSTF identified the following questions as priorities for research and evaluation:

- How effective are patient navigation services in increasing the following?
    - Repeat screenings (USPSTF recommends repeating breast, cervical, and colorectal cancer screenings at appropriate intervals [USPSTF 2016 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening], 2018 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening], 2021 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening]]); the included studies examined one-time screenings
    - The proportion of patients with positive screening tests who receive follow-up diagnostic tests
    - Cervical cancer screening for younger females (USPSTF recommends females start regular cervical cancer screening at age 21 years [USPSTF 2018 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening]]); the included studies recruited participants with a median age of 59.5 years.
- What is the cost-effectiveness of patient navigation services to increase cervical cancer screening?

Remaining questions for research and evaluation identified by CPSTF:

- How effective are patient navigation services in increasing the following?
  - Cervical cancer screening that includes HPV tests (following the 2018 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening] update from USPSTF that recommended high risk HPV testing alone or in combination with cytology for women aged 30 to 65 years)
  - Colorectal cancer screening for adults aged 45-49 years (following the 2021 [https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening] update from USPSTF that lowered the starting age for colorectal cancer screenings)
  - Colorectal cancer screening using other USPSTF-recommended tests such as the stool DNA test, flexible sigmoidoscopy, or computed tomography colonography
- Does intervention effectiveness vary by the following?
  - Participants' health literacy
  - Number of interactions between service deliverers and participants
- What is the precise economic impact of patient navigation services within comprehensive health promotion interventions?

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Disclaimer

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