Introducing the Community Guide's Reviews of Evidence on Interventions to Increase Screening for Breast, Cervical, and Colorectal Cancers

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Introduction

Cancer is the second leading cause of death in the U.S.,[1] causing approximately one in every four deaths. In 2003, more than 556,000 Americans died of cancer.[2] Among men, the majority of these deaths were due to lung (31%), prostate (10%), and colorectal cancers (10%). Among women, most deaths were from lung (25%), breast (15%), and colorectal cancers (10%), with an additional 1% from cervical cancers.

For breast, cervical, and colorectal cancers, routine screening is recommended by the U.S. Preventive Services Task Force (USPSTF)[3–6]—an independent panel of experts in primary care and prevention that systematically reviews evidence of effectiveness—and by most major medical organizations.[7] Screening recommendations from the USPSTF for breast, cervical, and colorectal cancers are shown in Table 1. A 2003 report from the National Cancer Policy Board[8] noted that screening all eligible people not currently screened with USPSTF-recommended mammography, Pap smears, and colorectal cancer screening tests could prevent an additional 4475 deaths from breast cancer, 3644 deaths from cervical cancer, and 9632 deaths from colorectal cancer per year. At present, the USPSTF does not recommend screening for lung and prostate cancers because no convincing evidence shows that benefits outweigh harms.[3,9]

Unfortunately, not all eligible people are screened. The 2005 National Health Interview Survey of U.S. adults[10] found that mammography rates have declined since 2000, and only 67% of women aged ≥40 years reported mammograms within the previous 2 years, and 78% of women aged ≥18 reported Pap tests within the previous 3 years. Among adults aged ≥50 years, only 50% reported ever having screening endoscopies and only 17% reported having fecal occult blood tests (FOBT) within the previous 2 years. Lower rates were observed among American Indians and Alaska Natives; people of Asian, Latino, or Hispanic ethnicity; African Americans (endoscopy only); and among poor and less-educated populations. Uptake of recommended screening tends to be lower among individuals without a usual source of health care, without health insurance, and among recent immigrants to the U.S.[11]

Why aren't all eligible people in the U.S. screened? Numerous barriers have been reported over the last 20 years of research.[8] These include lack of knowledge about cancer and cancer screening (including not knowing that cancer screening is needed in the absence of symptoms), lack of provider referral, lack of motivation, fear of cancer, lack of transportation, lack of health insurance, and simple forgetfulness. Increases in screening use since national survey data were first available in 1987[11] are consistent with progress in reducing many of these barriers[12] and may be due, in part, to interventions introduced in the past decades. Notably, improvements in barrier reduction and screening uptake have been less striking for groups with greatest need[11,12]; disparities persist, and some groups are falling behind even further.[11] Clearly, intervention activities need to concentrate on the more underscreened populations. At the same time, promoting and sustaining screening behaviors and accessibility for all eligible groups must continue within the context of community-specific needs. But which interventions have been effective in different populations and in different settings? How can those interventions or intervention combinations be used more effectively? How can we build on our advances in reducing barriers to screening and do an even better job of fulfilling the

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Table 1. U.S. Preventive Services Task Force (USPSTF) guidelines[4–6] for breast, cervical, and colorectal cancer screening

For breast cancer, the USPSTF:

- Recommends screening mammography every 1–2 years, with or without clinical breast examination, among women aged 40 and older.
- Recommends providers inform women of potential benefits, limitations, and possible harms of mammography in making decisions about when to begin screening.
- Concludes that the evidence is insufficient to recommend for or against routine clinical breast examination alone to screen for breast cancer.
- Concludes that the evidence is insufficient to recommend for or against teaching or performing routine breast self-examination.

For cervical cancer, the USPSTF:

- Strongly recommends screening women for cervical cancer if they are sexually active and have a cervix.
- Recommends against routinely screening women older than age 65 if they have had adequate recent screening with normal Pap smears and are not otherwise at increased risk for cervical cancer.
- Recommends against routine Pap screening for women who have had a total hysterectomy for benign disease.
- Concludes that the evidence is insufficient to recommend for or against new technologies (such as ThinPrep®) in place of conventional Pap tests.
- Concludes that the evidence is insufficient to recommend for or against *human papillomavirus* (HPV) testing as a primary screening test for cervical cancer.
- Based on indirect evidence, suggests that screening begin within 3 years of the start of sexual activity or at age 21, whichever comes first, and should be done at least every 3 years.

For colorectal cancer, the USPSTF:

- Strongly recommends that clinicians screen men and women aged 50 and older who are at average risk for colorectal cancer. For those at higher risk, such as those with a first-degree relative diagnosed with colorectal cancer before age 60, it is reasonable to begin screening at a younger age.
- Screening options include home fecal occult blood test (FOBT), flexible sigmoidoscopy, the combination of home FOBT and flexible sigmoidoscopy, colonoscopy, and double-contrast barium enema. There are insufficient data to determine which particular screening strategy is best in terms of the balance of benefits and harms or cost-effectiveness.

remaining potential for achieving the benefits of cancer screening and early detection?

This article introduces systematic reviews on the effectiveness of interventions to increase screening for breast, cervical, and colorectal cancers; it provides background on the *Community Guide* and its methods, discusses practical and conceptual issues arising in the review process, and explains how the results of the cancer screening reviews can inform public health policy, practice, and research in the field of cancer prevention and control.

The Guide to Community Preventive Services

The *Guide to Community Preventive Services* (*Community Guide*) provides a much-needed service to the public health community. Through systematic reviews,[13] the *Community Guide* provides evidence-based recommendations for public health practice and policy and identifies research needs. In a large ongoing effort, *Community Guide* reviews are performed in three key areas of public health: changing risk behaviors; addressing environmental and ecosystem challenges; and reducing injuries, impairments, and diseases (including cancer).[14] The *Community Guide* has multiple audiences and goals. For public health practitioners, their community partners, and policymakers, the *Community Guide* provides evidence-based information about effective public health interventions (i.e., activities, policies, and programs) for their communities, as well as information on cost effectiveness of the interventions, where available. For researchers, the *Community Guide* identifies which interventions have not been adequately studied (where more research is needed to fill gaps) as well as those that have been adequately studied (where more studies on the same topic would likely yield little additional benefit).

The *Community Guide* is the product of the independent, nonfederal Task Force on Community Preventive Services (the Task Force), which receives support from the U.S. Department of Health and Human Services (USDHHS) in collaboration with numerous public and private partners. Core staff and resources are provided by the CDC and are supplemented by staff and resources from the National Institutes of Health (NIH) and other federal agencies. The *Community Guide* serves as a population-level companion to the influential and widely used *Guide to Clinical Preventive Services*,[15] a product of the USPSTF, which evaluates the benefits of clinical services and makes recommendations about the preventive services that should be routinely incorporated into primary medical care. *Community Guide* systematic reviews on cancer include reviews on the effectiveness of community interventions to increase screening for breast, cervical, and colorectal cancers as well as reviews of economic evaluations for interventions shown to effectively increase screening for those cancers.

In addition, the *Community Guide* has published reviews of interventions to prevent skin cancer[16–18] and to promote informed decision making for cancer screening in communities and healthcare systems.[9] The *Community Guide* has also published many other reviews and recommendations with implications for cancer prevention, including reducing and preventing tobacco product use,[19–21] promoting oral health,[22–24] promoting physical activity,[25–27] improving vaccine coverage (including hepatitis B vaccine),[28–34] and preventing HIV and STDs.[35–38] Other reviews with implications for cancer prevention—including promoting healthy nutrition, reducing unhealthy alcohol use, and additional reviews of interventions to prevent HIV and STDs—are planned or in progress and information on these reviews can be accessed at www.thecommunityguide.org. The methods and process used to perform *Community Guide* reviews have been extensively described.[13,14,39,40] Every stage of the review process follows standardized procedures, from intervention selection to literature search, review and analysis, and formulation of recommendations.

Community Guide Cancer Screening Reviews

As with other *Community Guide* reviews, cancer screening reviews were conducted by a systematic review development team consisting of three groups working in collaboration with, and under the direction of, the Task Force:

- A coordination team[a] that included Task Force members, systematic review methodologists from the Community Guide Branch at CDC, and experts in cancer prevention and control from the Division of Cancer Prevention and Control at CDC and from the Division of Cancer Control and Population Science at the National Cancer Institute. The coordination team developed a conceptual framework; suggested priorities for the reviews; managed the data collection and review process; and drafted evidence tables, summaries of evidence, and reports.
- A consultation team that included 22 cancer control consultants[b] with backgrounds in medicine, public health, economics, health promotion, intervention design and implementation, health education, health policy, and epidemiology, from state and local public health organizations, academic institutions, federal agencies, and voluntary organizations. The consultation team reviewed and commented on materials developed by the coordination team and set priorities for the reviews.
- An abstraction team that collected and recorded data from studies for possible inclusion in the systematic reviews. This team included some members of the coordination and consultation teams as well as graduate students and research fellows.

All work by the teams was approved by the Task Force, which made recommendations based on findings from the systematic reviews. Unless otherwise noted, subsequent use of "team" in this report and the methods[41] and review[42–44] articles to follow refers to the coordination team only.

Selection of Cancer Screening Tests and Interventions for Review

Reviews of cancer screening interventions addressed only those cancer sites for which convincing scientific evidence shows that screening improves health outcomes and for which screening is currently recommended by the USPSTF—namely, breast, cervical, and colorectal cancers.[4–6]

Historically, public health strategies (i.e., plans to address specific conceptual objectives, such as increasing demand for screening within a community) and interventions (i.e., specific activities to achieve the goal, such as group education or mass media) have been used to increase uptake of breast, cervical, and colorectal cancer screening. For these reviews, a standardized ranking process[39] was used to prioritize interventions used to achieve the following three strategies required to increase screening: (1) increasing community demand for cancer screening services; (2) increasing community access (reducing barriers) to cancer screening services; and (3) increasing service delivery by healthcare providers.

The team selected for review the following classes of interventions to increase community demand, defined as:

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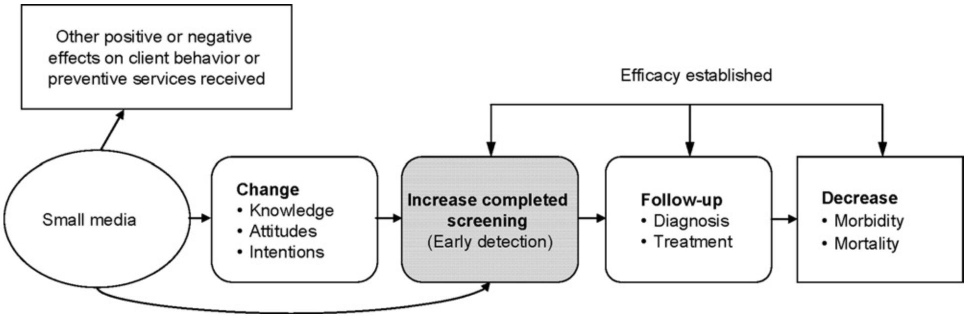

Figure 1. An example of the analytic framework used in reviews of interventions to increase screening for breast, cervical, and colorectal cancers. (Oval indicates intervention [small media]; rectangles with rounded corners indicate mediators or intermediate outcomes [shaded rectangle is the outcome demonstrating intervention effectiveness]; and clear rectangle indicates desired health outcomes.)

- client reminders: printed (generally letter or postcard) or telephone messages informing individuals they are due or late for cancer screening;
- client incentives: small, noncoercive financial or other rewards that motivate people to accept cancer screening;
- mass media: informational messages delivered to large audiences through television, radio, billboards, or newspapers;
- small media: informational messages delivered in pamphlets, brochures, leaflets, newsletters, letters, flip-charts, or videos;
- group education: delivering information or providing motivation in a classroom or other assembled group setting; and
- one-on-one education: one individual providing information or motivation to another, in person or by telephone.

The following classes of interventions to increase community access to cancer screening were selected for review and defined as:

- reducing out-of-pocket costs to clients: reimbursing clients, distributing vouchers, or increasing third-party payment;
- reducing structural or physical barriers (e.g., location, distance, inconvenient hours, dependent care, language and cultural differences): expanding clinic hours; establishing alternative screening sites; or providing transportation, translational services, or scheduling assistance; and
- laws to increase screening, specifically state or federally mandated screening or coverage of screening.

The following classes of interventions to encourage providers to increase delivery of screening to clients at appropriate intervals were selected for review and defined as:

- reminders or checklists: informing providers when clients need screening tests;
- assessment and feedback: evaluating provider performance in delivering a screening service to clients (assessment) and presenting providers with feedback on their performance; and
- provider incentives: monetary or nonmonetary awards for client screening.

Interventions to increase screening through community demand and community access are designed to alter client behavior and are considered, for the purposes of these reviews, "client-directed" interventions. Interventions to increase provider delivery of screening services, designed to alter provider behavior, are considered "provider-directed" interventions.

For each class of intervention reviewed, the team developed an analytic framework (an example of which is shown in Figure 1) to identify and map hypothesized relationships along the pathway(s) from intervention to intermediate and desired health outcomes. For the purpose of these reviews, completed screening (shaded) is the outcome of primary interest. Although an intermediate step in the model, completed screening is the measurable criterion for intervention effectiveness because of established links to the health outcomes of ultimate interest: decreased morbidity and mortality from breast, cervical, and colorectal cancers.[4–6] The Task Force based recommendation decisions on the direction, consistency, and magnitude of change in completed screening. Figure 1 displays the conceptual rationale for the use of small media interventions (analytic frameworks for other interventions included in the reviews are similar).[42–44] As shown, changes in some combination of knowledge, awareness, and intent (which may require altering attitudes and beliefs about screening services and tests) have the potential to increase demand for screening, leading to increased screening and early detection and, ultimately, reduced cancer morbidity and mortality. Alternatively, the intervention might cue or prompt clients who are ready for screening. The model also indicates that the intervention may result in other benefits and harms, such as positive or negative effects on other health behaviors or use of healthcare services.

Conceptual Issues in the Cancer Screening Reviews

Collective or individual site evaluation. The team and the Task Force carefully considered whether to evaluate the effectiveness of interventions to increase screening for cancer individually by cancer site or collectively across all three sites (breast, cervical, and colorectal). Differences in the target populations for each test and in screening test characteristics could potentially justify a decision to evaluate each site separately. Screening for cervical cancer begins at a much earlier age (aged 18 or earlier for sexually active women) than for breast (aged 40) or colorectal cancer (aged 50). Women are targeted for breast and cervical cancer screening, whereas both men and women are targeted for colorectal cancer screening. On the other hand, a case can also be made for combining results and recommendations across cancer sites on the basis of similar barriers among screening tests. For example, Pap tests, mammography, FOBT, and endoscopy are all potentially embarrassing, uncomfortable, and inconvenient. Moreover, these screening tests are associated with common obstacles for clients, including lack of knowledge, negative attitudes, and barriers to access (physical, cultural, and economic). In addition, providers are less likely to consider client barriers when considering whether to recommend screening tests.

Considering the differences across target populations and from one screening test to another, the Task Force decided to judge the effectiveness of client-directed interventions separately for each cancer site. (It also may be helpful for users interested in increasing screening for a cancer site to consider what is known about increasing screening for one or more other sites.) In contrast, interventions to influence provider behavior may be less dependent on barriers to the client population or the nature of screening tests. The Task Force therefore decided to judge the effectiveness of provider-directed interventions in increasing breast, cervical, and colorectal cancer screening tests collectively across all three sites.

Multicomponent interventions. Another issue was how to categorize studies that included more than one intervention component. These interventions are addressed in one of two ways. First, some interventions frequently or usually required the presence of other components to enable or support implementation; they were treated together without trying to disentangle independent effects of individual components. These interventions were labeled according to the principle component, as judged by the team. For example, interventions to reduce structural barriers (e.g., mobile mammography) generally require one or more informational components (e.g., small media) to alert the targeted population to the fact that physical barriers have been removed or reduced (e.g., scheduling of a mobile mammography unit). In these cases, the combination was defined to be a single intervention: reducing structural barriers. Second, many studies described combinations of interventions that were not inherently related or were contextually distinct in time or place of delivery (e.g., a combination of provider and client reminders). These were labeled as multicomponent interventions for which each component was identified individually. When possible, an attempt was made to evaluate the incremental contribution of each component separately, although study design frequently did not allow this to be done. In most cases, the effect of all the components was evaluated collectively, allowing conclusions on whether or not the combination was effective in increasing screening, but with implicit understanding of the potential benefit in being able to attribute value added by individual components. A review of the multicomponent interventions identified in the literature review will be published separately from reviews of the individual components.

Limitations in the descriptions of intervention methodologies and characteristics of the studies. The team often faced the challenge of classifying intervention components that investigators had not described completely, possibly due, in part, to page limits and other editorial policies imposed by journals or to different researcher perspectives on intervention content, description, and classification. This situation might improve if other mechanisms (such as providing supplemental information on the Internet or in other tabular formats) were used to provide more complete descriptions of methods and interventions.

Zaza and colleagues[40] have provided an overview of reportable study elements used in *Community Guide* reviews. The coding form for these reviews (available at www.thecommunityguide.org/methods/abstractionform.pdf) alerts authors to one consequence of incomplete description of study methods: a study whose quality of execution is rated as "limited" (because study methods are not fully described) is excluded from a *Community Guide* review, even if its design is of greatest suitability. *Community Guide* quality scoring elements correlate closely with other recent recommendations for improving reporting of intervention studies. The CONSORT group has identified 22 items necessary to avoid biased estimates of treatment effect and to judge reliability or relevance of findings.[45] Davidson and colleagues[46] have commented on the relevance of these 22 items for behavioral medicine research and have added guidelines specific to behavioral medicine. The TREND group also provides a checklist of items that should be reported in evaluation studies using nonrandomized designs.[47] In brief, common elements from these sources suggest that authors should clearly and specifically describe study setting and duration, eligibility criteria, the population from which participants were drawn, the study sample, the details of statistical analysis, and issues related to bias and confounding.

Uses for Cancer Screening Review Findings

The primary purpose of the *Community Guide* cancer screening reviews is to improve public health practice and policy by identifying effective strategies and interventions to increase use of effective screening tests. Public health is moving rapidly toward trying to identify and use evidence-based practice, and *Community Guide* reviews are a cornerstone of this passage. Because of *Community Guide* reviews, numerous audiences—including public health professionals, healthcare organizations, legislators and policymakers, funding agencies, and researchers—will be able to identify which cancer screening approaches are effective, which approaches are not effective, and for which approaches evidence is, as yet, insufficient to determine effectiveness.

Public health professionals in state and local health departments can use the findings of *Community Guide* reviews to plan effective programs and policies and to educate policymakers. Healthcare systems can use the reviews to implement effective system-level interventions (e.g., client reminder systems for mammography screening) that improve delivery of clinical services. Legislators and policymakers can use the findings to provide support for programs and policies.

The findings of *Community Guide* reviews can also contribute to research in several ways. For example, funding organizations can use the information to identify high priority areas for research as well as other areas that may no longer require additional research. *Community Guide* reviews can help researchers identify gaps in present knowledge and focus their efforts on those areas. Overall, *Community Guide* reviews can help promote the efficient use of limited human and financial resources.

More consistent provision of cancer screening services has untapped potential to continue recent declines in deaths from breast, cervical, and colorectal cancers. The reviews that follow present detailed evidence on the effectiveness of several population-level interventions for increasing the use of these screening services. Many of the reviewed interventions are also underused. Although it is clear that gaps exist in our knowledge, these gaps should not delay implementation of effective interventions identified in the following papers. We encourage practitioners to use the interventions that are applicable and feasible in their settings.

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