Creating Supportive Nutrition Environments for Population Health Impact and Health Equity
An Overview of the Nutrition and Obesity Policy Research and Evaluation Network’s Efforts

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Abstract: Childhood obesity is a major threat to individual health and society overall. Policies that support healthier food and beverage choices have been endorsed by many decision makers. These policies may reach a large proportion of the population or in some circumstances aim to reduce nutrition disparities to ensure health equity. The Nutrition and Obesity Policy Research and Evaluation Network (NOPREN) evaluates policy as a tool to improve food and beverage environments where Americans live, work, play, and learn. The network aspires to address research and evaluation gaps related to relevant policies, create standardized research tools, and help build the evidence base of effective policy solutions for childhood obesity prevention with a focus on reach, equity, cost effectiveness, and sustainability.

Background

In 2009, the CDC’s Division of Nutrition, Physical Activity, and Obesity (DNPAO) created the thematic Prevention Research Center (PRC) network called the Nutrition and Obesity Policy Research and Evaluation Network (NOPREN). The mission of the network is to describe and study the effectiveness of policies in creating environments that support healthy food and beverage choices. Key areas that are examined within practice-based policy research and evaluation include policy identification (i.e., identifying nutrition targets, settings, and circumstances subject to influence by policies); development (e.g., awareness, public education efforts, coalition building); enactment; implementation (e.g., barriers, critical success factors in modifying the environment); and enforcement.

In addition, researchers also may determine the effectiveness and consequences of enacted and implemented policies, including feasibility to implement as intended, measures of environment change, behavioral change, reach, equity, transferability, costs and offsets, co-benefits, and/or unintended consequences. The policy research and evaluation framework used by NOPREN is depicted visually in Figure 1. This framework has been informed by a number of models including classical approaches such as Kingdon’s theory for evaluation of policy and those more recently used in physical activity policy research. Additional NOPREN activities include the dissemination and translation of results through traditional research publications, briefs, and other communication channels.

Relevant nutrition-related policies for study by NOPREN may be enacted within jurisdictions at the local (community, city, county, or other municipality); state; federal; and territorial or tribal levels as well as the institutional or organizational level. Policies typically include bills, resolutions, executive orders, city/county ordinances and zoning, agency regulations and rule-making, contracts/legally binding agreements, organizational policies, and/or institutional practices or guidelines such as those written for schools, early care and education centers, workplaces, parks and recreation facilities, and community retail stores. Policies can be written codes or standards, or formal or informal rules established by governments or organizations that affect the nutrition environment.

The network is composed of subject matter advisors at DNPAO and extramural groups, primarily consisting of PRCs, a national program of 37 academic research centers funded by the CDC’s National Center for Chronic
Disease Prevention and Health Promotion. Each PRC is at either a school of public health or a medical school that has a preventive medicine residency program. The centers receive core funding to conduct prevention research for policy and public health practice and can apply for additional funding from groups within CDC to participate in special interest projects. These special interest projects include the DNPAO’s Physical Activity Policy Research Network and NOPREN. Funding is awarded through a competitive external review process. Six PRCs are funded by NOPREN: one coordinating center (Harvard School of Public Health) and five members (Tulane University, New York University, University of Washington, Texas A&M University, and University of Arkansas for Medical Sciences). These PRCs collectively are responsible for achieving collaborative research goals by participating in all NOPREN discussions, planning, and activities and in working groups (currently water access, rural food access, food policy councils, and policy communications). Funded NOPREN projects are described in Table 1.

Additional members of NOPREN include PRCs that are not funded by DNPAO, termed Affiliates. Affiliates bring multiple disciplinary expertise to the network, and contribute time to one or more collaborative working group projects. These members attend calls and help in data collection, analysis, and dissemination. Collaborative members are non-PRC university researchers and staff with a vested interest in network activities; their activities are similar to Affiliates. Finally, Partners are organization or agency personnel who provide input and expertise on network projects, participate in select meetings or calls with NOPREN or local university-based NOPRENs, and participate in working groups. Examples include health departments, education and child health agencies, local stakeholders, and nonprofit organizations including the Robert Wood Johnson Foundation Healthy Eating Research program.

Much of the focus by NOPREN is on the food environments in settings where children and families spend time or make food-purchasing decisions since poor nutrition contributes to childhood obesity, which affects approximately 12 million U.S. youth. Disparities exist with certain subgroups, such as Hispanic and non-Hispanic black youth, who experience higher levels of childhood obesity than non-Hispanic whites. Children who are obese are more likely to be at risk for adverse health conditions such as dyslipidemia, type 2 diabetes, fatty liver disease, and asthma, as well as experiencing a greater risk of social and psychological problems, such as stigmatization and poor self-esteem that can continue into adulthood.

Childhood obesity is associated also with increased school absenteeism and poorer school performance, and obesity in early adulthood is associated with subsequent lower levels of schooling and economic earnings. Obese children are more likely to become obese adults, and adult obesity is associated with many leading causes of death, including heart disease, diabetes, and some cancers. Healthcare payer and service costs associated with adult obesity were approximately $147 billion in 2008, and obesity has been linked to reduced worker productivity, increased disability costs, and chronic absence from work, further increasing the economic impact.

**Policy As a Lever to Improve Distal Environments That Affect Individual Behaviors**

As outlined in the recent IOM Workshop Summary “Legal Strategies in Childhood Obesity Prevention,” the combined use of legislation, regulation, and litigation was necessary in areas of public health such as injury prevention (e.g., automobile and gun safety) and tobacco control.

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**Figure 1.** Nutrition and obesity policy research and evaluation framework
to foster change in societal norms. However, although injury prevention and tobacco control lend themselves to policies that require or mandate specific behaviors (i.e., obtaining a license to carry a gun; not smoking in restaurants, worksites, and hospitals), policy interventions for obesity prevention are more feasible and practically directed at the environment (e.g., making healthy choices easier) rather than the individual (i.e., requiring one to make a healthy choice). As discussed in the 2011 *Lancet* Series on Obesity, energy balance is determined proximally by behaviors and distally by environments. Therefore, population-wide reductions in obesity will require individual changes in dietary and activity behaviors that are supported by public education efforts and healthful environments in key settings where these behaviors take place. More specifically, dietary behaviors are influenced not only by individual factors such as preferences and skills but also by multiple environments where children and families spend time. These include physical environments (e.g., physical access to and availability of

### Table 1. Projects of the funded Prevention Research Centers in the Nutrition and Obesity Policy Research and Evaluation Network (2009–2012)

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<th>Activity</th>
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<td>Systematic identification of relevant policies and post-enactment assessment of policies related to drinking water access and/or sugar-sweetened beverage offerings within multiple settings (e.g., school, afterschool, community including public service venues and park and recreation facilities) (Harvard School of Public Health)</td>
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<td>Case study of policy development through a Food Advisory Council and enactment of a healthy food financing initiative in New Orleans that aimed to increase access to healthy foods, especially fresh fruits and vegetables, by providing incentives to stores and markets to operate in underserved neighborhoods (Tulane University)</td>
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<td>Assessment of existing healthier and less-healthy food and beverage offerings (product assortment including presence, variety) of products at small food stores and in-store guidance for healthy food choices available to low-income Mexican-origin families in Texas <em>colonias</em> (Texas A&amp;M University)</td>
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<td>Post-enactment policy evaluation focused on New York’s racial and ethnic minority communities including use of menu labeling, access to healthy food, and drinking water intake and perceptions about water among youth in schools before and after water jet placements in school cafeterias (New York University)</td>
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<td>Case studies of policy development and implementation across three local health departments in Washington that have taken different approaches to policies for menu labeling in restaurants; including the roles, relationships, and barriers related to working with restaurants and strategies used to facilitate informed choices for residents (University of Washington)</td>
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<td>Assessment and perceptions of school food and beverage offerings and evaluation of acceptability of changes to products; assessment of rural food access (University of Arkansas for Medical Sciences)</td>
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Policies can be enacted to influence change in any of these environments. For example, policies to improve the physical nutrition environment can include financial or other incentives for the purchase of refrigeration in small stores for perishable produce or placement of water stations in a school for drinking water access. A bill that requires the provision of electronic card readers and electronic benefit transfer capability at produce markets and online grocery delivery services can affect the economic environment by allowing low-income residents to use their nutrition assistance program benefits to purchase healthier foods. Menu labeling and icons that provide consumer information at the point of purchase affects the communication/information environment. Zoning policies that allow fruit and farmers markets in urban areas or that create spaces for urban agriculture can influence the social environment of a community by facilitating dialogue between consumers and producers.

### Teaming with Local and State Public Health Agencies to Protect Public Health

Many recent state and local public health prevention initiatives, including those supported by the CDC, have evolved from the design and implementation of specific programs to consideration of system and environmental initiatives. Public health agencies may also take part in public education efforts to ensure that citizens are aware of obesity risk factors and to ensure informed choices. They can develop relationships with many stakeholders to create priorities and coordinate obesity prevention efforts as observed in state obesity plans and state or local obesity coalition work. As discussed by Pomeranz, the U.S. has state health agencies in all states and the District of Columbia and approximately 2800 local health agencies. These agencies often educate the public about nutrition risk factors for obesity and chronic disease and provide information in response to the inquiries of decision makers about changes to the environment that can protect the health of the community. More than half of state health agencies have some ability to enact rules and regulations to achieve public health goals.

Despite this ability and authority, few health agencies have had sufficient resources for evaluation of these new types of initiatives. Partnerships between health departments and researchers may aid in building the evidence...
base for what makes an effective rule or regulation. These partnerships are occurring in the PRC Cancer Prevention Network, in the Physical Activity Policy Research Network, and in NOPREN. Network members have created local networks in their state or region. The local Washington State NOPREN (WA NOPREN) is one such collaborative among the University of Washington PRC staff, practitioners from state and local health agencies, and other nutrition and food system stakeholders. Many of the collaborative initiatives are funded by federal agencies and foundation grants. For example, the WA NOPREN has partnered with Seattle & King County to provide training, technical assistance, and evaluation for CDC’s Communities Putting Prevention to Work (CPPW) efforts in child care and schools. The WA NOPREN provided technical assistance to Thurston County Health and Social Services for the evaluation of changes to children’s meals in fast-food restaurants. They also provided training, technical assistance, and evaluation support to the Washington State Health Department Nutrition, Physical Activity, and Obesity 805 Program with a focus on the State Plan for Nutrition and Physical Activity and a statewide food system assessment.

The local New York University (NYU) NOPREN is multidisciplinary and teams up regularly with multiple city agencies. For example, in collaboration with the New York City Department of Health and Mental Hygiene, the NYU NOPREN led an evaluation of an intervention that placed water jets (large, clear tap-water dispensers) in school cafeteria lunch lines. The evaluation used a pre–post matched-pairs design to determine whether the presence of the water jets affected the consumption of water and milk during school lunches in case and control schools, as well as how the water jets influenced students’ attitudes and behaviors regarding drinking tap water.

In Boston, the local Harvard NOPREN and its partners, including researchers at the Northeastern University School of Law, have worked with numerous state and local agencies in evaluating drinking water access in schools and other venues. For example, the Harvard NOPREN researchers serve on a committee that is providing input on food environment changes that the Boston Public Health Commission worked to implement as part of their CPPW obesity prevention grant and on a committee that addresses water access in Boston Public Schools. In addition, they have engaged the Massachusetts Department of Public Health and a variety of city agencies including the Boston Public Schools Food and Nutrition Services, the Department of Extended Learning Time and Services, Boston Centers for Youth and Families, YMCAs, and the Boys and Girls Club of Boston to collaborate in practice-tested research.

Building Practical Evidence of Effectiveness, Costs, and Health Equity Impact

The evidence base for effective approaches to childhood obesity prevention is growing. Both the Cochrane Database of Systematic Reviews and the Guide to Community Preventive Services have published documents that recommend specific interventions determined by rigorous systematic abstraction processes, topics include behavioral interventions to reduce screen time and comprehensive systems change school-based interventions. However, as pointed out by Gortmaker et al., these reviews and others are restricted in both what is measured in the included studies and the criteria used to determine evidence of effectiveness. For example, measures of feasibility, cost, sustainability, and effects on equity are often overlooked in individual studies.

The growing evidence that some of the most cost-effective strategies involve fiscal and regulatory approaches indicates a need for new policy research models. Initiatives such as Assessing Cost-Effectiveness in Obesity (ACE-Obesity) that use a standardized evaluation method provide an innovative approach to the assessment of effectiveness through its use of a broader set of primary and secondary filter criteria. The ACE-Obesity approach considers the cost estimates and cost offsets of interventions as well as aspects of equity, strength of the evidence, feasibility of implementation, acceptability to stakeholders, sustainability, and potential for side effects. Use of models such as ACE-Obesity may benefit multiple stakeholders who are interested in what works and whether the approach is feasible and cost effective.

Kansagra and Farley recently emphasized the need for diverse research methods (e.g., observational studies, use of surveillance data for evaluation) and studies to address questions relevant to public health practitioners, with an emphasis on the potential effectiveness of policy and environmental changes that have broad population reach. The IOM Committee on an Evidence Framework for Obesity Prevention Decision Making has provided the LEAD (Locate Evidence, Evaluate Evidence, Assemble Evidence, Inform Decisions) framework and similarly underscored the need to move beyond randomized controlled trials and more classic medical treatment models, calling for evidence that is more attuned to the design, implementation, and outcomes of policies and programs to prevent obesity—whether initiated in research, community, or practice settings.

Network research has followed this guidance. For example, the Tulane PRC has evaluated a natural experi-
ment via its own city’s experience, specifically the influence of recent changes to the U.S. Department of Agriculture’s Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) national guidelines change on the retail food environment in New Orleans. Although these are national regulations, states can specify their own stocking requirements affecting the physical environment (e.g., variety of fruits, variety of vegetables, low-fat/nonfat milk). Multiple city assessments of this type using standardized research tools and protocols can be synthesized to describe variations in policy across states and build evidence of effects, not from a single intervention trial but from different contexts. This approach can aid the study of transferability and scalability of policies. Another example of a natural experiment is the Harvard School of Public Health NOPREN team’s utilization of routinely collected school-based surveillance data on dietary behaviors before and after the implementation of a city policy to limit less healthy beverages in Boston city schools. The evaluation found a reduction in daily frequency of sugar-sweetened drink intake among youth in Grades 9–12. This school policy assessment was highlighted in the recent IOM report, Accelerating Progress in Obesity Prevention—Solving the Weight of the Nation.

Supplement Overview

As illustrated by the articles included in this supplement to the American Journal of Preventive Medicine, NOPREN’s approach to policy evaluation and research aspires to include aspects of feasibility, effectiveness, and cost. It also addresses effective translation and dissemination of research findings to ensure that the information is appropriately communicated to decision makers, partners, and relevant stakeholders. In their supplement article, Cradock et al. provide estimates of the costs of three water-provision strategies to aid implementation and compliance with the recent federal law requiring free drinking water access for students during mealtime. The case study by Ulmer and colleagues synthesizes, through semi-structured interviews with key informants from private, nonprofit, and government organizations, the evolution of the Food Policy Advisory Committee and the feasibility and cost barriers of enacting a food retail financing program. Dodson et al. consider the latter part of the framework, determining effective policy research communication approaches by evaluating existing obesity research briefs to help public health researchers better communicate and disseminate research to decision makers.

Conclusion

Policy change is one approach to making healthy food and beverage options more accessible, affordable, and desirable for children and families. Nutrition policies may improve health equity by focusing on certain community members and/or reach a large proportion of the population. Research and evaluation are important to determine whether a policy has met its intended goal and is an effective solution that other communities or states may want to consider to support their residents.

Articles in this supplement highlight research across jurisdictions (e.g., local/city, tribal, organizational, and store); nutrition content area (e.g., drinking water access, menu labeling, food systems and healthier food retail); different types of design and research tools (e.g., group randomized trial, natural experiments, key informant interviews, database searches); and assessment across NOPREN’s policy evaluation framework. Through its collaborative work, NOPREN aims to increase the capacity of multiple partners to participate in policy and environmental approaches to obesity prevention, study transferability and scalability of policies, create standardized research tools, share best practices to strengthen evaluation and research methods, increase resources to utilize natural experiments at the local level, build an evidence framework for effective obesity prevention policies with criteria that reach beyond traditional randomized controlled trials, and cultivate leadership in policy research and evaluation.

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