The Cancer Prevention and Control Research Network: An Interactive Systems Approach to Advancing Cancer Control Implementation Research and Practice

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Abstract

Background: Although cancer research has advanced at a rapid pace, a gap remains between what is known about how to improve cancer prevention and control (CPC) and what is implemented as best practices within health care systems and communities. The Cancer Prevention and Control Research Network (CPCRN), with more than 10 years of dissemination and implementation research experience, aims to accelerate the uptake and use of evidence-based CPC interventions.

Methods: The collective work of the CPCRN has facilitated the analysis and categorization of research and implementation efforts according to the Interactive Systems Framework for Dissemination and Implementation (ISF), providing a useful heuristic for bridging the gap between prevention research and practice. The ISF authors have called for examples of its application as input to help refine the model.

Results: We provide examples of how the collaborative activities supported by the CPCRN, using community-engaged processes, accelerated the synthesis and translation of evidence, built both general and innovation-specific capacity, and worked with delivery systems to advance cancer control research and practice.

Conclusions: The work of the CPCRN has provided real-world examples of the application of the ISF and demonstrated that synthesizing and translating evidence can increase the potential that evidence-based CPC programs will be used and that capacity building for both the support system and the delivery system is crucial for the successful implementation and maintenance of evidence-based cancer control.

Impact: Adoption and implementation of CPC can be enhanced by better understanding ISF systems and intervening to improve them. Cancer Epidemiol Biomarkers Prev; 23(11); 2512–21. ©2014 AACR.

Introduction

Over the last decade, prevention research has advanced at a rapid pace. However, gaps still exist between what is known about how to improve health and what is implemented as best practice within health care systems and communities (1–3). In the cancer prevention and control (CPC) field, these gaps will continue to widen if we do not improve our understanding of how and why evidence-based interventions (EBI) are adopted and implemented. Dissemination and implementation (D&I) science, which seeks to identify the best means of translating effective interventions into practice, is critical to closing the research-to-practice gap (4).
The Interactive Systems Framework for Dissemination and Implementation (ISF; Fig. 1) provides a useful heuristic to guide the growing field of D&I research and practice (5). Three systems comprise the ISF and must work together to effectively move research to practice. The first system, Prevention Synthesis and Translation, summarizes existing evidence and customizes evidence-based products to be more easily accessible and usable by end users. The second system, Prevention Support, provides general and intervention-specific training, technical assistance, and tools to build practitioner and organizational capacity to implement EBIs. The third system, Prevention Delivery, executes activities to implement and deliver EBIs (5).

Using the ISF to better understand and intervene to accelerate the adoption, implementation and maintenance of CPC EBIs could result in improved means for translating the evidence, providing supportive structures for implementation, and building capacity for delivery. The synthesis and translation system (5) generates 2 different types of products—systematic review findings (e.g., Guide to Community Preventive Services; ref. 6) and intervention programs (e.g., Research Tested Intervention Programs; ref. 7). The challenge for practitioners is one of interpreting and applying research findings for use in community and practice settings (8). Much is needed to improve research synthesis and translation to accelerate the uptake and use of effective cancer control EBIs (9).

Within the framework of the ISF, the Rapid Synthesis and Translation Process (RSTP) supports the work of organizations that are tasked with presenting the best available science that can be easily and quickly understood (10). The RSTP provides guiding questions, action steps, and process components that can accelerate the work of organizations that are strategically positioned to bridge the gap between the research and practice realms (10). Noonan and colleagues have suggested a new focus on marketing and communications to ensure that research innovations being “pushed” to the public correspond to the needs of end users and that there is sufficient “pull” from end users to justify the provision of these specific innovations (11).

The support and delivery systems also require specific interventions to increase general and innovation-specific capacity to carry out prevention efforts (5, 9, 12). Following the development of the ISF, Wandersman and colleagues proposed an evidence-based system for innovation support (EBSIS) to increase the effectiveness and efficiency of support activities (13). The EBSIS model is conceptualized as a bridge between the ISF Prevention Support and Delivery Systems and is intended to build capacity for implementation (14, 15). EBSIS includes 4 components for innovation-specific and general capacity-building: tools, training, technical assistance, and quality assurance/quality improvement (16).

Materials and Methods
Researchers, health care leaders, and other stakeholders can use the ISF framework (10, 13, 16) to better understand system resources and challenges and to identify opportunities to accelerate EBI use. However, there are few examples of its application, particularly in the area of cancer control. ISF developers note that learning from stakeholders’ experience of processes described in the ISF is essential to further refine and expand the ISF and better understand interactions between systems (5). This article describes how the Cancer Prevention and Control Research Network

Figure 1. The interactive systems framework for dissemination and implementation. Source: Wandersman and colleagues (5). With kind permission of Springer Science+Business Media.
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and colorectal cancer screening.

effectiveness of health fairs to promote breast, cervical, and CBOs across the country on the effectiveness and cost-
systematic review of peer-reviewed and gray literature
based evidence on the effectiveness of special events via a
by Emory, the CPCRN synthesized practice and research-
history is described elsewhere (17, 18). Table 1 highlights
the activities of CPCRN’s 5 workgroups and how they
address different ISF components.

Results

Prevention synthesis and translation system

CPCRN’s role in synthesizing evidence. CPCRN members update and synthesize existing evidence and conduct environmental scans of implementation efforts to add practice-based perspectives to existing evidence. For example, faculty from 6 CPCRN centers joined experts from the CDC, NCI, academic institutions, and the U.S. Preventive Services Task Force to review evidence on effective interventions to increase breast, cervical, and colorectal cancer screening and to update recommendations in the Guide to Community Preventive Services (Community Guide; ref. 19). The multidisciplinary team ensured that the final product was scientifically accurate and relevant to end users. Currently, another cross-site CPCRN team [University of Texas Health Science Center at Houston (UTH), Houston, TX; Emory University, Atlanta, GA; University of California at Los Angeles (UCLA), Los Angeles, CA; University of South Carolina (USC), Columbia, SC; and University of Washington (UW), Seattle, WA] is helping to reexamine the evidence and update Community Guide recommendations for multicomponent cancer screening interventions.

Special events (e.g., health fairs, screening events) are a common CPC activity (20); however, evidence is lacking on whether they increase cancer screening rates (21). Led by Emory, the CPCRN synthesized practice and research-based evidence on the effectiveness of special events via a systematic review of peer-reviewed and gray literature (20). Emory is conducting a prospective study with UTH and CBOs across the country on the effectiveness and cost-effectiveness of health fairs to promote breast, cervical, and colorectal cancer screening.

University of Colorado (UC; Denver, CO), Texas A&M (College Station, TX), UW, and Harvard University (Cambridge, MA) CPCRN conducted an environmental scan of health promotion activities for cancer survivors to better understand the extent to which research about recommended lifestyle behaviors and psychosocial support is translated into practice. The results of this pragmatic synthesis showing that few programs provided comprehensive health promotion services will be used to inform future program planning and evaluations and help providers and survivors locate different types of health promotion programs (22).

CPCRN’s role in translating existing evidence. CPCRN’s role in translating evidence has included activities and products that make the findings from evidence syntheses easier to adopt and implement (23). For example, Washington University (St. Louis, MO) CPCRN partnered with CDC’s Colorectal Cancer Control Program (CRCCP) to assess and increase use of 2 evidence-based interventions—small media and client reminders—for promoting CRC screening among CRCCP grantees and partners in 25 states and 4 tribal organizations (24). Researchers developed an online tool (MIYO or Make It Your Own; www.MIYOworks.org) to help users customize these Community Guide–recommended interventions for the specific populations they serve (25, 26). Registered users from 370 state and local health organizations in 47 states have created more than 4,300 versions of EBIs through MIYO, with a particular focus on vulnerable populations (27). The use of MIYO for promoting colorectal cancer screening has led CDC to invest in developing new MIYO modules promoting breast and cervical cancer screening.

The UCLA and Texas A&M CPCRN successfully translated the evidence-based Stanford Chronic Disease Self-Management Program for use among cancer survivors by taking a generic chronic disease self-management program and adding components that are especially relevant to cancer survivors’ increased attention to symptom management, making informed treatment decisions, and improving lifestyle behaviors (28). More than 25 workshops were provided to 244 participants. More than 80% of participants attended >3 of the 6 sessions, 95% of the participants were satisfied and would recommend the program (28, 29).

Prevention support system

The CPCRN conducts both the general and innovation-specific capacity-building functions of the prevention support system (PSS). Several examples of these CPCRN activities also fit into the 4 EBIS components: tools, training, technical assistance, and quality assurance/quality improvement, as described by Wandersman and colleagues. EBIS uses the Getting to Outcomes (GTO) framework, a 10-step approach to aid the identification and synthesis of concepts, tools, and evidence (13). These include assessment, planning, addressing capacity issues, implementing, evaluation, continuous quality improvement, and addressing sustainability issues.

(CPCRN) has conducted dissemination and implementation research and practice across the 3 systems of the ISF. We apply the ISF retrospectively, providing specific examples of activities within these systems. We also identify challenges and opportunities to work both within and across these systems to enhance dissemination and implementation of EBIs for cancer control.

Description of the CPCRN

The CPCRN is a national network funded by the National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention (CDC) and the Division of Cancer Control & Population Sciences of the National Cancer Institute (NCI). The mission of CPCRN is to accelerate the use of EBIs in communities and to fill the evidence gaps about “what works” in CPC (17). The CPCRN is a unique “network of networks” composed of 10 centers in 9 states, each with their own local network of partners. CPCRN history is described elsewhere (17, 18). Table 1 highlights the activities of CPCRN’s 5 workgroups and how they address different ISF components.
General capacity building. CPCRN researchers assess delivery system capacity, as in GTO Step 1, and then design and provide training and technical assistance to address gaps. For example, the CPCRN conducted a survey of 282 cancer control planners from 7 states to understand their knowledge, attitudes, behaviors, and
training needs for translating research evidence into practice (9, 13). Fewer than half of respondents (48%) representing government agencies, health care providers, and community-based organizations had ever used online resources to locate EBIs for CPC (9). Most expressed a need for training on how to locate and secure funding and technical assistance and how to adapt EBIs for different populations (75.8% and 64.2%, respectively; ref. 9). Results of this assessment led to 2 major CPCRN-wide initiatives to provide guidance to partners on finding, adapting, and implementing EBIs.

Consistent with the training component of EBIS, the Capacity Building and Technical Assistance Training (CBTAT) Workgroup produced a uniform set of training materials to increase community capacity to use EBIs (26). The training familiarizes clinical and community partners with credible sources of EBIs (e.g., Community Guide, Cancer Control P.L.A.N.E.T.) that describe evidence about what works in CPC practice. The CBTAT group conducted multiple trainings at national conferences and for partners such as state health departments, the National Breast and Cervical Cancer Early Detection Program, and the National Association of Chronic Disease Directors. Feedback from our partners made it clear that simply telling them where to find EBIs was insufficient to prompt use (9, 26, 30). They wanted to learn how to choose from among recommended strategies, adapt EBIs to fit specific settings and audiences, and estimate the costs of implementation and maintenance (30). An evaluation of 3 revised trainings conducted in Georgia that addressed these needs found that competencies related to locating evidence-based resources and defining steps in the adaptation process, along with specific guidance on adaptation and implementation, increased capacity among community practitioners who attended the trainings (30).

With funds from an NCI R01 (CA163526-01), CPCRN (led by UTH and Emory) are developing and evaluating Tailored Aid for Communities Adapting Tested Interventions for Cancer Control (TACTICC; ref. 31), an online tool to walk users through the steps of finding and adapting EBIs for CPC, an example of the tools component of EBIS.

The CPCRN has also studied what factors influence adoption and implementation of CPC in Community Health Centers (CHC) conducting a survey of CHCs in seven states. This study resulted in the development and validation of measures of inner-setting constructs as defined by the Consolidated Framework for Implementation Research (CFIR) that can be used to identify areas in need of general capacity building (32). Another study based on these data demonstrated that clinic Practice Adaptive Reserve was significantly associated with implementation of colorectal cancer screening programs at CHCs (33). Adaptive reserve includes relationships, leadership, time for group reflection and consideration about changes, and attention to the environment (34). The CPCRN Federally Qualified Health Center (FQHC) workgroup also conducted in-depth interviews with 59 leaders and staff from more than 25 FQHCs across the country to better understand factors that influence implementation of EBIs in FQHCs or similar settings (35). Collectively, these studies identify factors influencing implementation that can be targeted to accelerate and maintain CPC EBI use.

**Intervention-specific capacity building.** CPCRN teams also provide training and other support to build capacity to adapt and implement specific EBIs or guidelines while maintaining fidelity to a program’s core elements. Specific EBIs include Pool Cool, Body & Soul, Treatwell 5-a-Day programs, Friend to Friend, and the Community Guide breast cancer screening recommendations (Emory and Wash U, Wash U, UW, Texas A&M, and UNC respectively; refs. 36–39). These initiatives have increased EBI adoption and implementation. UNC, for example, found that CBOs increased their adoption of Community Guide EBIs following training and technical assistance, with close to twice as many applicants proposing to do one-to-one education and/or client reminders (13). UTH worked with community organizations in both Houston and Puerto Rico to adapt and implement Cultivando la Salud, an evidence-based breast and cervical cancer screening program. In Houston, the adapted program increased mammography and Pap test screening. Preliminary results indicate that 35.0% and 37% of women in the intervention group received mammography and Pap test screening, respectively, representing a level two a half times greater than women in the comparison group (40). In Puerto Rico, the adapted CLS program similarly increased Pap test screening [OR, 2.34; 95% confidence interval (CI), 1.13–4.87] but not mammography (41).

CPCRN researchers from Emory, UTH, Texas A&M, UCLA, and USC have instituted migrant programs (ranging from $3,500–$12,000/participating organization) as another approach to supporting CBOs’ implementation of specific EBIs that have proven to be effective at changing diet, physical activity, and screening behaviors (37, 39, 42, 43). The training and technical assistance offered typically focused on several of the GTO steps, including goal setting, addressing capacity, planning, implementing, and evaluating. Consequently, the training and technical assistance enabled funded sites to adapt EBIs to better suit their setting and audience, overcome systems barriers to implementation, evaluate their programs, and apply for additional funding (39).

The capacity to adopt and implement specific guidelines such as the use of patient-reported measures in primary care is another area recently advanced by the CPCRN. The UCLA CPCRN piloted a tool using a set of validated patient-reported measures of health behaviors and psychosocial issues (44, 45) in 5 FQHCs serving primarily Latino and Asian patients. They found that it was feasible to implement the tool in clinic settings and showed high levels of patient, staff, and physician acceptance and perceived use for facilitating patient–physician discussions.

Following this, a national multisite pragmatic trial was launched, using a publicly available tool for electronic...
capture and interpretation of the measures (www.myownhealthreport.org), to assess the feasibility and use of incorporating the measures into routine primary care practice. Four CPCRN sites (UCLA, UNC, UTH, Texas A&M) participated in the trial, which confirmed findings of the pilot study. Preliminary findings indicate that intervention patients reported significantly more positive changes in diet, physical activity, and other areas (45, 46). This example incorporates all EBSIS components: tools, training, technical assistance, and quality improvement.

These experiences helped the CPCRN better understand the types of adaptations practitioners make to EBIs (39), the challenges of finding and adapting EBIs, and the types and intensity of technical assistance needed at various stages in the process of moving EBIs into community and clinical settings.

**Prevention delivery system**

*Understanding the delivery systems' current use of EBIs.* All CPCRN sites engage local delivery systems in research–practice partnerships to improve CPC. For example, the CPCRN is collaborating with the CDC to evaluate CRCPP grantees' implementation of 5 Community Guide EBIs and patient navigation (47). The CPCRN surveys CRCPP grantees annually to assess EBI use. Survey data show that grantees are more likely to implement small media and client reminders than provider-oriented EBIs (48) and are more likely to implement all of the Community Guide EBIs than states and tribal groups that do not have CRCCP funding (48, 49).

*Partnering with delivery systems to improve CPC.* The CPCRN builds partnerships with organizations to expand traditional prevention delivery settings and extend the reach of effective interventions (50, 51) in varied settings, including workplaces, faith-based organizations, housing developments, the 2-1-1 Helpline, and community health centers.

Workplaces are an important delivery system given that 63% of U.S. adults are employed (52). UW’s CPCRN partnered with the American Cancer Society to develop Workplace Solutions, a package of Community Guide EBIs that offers employers free, on-site consultation to help them select, adapt, and implement EBIs (53, 54). ACS delivered Workplace Solutions to more than 1,700 employers across the United States (55). Harvard’s CPCRN is developing a tailored, telephone-delivered intervention promoting smoking cessation and weight management among blue-collar workers through health and welfare funds (56). UCLA is disseminating an organizational change physical activity and healthy nutrition intervention in worksites throughout Los Angeles County. Texas A&M is working with academic, health care, and business workplaces to promote successful application of the CEO Cancer Gold Standard. USC offers members of African-American communities of faith diet, physical activity, and stress reduction interventions along the lines of a randomized trial conducted in African-American churches in central South Carolina. This work, which has been shown to be effective at modulating C-reactive protein, an important marker of systemic inflammation, is moving to D&I phase with funding from the NHLBI (R01-HL122285; ref. 57). It also complements USC's pilot project—creating a farmers’ market at an FQHC (58–60), which has since formed the basis of the interinstitutional collaborative effort in 3 states—Ohio, South Carolina, and Texas (61).

Several CPCRN (Wash U, UTH, UNC, Emory, UCLA) are partnering with local 2-1-1 Helplines, a national 3-digit telephone information and referral service connecting people to local health and social services (62). 2-1-1 callers are often racial or ethnic minorities with lower levels of income and education than the general population and higher rates of unemployment or job insecurity (63). The CPCRN formed a 2-1-1 Workgroup to address research questions posed by 2-1-1 and participated in a nationwide research consortium with academics and 2-1-1 partners. Progress and contributions are highlighted in a Supplement to the *American Journal of Preventive Medicine* (64).

The CPCRN found that 2-1-1 callers were willing to complete a brief cancer risk assessment after receiving standard 2-1-1 service and would accept cancer control referrals when offered (63). CPCRN researchers also (65–68) demonstrated that 2-1-1 callers had significantly higher rates of smoking and lower rates of screening for breast, cervical, and colorectal cancers than U.S. adults. WU's CPCRN conducted a randomized controlled trial that demonstrated the efficacy of using proactive referrals and navigators for preventive services to motivate callers to follow-up with cancer control needs (69). UTH’s CPCRN is currently implementing and evaluating navigation services and referrals for preventive services for 2-1-1 Texas callers (67). In collaboration with 3 other CPCRN (WU, UTH, UNC), Emory received NCI funding (S13745/U101CA154282) to test an intervention to promote smoke-free homes with an efficacy trial followed by 2 effectiveness trials in which the intervention will be delivered by 2-1-1 North Carolina and Houston. Results from a pilot study of the intervention showed that more than 30% of households had established a smoke-free home at follow-up (70). The intervention, if effective, will be disseminated to 2-1-1s nationally through a grants program.

**Discussion**

The research described in this article advances the field of implementation science in several ways. First, it operationalizes definitions and descriptions of the ISF and validates its usefulness as a way of categorizing activities and studies that contribute to enhancing research translation. Second, it demonstrates the strength of national collaborative efforts focused on a common theme and informed by experiences with local partnerships. Finally, the framework allowed CPCRN researchers to better conceptualize key systems, functions, and relationships affecting the movement of research into practice. The CPCRN works in and across all 3 ISF systems and provides insight into an understudied element of the ISF: the potential of bidirectional communication across
The CPCRN is a dynamic network bringing together stakeholders from the ISF Systems to advance CPC innovations and evidence. The CPCRN takes a community-centered approach to ensure that its efforts to bridge the research-to-practice gap around CPC are grounded in the needs of community partners to build the evidence base and enhance their capacity to adopt, implement, and maintain effective interventions over time. We recognize that researchers, practitioners, and community members interested in advancing CPC cannot function in separate silos; instead, researchers must invite practitioners and community members to become intimately involved in the entire research process from program development to dissemination if they are to develop relevant and usable products.

Disclosure of Potential Conflicts of Interest
No potential conflicts of interest were disclosed.

Disclaimer
The findings and conclusions presented here are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the National Cancer Institute.

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