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Extending Cancer Prevention to Improve Fruit and Vegetable Consumption

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Abstract

Consuming a diet that is rich in fruits and vegetables is critical for preventing cancer and cancer-related disparities. Food systems approaches that increase spatial-temporal, economic, and social access to fruits and vegetables may ultimately result in improved consumption patterns among Americans. Engaging the triad of Cooperative Extension Services, public health systems, and community health centers may yield maximal public health benefits from food systems interventions. These entities have a mutual interest in promoting health equity and community and economic vitality that provides common ground to (a) implement solutions through the dissemination of evidence-based programs and (b) share resources to foster grassroots support for sustained change. Working together, these systems have an unprecedented opportunity to build on their common ground to implement, evaluate, and disseminate evidence-based food systems

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interventions in communities and with populations experiencing disparate risk for cancer and cancer-related diseases.

Introduction

In some Native American traditions it is customary to grow together the “three sisters” of corn, beans, and squash to enhance vitality and sustainability. In this commentary we highlight how another triad addresses cancer prevention through a focus on nutrition and health. Cooperative Extension Services (CES), public health systems (PHS), and community health centers (CHCs) when cultivated together have the potential to promote health for individuals, communities, and society by reducing cancer risks. These entities have a mutual interest in promoting health equity and community and economic vitality that provides common ground to (a) implement solutions through the dissemination of evidence-based programs and (b) share resources to foster grassroots support for sustained change. See Table 1 for a graphic display of similarities and differences in key characteristics among CES, PHS, and CHCs.

Nutrition and Health

Consuming a diet rich in fruits and vegetables (FV) is associated with decreased risk for most chronic diseases [1] including cancers [2, 3]. Chronic inflammation has emerged as a mechanism underlying virtually all chronic diseases, and FVs have the strongest anti-inflammatory properties of any foods that individuals can consume [4]. Few Americans, however, consume the recommended servings of FVs daily [5]; a trend that has persisted despite numerous initiatives aimed at improving FV intake [6]. Nevertheless, the Centers for Disease Control and Prevention (CDC) has identified increasing FV consumption a “winnable battle” that will be won, in part, through food systems approaches (e.g., making changes to physical surroundings, social and cultural climate, information and resource availability, and organizational systems across the continuum of food production to consumption) [7, 8]. Such environmental interventions are broadly consistent with the “health protection” orientation characteristic of very successful public health efforts of the early 20th century [9, 10].

There is emerging evidence supporting food systems-oriented interventions such as farmers' markets, farm-to-institution, and community gardens as strategies for improving FV consumption [8]. At the core of these interventions is an implicit belief in the connection between agriculture, community health activism, and public health programming. These sectors, however, have limited experience working together, especially in implementing interventions. The purpose of this commentary is to highlight innovative opportunities for integrating CES, PHS and CHCs to facilitate the dissemination, implementation, and evaluation of evidence-based food systems interventions to reduce cancer-related health disparities.

Discussion

Cooperative Extension Service

The premise of the County Demonstration Agent System envisioned by its founder, Seaman A. Knapp [11] is to “get badly needed technological and sociological knowledge from colleges and laboratories to the groups furthest from the sources.” This concept forms the foundation of the U.S. Department of Agriculture (USDA), Cooperative Extension System (CES) [11], which operates today at 100+ land-grant colleges and universities with at least one in every U.S. state and territory. The CES, originally focused on agriculture, has been credited as one of the most effective programs ever seen for disseminating innovations [12].

Extending Public Health Systems

Dramatic improvements in health over the last 125 years can be attributed to developments in public health, which began as a cross-disciplinary collaboration between medicine and civil engineering. Developments in health protection that occurred from the last decades of the 19th century, when the County Demonstration Agent System was birthed, to the period just after World War I involved a firm commitment to creating healthier environments through engineering controls resulting in improved sanitation and water supplies, food production and safety, transportation, and housing. Currently, the pendulum in public health is returning to these roots by focusing on societal conditions, policies, institutions, and environments influencing the public's health [13]. These “fundamental causes,” including food and agriculture policies related to distribution, retail and affordability, exert great influence on population health especially in comparison to genetics, health behaviors, and medical care [14]. Connecting PHS with CES provides fertile grounds for interdisciplinary thinking and practice to holistically address fundamental influences on FV consumption.

Extending Community Health Center Systems

Community health centers (CHCs) are key linkages for connecting CES and PHS perspectives. The CHC movement took hold in the U.S. in the 1960s amidst rampant poverty and racial tension in inner-city neighborhoods and rural communities [15]. Like the birth of the demonstration movement in agriculture, the CHC movement emerged as a critique—this time of health care practices that focused too heavily on biomedical causes of disease rather than comprehensive health promotion for individuals *and* their communities. This movement, which placed heavy emphasis on community and economic development [16, 17], was spearheaded by H. Jack Geiger, and came to life at the Office of Economic Opportunity (OEO) when funding was approved for the first two community health center demonstration projects in Boston, Massachusetts and Mound Bayou, Mississippi [15]. Today there are more than 7,500 CHCs across the U.S. that provide patient-centered care to medically underserved populations regardless of socioeconomic status. From the beginning, providers in CHCs made the connection between food systems and health when, for instance, they wrote prescriptions for food because it was the “specific therapy for malnutrition” [18].

Connecting the Triad to Improve Fruit and Vegetable Consumption

CES has partnered with PHS and CHCs to address health topics ranging from environmental exposures to chronic disease (see Table 2); however, very few published studies highlight partnerships with the goal of implementing evidence-based interventions to improve FV consumption. Two exemplars include the national “5 A Day” awareness campaign initiated in the 1990s with support from the National Cancer Institute [19], and a partnership between cooperative extension and the Dana-Farber Cancer Institute to adapt the Expanded Food and Nutrition Education Program (EFNEP), a nutrition education program operated by CES since the 1960s [20]. Both highlight opportunities for engaging CES in efforts targeting *consumers* of FVs, while also raising questions about increasing the potency of these interventions by engaging stakeholders across the food production-to-consumption continuum. The recent shift in public health to food systems approaches for improving FV consumption creates opportunities for more purposefully engaging CES in comprehensive, multi-level strategies to improve FV consumption. PHS and CHCs are logical partners in these efforts.

The Right Choice Fresh Start (RCFS) farmers' market represents a contemporary example of a food systems approach to improving FV consumption that involved a partnership between PHS, CHC, and CES. The RCFS farmers' market is the core project of the University of South Carolina Cancer Prevention and Control Research Network, one of 10 networks funded by the CDC. Developing and implementing the RCFS farmers' market occurred in partnership with a CHC, Family Health Centers, Inc., and two CES systems: South Carolina State University, one of the oldest 1890 land-grant universities serving minority populations, and Clemson University, the 1862 land-grant university in South Carolina.

The goal of the RCFS farmers' market, which operates in rural South Carolina, was to examine the feasibility of establishing a farmers' market at a CHC. CES was central to the formation of the RCFS farmers' market by (a) identifying farmers who, in turn, informed the development of the market and served as vendors, (b) providing technical assistance on the business and safety regulations associated with farmers' market operations, (c) serving on the RCFS Advisory Council, and (d) disseminating information and resources to participating farmers on a range of topics (e.g., organic methods for crop pest control, becoming certified to accept payment from consumers using federal food assistance subsidy programs, and marketing strategies to increase economic opportunity).

Exchanges between CES, the CHC, and PHS occurred in mutually beneficial ways throughout the RCFS farmers' market. The director of the statewide South Carolina Cancer Prevention and Control Program, for instance, provided a keynote address about the science of FV consumption and cancer prevention at a RCFS farmers' market celebration event for “National Farmers' Market Week.” This information provided evidence to guide future educational services offered by a CES agent working with many of the RCFS farmer-vendors. The CHC created a farmers' market produce prescription initiative to incentivize FV purchases made by patients completing diabetes education, which boosted revenue opportunities for farmers. The state public health department later supported the RCFS farmers' market through the award of a Community Transformation Grant that funded the

farmers' market manager and a food assistance monetary incentive program. CES offered additional support to the RCFS farmers' market manager by inviting her to attend monthly farmers' association meetings organized by CES; these meetings introduced the market manager to additional farmers interested in becoming vendors at the market and provided critical insights into some of the opportunities and challenges associated with growing FVs. For instance, information gained at one of these meetings during a particularly dry season provided information that influenced a change in the RCFS vendor policy to allow more re-sale (i.e., foods not grown by the farmer) to be sold at the farmers' market because locally produced yields were declining. Finally, partnerships between the three facilitated the acquisition of resources to sustain and expand the RCFS farmers' market to serve more low-income consumers and enhance economic opportunity for small-scale farmers.

The RCFS exemplar highlights synergies among PHS, CHC, and CES related to community, economic, and health development. While each entity has a tradition of utilizing expertise related to these goals (see Table 1), none have the capacity to single-handedly address all aspects of food systems change for public health benefit. Working together on the RCFS farmers' market, PHS, CHC, and CES had the opportunity to build on their respective strengths, creating a culture for co-learning, capacity building, and mutual benefit. However, this type of collaboration is not without challenges. Prior to the formation of the RCFS, there were no formal connections between the CHC, PHS, and CES. In fact, a CES agent involved in the RCFS indicated this was the first time he had ever seen a farmers' market use a health promotion framework to guide its development and implementation. Coalition building efforts were needed to create a structure for the cross-sector partnership. Additionally, team building efforts were needed to introduce the skillsets and expertise of each entity because many practitioners from the CHC, PHS, and CES were unfamiliar with the assets of each contributing partner. Future partnerships among these sectors should include strategies to develop effective group processes and capacity building to facilitate their ability to successfully initiate and sustain food systems change.

Public Health Implications

Public health arose at the end of the 19th century as a set of multidisciplinary activities. No movement in human history has had a more profound effect on health outcomes and life expectancy. Now, in the 21st century, we have a conceptually similar opportunity to combine the triad of the CES, PHS, and CHC to the mutual benefit of each to advance the public's health. Similar to the companion planting technique of the three sisters that yields a healthy harvest, this triad can benefit from working together to advance cancer prevention research, education, and practice. We present four key recommendations for expanding triadic collaborations including:

1. Implementation of multi-level approaches to improve FV consumption that address *both* pressing individual needs *and* socio-structural factors and assess impact on a range of outcomes (e.g., economic growth for farmers engaged in implementing interventions measurable through the CES, population health behaviors assessed through PHS surveillance, patient outcomes measured using electronic medical records);

2. Research and education initiatives that reinforce the *health of the community* as a critical determinant of individual health and well-being and accord high priority to community and economic development initiatives;
3. Dissemination of evidence-based nutrition and health education to underserved groups, including capacity building to implement food systems interventions;
4. Translation of evidence-to-practice and practice-to-evidence through closer connections between producers and users of evidence.

One potential opportunity for supporting triadic collaborations is through engagement in Supplemental Nutrition Assistance Education (SNAP-Ed) initiatives supported by the USDA (see http://snap.nal.usda.gov/). The Healthy Hunger Free Kids Act transformed SNAP-Ed into the Nutrition and Obesity Prevention Grant Program with an emphasis on food systems approaches to address obesity prevention. Beginning in fiscal year 2014, over $400 million in annual funds were made available to states to consider, select, implement, and evaluate evidence-based interventions that align with SNAP Ed goals including increasing consumption of FVs. Collaborations among CES, PHS, and CHCs will be critical for this success.

Conclusion

Cancer prevention efforts will be enhanced through collaborations among CES, PHS, and CHCs. The U.S. national public health goal to “promote health and reduce chronic disease risk through the consumption of healthful diets” [21] may be more attainable through the proposed triadic collaboration. Through efforts to test effective programs, the three systems can bring to scale interventions to reach a broader audience and advance dissemination research specific to cancer prevention. Integrating the strengths of each system will contribute to reductions in cancer-related risks and promote long-term sustainability of their collective efforts.

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Table 1

Characteristics of Three Systems: Cooperative Extension, Public Health, and Community Health Centers

	Cooperative Extension Service (CES)	Public Health System (PHS)	Community Health Centers (CHC)
Beginning of the movement (approximate date)	*1914*	*Late 1800s*	*1960s (in the U.S.)*
Defining Characteristics			
Population and Disciplinary Focus			
Serving diverse, low-resource communities	++	++	+++
Population-level focus	++	+++	+
Family-centered focus	++	+	+++
Collaborative & interdisciplinary	+++	+++	++
Mechanisms of Action			
Primary prevention	+	+++	++
Chronic disease care	-	+	+++
Makes connection between health and food systems change	+	+	+
Implementation of evidence-based interventions and practices	+	++	++
Community-engaged dissemination	++	++	++
Theoretical Underpinnings			
Community development	+++	++	+++
Economic development	+++	+	++
Health equity focus	+	++	+++

Note: The + symbol is used to denote the degree to which the systems address each characteristic with + indicating a lower level than +++. The − symbol denotes the system does not focus on the characteristic. These ratings are based on expert opinion of authors.

Table 2

Examples of partnerships between Cooperative Extension Services (CES), public health systems (PHS), and/or community health centers (CHC) for population-level health promotion.

Reference	Program	Partners	Location	Program Focus
Cohen & Ingram, 2005 [22]	Border Health Strategic Initiative or Border Health ¡SI!	CES PHS CHC	Arizona (U.S./Mexico border)	Prevent and control diabetes
Lisovicz et al., 2006 [23]	Deep South Network for Cancer Control	CES PHS CHC	Alabama, Mississippi	Prevent and control cancer disparities
Freedman et al., 2013 [24]	Right Choice Fresh Start Farmers' Market	CES PHS CHC	South Carolina	Improve access to and consumption of fruits and vegetables and economic opportunity for farmers
Havas et al., 1995 [19]	5 A Day for Better Health	CES PHS	Alabama, Arizona, Georgia, Louisiana, Maryland, Massachusetts, Minnesota, North Carolina, Washington	Increase fruit and vegetable consumption
Scutchfield et al., 2007 [25]	Health Education through Extension Leadership Project	CES PHS	Kentucky	Prevent and control chronic disease
Warren et al., 2012 [26]	Texas Grow! Eat! Go!	CES PHS	Texas	Prevent childhood obesity Prevention
Parrott et al., 1999 [27]	Cultivando Buenos Habitos Campaign	CES CHC	Georgia	Reduce environmental risks for cancer