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Editorial correspondence should be directed to:

American Journal of Preventive Medicine
University of California, San Diego
9500 Gilman Drive, DEPT 0811
La Jolla CA 92093-0811

Tel (858) 534-9340
Fax (858) 534-9344

E-mail for AJPM business:
ajpm@ucsd.edu

E-mail for blog site:
ajpmblog@ucsd.edu

E-mail for manuscript queries:
eAJPM@ucsd.edu

E-mail for press queries:
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Fed Ex Address:
Calit2/Atkinson Hall, Room 3322
University of California, San Diego
La Jolla CA 92093-0811

Sponsoring Organizations' Offices:

American College of Preventive Medicine
Michael A. Barry, CAE
Executive Director
455 Massachusetts Avenue NW,
Suite 200
Washington DC 20001

Tel (202) 466-2044
Fax (202) 466-2662
www.acpm.org

Association for Prevention Teaching and Research
Allison L. Lewis
Executive Director
1001 Connecticut Avenue NW,
Suite 610
Washington DC 20036

Tel (202) 463-0550
Fax (202) 463-0555
www.aptrweb.org

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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

Heidi M. Blanck, PhD, Sonia A. Kim, PhD

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.

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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.[1,2] 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[3], primarily consisting of PRCs, a national program of 37 academic research centers funded by the CDC's National Center for Chronic

From the Division of Nutrition, Physical Activity, and Obesity, CDC, Atlanta, Georgia

Address correspondence to: Heidi M. Blanck, PhD, CDC, 4770 Buford Highway NE, MS K-26, Atlanta GA 30341. E-mail: hblanck@cdc.gov.

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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.

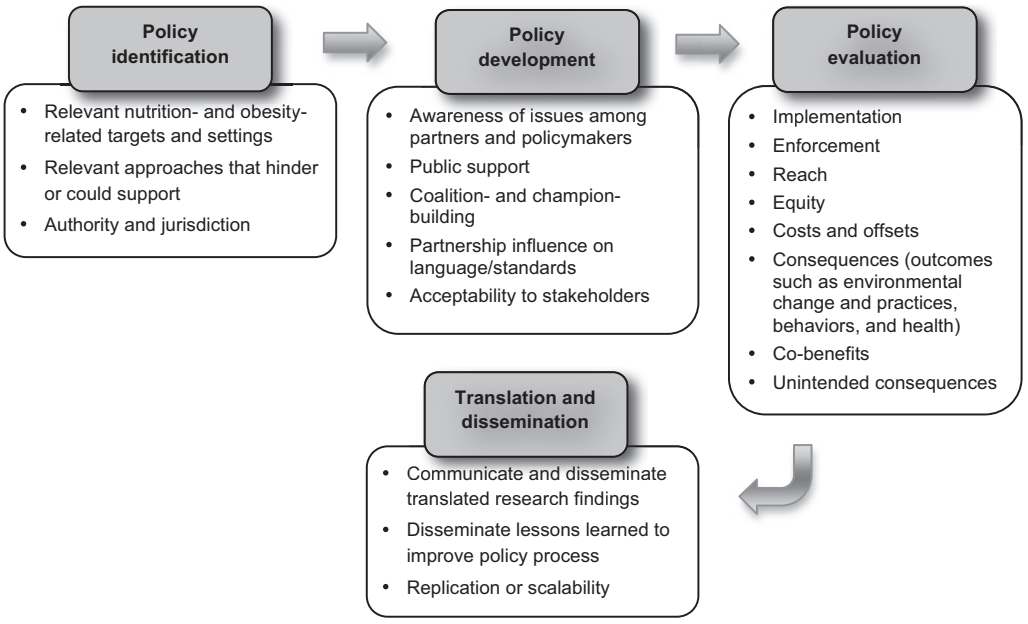

Figure 1. Nutrition and obesity policy research and evaluation framework

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.[4] 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.[5–7] 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.[8–10] 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.[11] 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.[12,13]

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

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

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)
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)
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 *colonias* (Texas A&M University)
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)
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)
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)

to foster change in societal norms.[14] 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 feasibly 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).[15] 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.[15] 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 healthy foods and beverages in early child care and education [child care], school, community, and healthcare settings); the economic environment (e.g., pricing and perceived affordability of healthier foods and beverages); social environments (e.g., family, peers, and peer networks, use of social media to create support groups); and the communication/information environment (e.g., advertisements and consumer education initiatives).[16–18]

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.[19] As discussed by Pomeranz,[20] the U.S. has state health departments 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,[21,22] 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.[23,24] However, as pointed out by Gortmaker et al.,[25] 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.[15,25,26] 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.[27] 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[28] 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.[29]

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.[30] 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.[31] This school policy assessment was highlighted in the recent IOM report, Accelerating Progress in Obesity Prevention—Solving the Weight of the Nation.[32]

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.[33–40] 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.[33] 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[40] 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.[34] 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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The Prevention Research Centers Program
Translating Research Into Public Health Practice and Impact

Kurt J. Greenlund, PhD, Wayne H. Giles, MD, MS

Chronic diseases such as heart disease, cancer, stroke, and diabetes account for seven of the ten leading causes of death in the U.S. each year, and they are leading causes of disability and impaired health-related quality of life.[1] Nevertheless, these conditions and the risk factors and behaviors related to them—for example, tobacco use, high blood pressure and cholesterol, obesity, physical inactivity, unhealthy diets—are largely preventable. We know much about the development of chronic diseases and what must be done to prevent them or at the very least greatly lower risk. To achieve greater health impact, more effective translation of prevention science into action and practice is urgently needed.

The Prevention Research Centers (PRC) program (www.cdc.gov/prc/index.htm) of the CDC provides an important role in the application, evaluation, and translation of public health research into practice.[2] The 37 PRCs, which are community-based academic research centers, conduct both formal and applied prevention research that assesses interventions (individual based as well as broader policy or environmental level) for application to communities and scalability for public health impact. The PRCs assess and disseminate effective approaches, translate research into public health practice, evaluate the impact of interventions, and develop and deliver training programs.

More than two thirds of U.S. adults and more than one third of children are considered overweight or obese.[3] Such a widespread problem requires action on the part of multiple sectors and at various levels of society. The PRCs provide a critical function for the wide-scale dissemination of public health interventions by linking those involved in public health, including local and state health departments and other government agencies such as departments of education, healthcare institutions, nonprofit organizations, and the community. In addition to receiving core funding, each PRC can further compete for Special Interest Projects (SIPs) developed by programs at CDC and the DHHS to address specific public health issues such as nutrition, physical activity, and obesity. The centers are currently carrying out more than 20 core research projects and more than 40 active SIPs that focus on obesity, nutrition, and physical activity. In 2012, it is estimated that through their work the 37 centers reached nearly 30 million people in 103 partner communities.[2]

An innovative development in the PRC program has been the formation of thematic collaborative networks. Thematic networks such as the Nutrition and Obesity Policy Research and Evaluation Network (NOPREN), for which projects are reported in this supplement to the *American Journal of Preventive Medicine*, allow PRCs to work collaboratively on major public health issues (www.nopren.org). As Blanck and Kim note in the introductory article,[4] the NOPREN aims to address research gaps related to relevant nutrition- and obesity-related policy interventions and help build the evidence base of effective policy solutions for obesity prevention with a focus on feasibility, reach, equity, cost effectiveness, and sustainability. Whereas six centers are funded as members of the network, an additional nine PRCs are involved with the network, demonstrating the importance of the issues addressed through the PRC thematic network. Furthermore, the 15 NOPREN PRC members work collaboratively with the Robert Wood Johnson Foundation's Healthy Eating Research Program in the areas of food access, corner store initiatives, and menu labeling (www.healthyeatingresearch.org) and are supported through senior advisors from the National Collaborative on Childhood Obesity Research (www.nccor.org).

The network has identified several key areas or strategies to improve environments for healthy food and beverage choices in urban, rural, and tribal areas: food policy councils and coalitions; community design and zoning strategies; financial incentives for healthy food and beverage retail venues; school, afterschool, and child care food and beverage standards and strategies; point-of-purchase information, marketing, and advertising strategies; and strategies that increase the access to drinking water in multiple settings as a substitute for sugar-sweetened bev-

From the Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia

Address correspondence to: Kurt J. Greenlund, PhD, Division of Population Health, CDC, 4770 Buford Hwy NE, MS K-45, Atlanta GA 30341. E-mail: keg9@cdc.gov.

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erages. The NOPREN projects described here show the diverse methods used in prevention research (e.g., key informant interviews, content analyses of documents, review of local policies, use of promotoras to assess the local environment, and quantitative analysis of survey data). All projects were carried out over about 2 years, showing the timeliness that can be achieved. The work of the Network is especially relevant to several critical goals set forth in the new IOM report *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*, including making healthy food and beverage options widely available, impacting marketing and messages about nutrition and physical activity, and utilizing schools as a gateway to promoting healthy weight.[3]

It is only through dissemination of effective interventions that include multiple sectors and stakeholders (e.g., state and local health departments, nonprofit organizations, education and park and recreation agencies, healthcare institutions, and academia) that addressing the epidemics of obesity and chronic disease will be effective. We applaud the work of the authors of the articles in this *AJPM* supplement for documenting the network's efforts.[5–12]

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Reversing the Obesity Epidemic
The Importance of Policy and Policy Research

Thomas A. Farley, MD, MPH, Gretchen Van Wye, PhD, MA

The British epidemiologist Geoffrey Rose wrote that "mass diseases and mass exposures need mass remedies."[1] When health problems become so prevalent that large segments of a population have them, they can stem only from social and environmental causes and can be solved only by policy and environmental solutions.

The epidemic of obesity clearly falls in this category. Two thirds of Americans are obese or overweight. The doubling of obesity in America in the past 30 years has occurred not because humans or their genes have changed, but instead because the environment has changed to one that promotes energy storage as a default. The way to reverse this epidemic is by altering that environment again, through policy and system changes that make the new default behaviors those that maintain energy balance.

Policy solutions to social problems often are controversial because of the fear of change and because of vested interests in the status quo. For example, calorie posting on menus met fierce opposition from the restaurant industry when it was introduced in 2006 in New York City.[2] That means it is particularly important to have solid data in developing public health policies.

Unfortunately, data on key questions that arise during policy development are often lacking. For example, in 2010, the New York State Office of Temporary Disability Assistance, in collaboration with the New York City's Department of Health and Mental Hygiene and Health Resources Administration, submitted a proposal to the U.S. Department of Agriculture to remove sugary drinks from the list of purchases allowable with Supplemental Nutrition Assistance Program (SNAP; formerly Food Stamp) benefits. At the time of the submission it was known that obesity was prevalent among SNAP recipients, that sugary drinks were a major contributor to obesity, and that soda accounted for almost 6% of total caloric intake in SNAP households.[3] However, there was little information available on the stores from which SNAP participants purchased their sugary drinks (e.g., supermarkets vs corner stores); the degree to which SNAP participants would respond to a restriction by purchasing sugary drinks with their own cash; or the foods and beverages SNAP participants would purchase with their redirected benefits. Because of these uncertainties, the proposal was developed as a 2-year demonstration project with a rigorous evaluation plan that would measure the impact of the policy on store sales, beneficiaries' purchases, and household consumption of sugary drinks.

It is not only this policy that requires intensive evaluation. Although it is clear that reversing the obesity epidemic will require environmental change, it is less clear which features of the environment are most important and most amenable to change, the mechanisms by which they can be changed, or the impact on energy balance in populations of changing them. It is for these reasons that we need more policy-oriented research and evaluation. This should be done at the levels at which policy is made, in the many settings that may serve as sites of intervention for environmental change, and among the populations most affected by this epidemic. The information may be obtained through routine surveillance of risk factors and outcomes, modeling to estimate the impact of potential interventions, surveys that assess public receptivity to interventions, key informant interviews of those most likely to be affected by interventions, or evaluations of policies that are changed. The raw data gathered in this research should not stop at self-report surveys but should also include measures of the environment, administrative data, and financial data.[4] This research should be conducted at the same time as, and in coordination with, actual policy development and implementation, because we cannot wait to respond to an epidemic of this magnitude until all questions are answered.

Several papers in this supplement to the *American Journal of Preventive Medicine* exemplify research that is relevant to obesity policies. Sharkey et al.[5] measured the availability and variety of snack foods and beverages in small stores in Texas border colonias. Small food stores often pack low-income neighborhoods that have high rates of obesity throughout the U.S., and there is good reason to believe that the over-abundance of the calorie-dense snack foods and sugar-sweetened beverages that they carry is a key contributor to excess weight gain. Any policy approach to addressing this over-abundance must start with a quantitative understanding of the problem.

Cradock et al.[6] and Giles et al.[7] conducted studies relevant to what ought to be the simplest of policy solutions to excess weight gain in childhood: provision of free

From the New York City Department of Health and Mental Hygiene, Queens, New York

Address correspondence to: Thomas A. Farley, MD, MPH, New York City Department of Health and Mental Hygiene, 42-09 28th Street, 8th Floor, Queens NY 11101. E-mail: tfarley@health.nyc.gov.

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drinking water to children as a healthy and calorie-free alternative to caloric beverages. Cradock et al.[6] found that existing school wellness policies typically overlook this solution, despite its costing school systems very little. Giles et al.[7] demonstrated in a group randomized controlled trial that children in after-school programs given water to drink consumed a remarkable 61 fewer calories per day from beverages, which is enough to substantially affect weight gain over time. Together, these studies point to the provision of drinking water as a clear opportunity to reduce childhood obesity, using real-world data that are of direct relevance to policymakers.

Good ideas like these do not become enacted policies on their own. They require advocates, who persuade others through formal and informal decision-making processes. These processes are crucial but often unfamiliar to public health experts. Ulmer et al.[8] and Johnson et al.[9] describe successful policymaking processes that can serve as models. Two more papers describe essential tools of advocacy: policy briefs[10] and opinion surveys.[11] Decision makers rarely read scientific journals, but they do care about results, so distilling key information for them in policy briefs is a valuable service, and designing impactful policy briefs is an under-recognized skill. Elected officials need to understand the opinions of their constituents, so opinion surveys, though not determinative, are nonetheless an important ingredient to any policy decision.

In New York City, we have developed an agenda around obesity research and evaluation that includes assessments of the retail environment, surveys of New Yorkers' attitudes and opinions about sugary drinks, and biometric characterization of the physical activity levels of residents. Research of this type, and the interaction between such research and policy implementation, will be an ongoing need until this epidemic is reversed.

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Getting Back on Tap

The Policy Context and Cost of Ensuring Access to Low-Cost Drinking Water in Massachusetts Schools

Angie L. Cradock, ScD, Cara L. Wilking, JD, Sarah A. Olliges, MS, Steven L. Gortmaker, PhD

Background: Adequate water intake may have important health benefits for schoolchildren. Layers of federal, state, and local policy are relevant to provision of water within schools. Recently passed state and federal laws require free drinking-water access for students during mealtimes.

Purpose: To review Massachusetts local district wellness policies related to water access, provide estimates of costs for three water-provision strategies, and discuss implications for policy relevant to adequate drinking-water access.

Methods: Legal research was conducted using the LexisNexis legal database and government websites. Local wellness policies were double-coded using existing research tools. Costs of three water-delivery options were estimated using a 10-year school-district perspective.

Results: Prior to 2010, most Massachusetts public school district wellness policies (92%–94%) did not address access to free drinking water. Ten-year costs per school for providing water during mealtimes to students, including dispenser unit, installation, water testing, water, cups, and labor, range between $12,544 and $27,922 (depending on water-delivery option) assuming the average Massachusetts school enrollment. Water-provision strategies relying on tap water are more economical than bottled water in the long term.

Conclusions: Policy recommendations and cost considerations deserve attention at the local, state, and federal levels. Recommendations are discussed to ensure access to safe, free drinking water for all students.
(Am J Prev Med 2012;43(3S2):S95–S101)

Background

Nearly 49 million students enroll in elementary and secondary public school programs in the U.S.[1] Adequate water intake may have health benefits for students and, potentially, an impact on obesity by providing a calorie-free source of hydration. Although multiple layers of policy are relevant to provision of water within schools, little is known about the effectiveness, impact, or implementation cost of various policy approaches to address water access and consumption. This article reviews the framework of federal, state, and local policy that historically has shaped school drinking-water access, infrastructure, and quality in Massachusetts schools; provides estimates of the costs of different water-provision strategies; and discusses implications for policy.

Water and Child Health

Despite its critical importance, research on water and its relationship to overall child health is limited. National estimates suggest that children and adolescents aged 4–19 years consume less than the recommended adequate intake of water,[2] despite the potential for cognitive and physical benefits including prevention of dehydration[3] and dental caries (with consumption of fluoridated water).[4] Water, when consumed in place of sugar-sweetened beverages, juice, and milk, is associated with reduced caloric intake.[3,5] School-based intervention studies to promote water access and consumption show water-consumption promotion is feasible in school settings,[6–10] and increased water consumption alone[7] or accompanied by decreased sugary drink consumption is associated with lower obesity risk.[11] However, in some cities, contamination in school drinking water has restricted access to plumbed drinking water.[12–14] Enabling

From the Department of Society, Human Development, and Health, Harvard School of Public Health (Cradock, Olliges, Gortmaker), and the Public Health Advocacy Institute, Northeastern University School of Law (Wilking), Boston, Massachusetts

Address correspondence to: Angie L. Cradock, ScD, Department of Society, Human Development, and Health, Harvard School of Public Health, 401 Park Drive, 4th Floor West, Boston MA 02215. E-mail: acradock@hsph.harvard.edu.

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Table 1. Key recent policy and programmatic activities influencing school water access in Massachusetts

1988	Federal LCCA signed into law establishing a remedial action program requiring states to establish a program to address lead in school drinking water
	MassDEP Lead in Schools Initiative begins
	The Consumer Product Safety Commission recalls lead-contaminated water-cooler units nationwide
	Massachusetts Department of Public Health conducts random water-quality sampling of elementary schools
	Boston Public Schools conducts districtwide water-quality testing
1996	The LCCA's remedial action program struck down by a federal court on constitutional grounds rendering it unenforceable against the states
2001	MA Healthy Schools Council, a state interagency task force, established
2003	Drinking water included in the MA Healthy Schools Council's "Checklist Concerning Environmental Health & Safety in Schools"
2004	MSBA created by statute
2005	MSBA publishes first Needs Survey Report rating school building conditions
	MassDEP Lead in Schools Initiative requests school districts conduct water-quality testing and report results
2006	Local school wellness policies required by law for schools participating in the National School Lunch Program
2010	MSBA publishes follow-up Needs Survey Report rating school building conditions
	MassDEP requests school districts test for lead and copper and report results
	Healthy Hunger Free Kids Act requires water be made available at no cost to students in food service areas (effective for the 2011–2012 school year)
2011	MA School Nutrition Bill requires water provision at no cost to students throughout the school day (effective date August, 2012)

MassDEP, Massachusetts Department of Environmental Protection; LCCA, Lead Contamination and Control Act; MA, Massachusetts; MSBA, Massachusetts School Building Authority

all children to receive the potential health and cognitive benefits of adequate, safe drinking water is a critical issue for decision makers.

Federal and Massachusetts State School Water Policies

School districts are subject to federal, state, and local laws and also have authority to adopt policies. Table 1 outlines important school water-access policy milestones for Massachusetts. School water quality emerged as a federal issue in 1988 with the Lead Contamination and Control Act (LCCA).[15] The LCCA ordered a nationwide recall of lead-contaminated water cooler units in U.S. school buildings and had a "remedial action" provision requiring states to establish programs to address lead in school drinking water.[15] Water-quality testing in Boston and other Massachusetts schools found levels of lead above the allowable thresholds for health.[16] However, a 1996 legal challenge determined the LCCAs remedial action program to be unenforceable against the states, and states were no longer required by federal law to establish programs to monitor the presence of lead in school drinking water.[17]

More recently, drinking water in schools has been addressed as a federal school nutrition issue. Under the Federal Child Nutrition and WIC Reauthorization Act of 2004, local school agencies participating in the federally funded National School Lunch Program (NSLP) were required to have a local school wellness policy including nutrition guidelines selected by the local educational agency in place by the first day of the 2006–2007 school year.[18] Districts could elect, but were not required, to address water access in these policies. When the legislation was reauthorized in 2010, schools were required to make drinking water freely available during lunch and snack programs at no cost to students beginning with the 2011–2012 school year.[19,20] Water was to be available in meal-service areas and could be provided via drinking fountains or other water sources where children could fill cups or bottles.

Massachusetts legislation and regulatory initiatives also influence school water access and quality (Table 1). In 2010, the Massachusetts state legislature required public schools to make plain, potable water available to students, free of charge, during the day, beginning with the 2012–2013 school year.[21] The Massachusetts Uniform State Plumbing Code requires a minimum of one drinking fountain per 75 students in primary and secondary

educational facilities[22] and that only potable water shall be accessible to plumbing fixtures supplying drinking water.[23] Although the plumbing code states that plumbing systems shall be maintained in accordance with state regulations,[24] local building inspectors are required to inspect only during construction, alteration, or repairs requiring a permit.[25] As a result, no uniform enforcement system is in place to ensure that school plumbing systems are maintained in proper working order.

School water-quality assessment and monitoring in Massachusetts is coordinated by the Massachusetts Department of Environmental Protection (MassDEP).[26] MassDEP periodically requests water testing and instructs schools with water-quality issues to notify parents, shut off contaminated sources, and provide bottled water from an approved supplier until water-quality concerns are addressed. Installation of point-of-use filtration devices to filter contaminants is not a practical option because, under Massachusetts law, installation of such devices triggers laws applicable to public water suppliers including water-distributor licensing, instituting testing protocols, and other regulatory provisions.[27] Schools on wells are regulated as public water suppliers and cannot use bottled water to comply with water-quality laws unless they obtain temporary approval in order to avoid health risks.[28]

Massachusetts School Building Infrastructure and Water-Quality Status

Massachusetts was home to 1757 school buildings in 2010.[29] Seventy-seven percent of Massachusetts school children attended school in buildings built before 1980,[29] 6 years prior to the 1986 national ban on the use of lead plumbing materials. During a 2009–2010 school year assessment of school plumbing systems, the Massachusetts School Building Authority (MSBA) indicated that 6% of school buildings needed major plumbing-system repairs, and 1% full system replacement (unpublished data, MSBA, 2010, on file with the authors). Thus a fraction (7%) of public school buildings may lack sufficient drinking-water infrastructure. However, local information regarding whether school-district policies have addressed access to drinking water alone or in response to quality concerns is lacking.

Methods

Legal Research Methods

Legal research was conducted using the LexisNexis legal database and Massachusetts (e.g., MassDEP, MSBA) and federal government (e.g., Environmental Protection Agency) websites. Additional information about school building infrastructure and water quality was obtained through requests to government officials via phone and electronic (e-mail) correspondence.

Local School Wellness Policy Assessment

Although local school wellness policies are nonbinding, they provided insight into Massachusetts' local drinking-water policy adoption prior to the new federal and state water requirements. According to the MA Department of Early and Secondary Education (MA DESE) website (profiles.doe.mass.edu/), 391 public school districts were operating in the 2008–2009 school year. Researchers requested copies of local school wellness policies from school administrators or district food-service directors and assessed local school wellness policies covering 307 school districts. Fifteen additional districts confirmed that their district did not have an existing policy. The overall district response rate was 82%. Responding districts enrolled 91% of students in Massachusetts.

Policies were double-coded independently by two trained research assistants using the 2008–2009 Bridging the Gap School District Wellness Policy Coding Tool, version 2.[30,31] When policies referenced other guidelines (e.g., implementation guidelines), the original guidelines were obtained and incorporated. Coding discrepancies were resolved by a third coder. Data were obtained from the MA DESE (2008–2009 school year), including student enrollment by district and by grade, and proportions of students eligible for free or reduced-price meal programs.

Cost Assessment of Water Provision

Cost information associated with providing water to students during mealtimes in Massachusetts was gathered using methods based on prior studies[32] and adapted for the U.S. setting. Costs were estimated using the perspective of the school or school district for installation of three water-delivery options: commercial bottled water cooler, tap-water dispensers (including both refrigerated and nonrefrigerated options), and plumbed drinking fountains (including both a wall-mounted water bottle filler and a water fountain). Life-cycle analysis, which assesses the initial costs, operating costs, and maintenance costs over the life cycle of a project,[33] was conducted for a 10-year period for a school with 520 students, the average school enrollment in Massachusetts.[34] Expert opinion from advocacy groups, content-area experts, local food-service directors, and other city health and education departments informed identification, quantification, and valuation of costs.[35] Assumptions regarding water consumption and numbers of water stations needed were based on expert opinion, and costs were calculated based on both a 4-ounce and an 8-ounce/meal consumption level.

Monetary values were obtained for Massachusetts, where available, or based on national or local municipal data. Specific sources are listed in Table 2. No additional costs were added to account for trash disposal of water cups. Scenarios for provision of water via water fountain do not account for the relatively lower efficiency of water delivery.[41] All costs are in 2010 U.S. dollars, and are discounted according to federal guidelines.[40]

Results

Local School Wellness Policy Assessment

In the 2008–2009 school year, 92% of Massachusetts public school districts with elementary school levels and 94% of districts with middle and high-school levels did not address access to free drinking water throughout the school day in their local school wellness policy. These

Table 2. Cost analysis for providing water access during lunch and afterschool snack in a Massachusetts public school with no existing plumbed drinking fountains in meal-service areas, 2010

	Commercial bottled water dispenser	Tap-water dispensers		Plumbed drinking water	
	Bottled water cooler (5-gallon reservoir)	Refrigerated beverage dispenser (three 5-gallon reservoirs)	Nonrefrigerated beverage dispenser (5-gallon reservoir)	Wall-mounted water bottle filler	Refrigerated water fountain
Servings per dispenser	640	1,920	640	N/A	N/A
Average MA public school enrollment during lunch and afterschool snack[a,34]	624	624	624	624	624
Dispensers needed	3	1	3	3	3
Water costs ($)[b]					
Water per student per meal (oz)[36]	4	4	4	4	4
Water ($/gal)[a,37]	0.41	0.013	0.013	0.013	0.013
Water, per year	1,439	46	46	46	46
Infrastructure costs ($)[b]					
Dispenser unit, each[a,c]	N/A	1,955	117	963	963
Dispenser installation, each[a]	N/A	1,500	N/A	2,000	2,000
Infrastructure total, 10 years	N/A	3,455	699	8,889	8,889
Other costs ($)[b]					
Cups, per year[a]	1,123	1,123	1,123	1,123	N/A
Labor, per year[a,38]	481	525	525	124	124
Electricity, per year[c,39]	30	140	N/A	N/A	150
Water testing, per 5 years	N/A	258	258	398	398
Total cost ($)[b]					
Year 1[d]	3,073	5,546	2,301	10,579	9,606
Average cost, Years 2–10[c,e]	2,761	1,673	1,582	1,201	326
Total cost over 10 years[f]	27,922	20,601	16,538	21,386	12,544

[a]Researchers estimated costs, labor, and enrollment in afterschool programs based on communication with Boston Public Schools staff and expert opinion.
[b]All costs are in 2010 dollars. Prices have been adjusted to 2010 dollars using the Consumer Price Index, U.S. Bureau of Labor Statistics. Costs after Year 1 have been discounted using real treasury 10-year interest rates for 2010 (2.2%).[40]
[c]Researchers estimated costs, energy usage, and replacement rates based on costs and specifications from the following companies: Citisco Foodservice Equipment; Global Tap; Crystal Mountain Coolers; Grindmaster Cecilware; and Hasley Taylor.
[d]Cost of dispenser units, installation, water testing, water, cups, and labor
[e]Average yearly cost, excluding initial capital purchases. Includes cost of water, labor, electricity, cups, water testing every 5 years, and replacement of dispensers if needed.
[f]All capital costs plus yearly cost of water, labor, electricity, and cups; water testing every 5 years; and replacement of dispensers if needed.
MA, Massachusetts; N/A, not applicable

districts serve 96% of Massachusetts elementary, middle, and high school students. Three percent of elementary, middle, and high school students were enrolled in districts with strong policies mandating that free water always be available throughout the school day (Table 3). In that same school year, 5% of Massachusetts public school districts with elementary schools, 3% of districts with middle schools, and 2% of districts with high schools had strong policies that met the IOM standard prohibiting all beverages with added caloric sweeteners and/or banned all competitive foods and beverages on school campuses. Table 3 depicts the proportion of students enrolled in districts in Massachusetts that have various categories of policies related to drinking water and vending machines by school level.

Water-Provision Costs

For a MA school of average enrollment without existing drinking-water infrastructure in the food-service area, first-year cost estimates to provide 4 ounces of water per student/day solely during mealtimes, depending on the water-delivery system selected, are between $2,301 and $10,579 (Table 2). Assuming children consume 4 ounces

Table 3. Percentage of students in Massachusetts school districts with wellness policies (n=307), 2008–2009 school year

	Elementary school students		Middle-school students		High-school students	
Policy focus and strength	All (n=381,541)	Eligible (n=118,136)	All (n=193,723)	Eligible (n=58,846)	All (n=255,053)	Eligible (n=79,106)
Access to free drinking water						
None	95	95	95	95	96	96
Weak[a]	2	3	2	3	2	2
Strong[b]	3	2	3	2	3	1
Regulation of vending machines						
None	34	27	34	27	36	29
Weak[a]	42	40	43	40	41	38
Strong[b]	24	33	24	33	23	33

Note: Eligible indicates those students who qualified for free or reduced-price lunch. Percentages may not add to 100 due to rounding error.
[a]Weak policies included vague terms, suggestions, or recommendations, as well as those that required action, but noted exceptions for certain grade levels or certain times of day.[42]
[b]Strong policies were definitely required and specified an implementation plan or strategy. These include both strong policy language and complete restriction (e.g., ban on vending machines or competitive foods).[42]

of water during mealtime and at snack, the 10-year costs for providing water to students, including dispenser unit, installation, water testing, water, cups, electricity, and labor are $27,922 for commercial bottled water coolers, $20,601 and $16,538 for refrigerated and nonrefrigerated tap-water dispensers (respectively), and $21,386 and $12,544 for plumbed wall-mounted water bottle filler and refrigerated water fountain (respectively). Using the alternative assumption that school students each consume 8 ounces of water during meal and snack periods, 10-year costs would be $40,996 for commercial bottled water coolers, $21,015, and $16,952 for refrigerated and nonrefrigerated tap-water dispensers, and $21,800 and $12,959 for plumbed wall-mounted water bottle filler and refrigerated water fountain (respectively). Statewide, between $1.1 and $1.3 million in local district expenditures in the first year will be needed if the 7% of Massachusetts schools classified by the MSBA as either in need of major plumbing-system repair or replacement were to implement capital plumbed drinking fountain improvements making drinking water available to students during lunch and snack times.

Discussion

Prior to the 2010 federal requirements for the provision of free drinking water to students during mealtimes,[42] few Massachusetts local school district wellness policies addressed water provision. Between 4% and 5% of all Massachusetts students were enrolled in districts that were identified as having any policy provisions related to providing free drinking water to students. Nationally, 12%–13% of students were enrolled in districts that addressed availability of free drinking water.[31] For many districts in Massachusetts, the original wellness policy drafting process was a missed opportunity to address water availability; relatively more attention was focused on access to competitive foods and beverages via vending.

Beginning with the 2012–2013 school year, Massachusetts schools will be required to provide water during mealtimes *and* throughout the school day at no cost to students.[21] Based on an estimated first-year cost of between $2,301 and $10,579 for 4 ounces of water provided during mealtimes alone, school districts must consider longer-term costs in developing strategies to meet these requirements. Although recent intervention studies suggest similar volumes of water consumption when water is provided during mealtimes or snack times in conjunction with education and promotion activities,[36,43] 4 ounces of water per meal per student may be suboptimal for hydration and health benefits. Assuming students receive approximately one third of daily nutrition requirements in school via school meals programs, adequate consumption levels of plain drinking water during school could be 8–12 ounces per day[2] with accompanying higher cost.

Given the potential cost impact, as well as the health and cognitive benefits for children that accompany adequate access to safe drinking water, local, state, and federal leaders must consider several factors. First, availability of safe drinking water in school buildings will be necessary to implement federal and state drinking-water policies; second, oversight, sources of financial support, and technical assistance for local agencies will be needed

to ensure compliance. Reforms may be needed at the school district, state, and federal levels to ensure access to low-cost drinking water in school settings.

Implications for School Districts

Decisive action is needed in school districts with water-quality issues stemming from inadequate infrastructure. District drinking-water policies and local school wellness policies can be written to require remediation and repairs to bring school buildings into compliance with plumbing-code requirements and relevant state laws. Although bottled water may be necessary in the short term to protect the health and safety of children in buildings with water-quality concerns, it is not the preferred long-term approach. The analysis of water provision during mealtimes alone indicates that upfront and capital 1-year costs of bottled water are on par with tap-water dispensers. However, based on 10-year operational cost estimates, provisions that rely on safe, quality tap water, whether chilled or otherwise, have considerably lower cost. Case-study examples of school efforts to provide water to students are available at the Water in Schools website (www.waterinschools.org/).

Implications for State and Federal Policy

Massachusetts' relatively robust set of mandates for drinking-water access in schools could be strengthened by reforms to align water access in schools with the existing plumbing code, discourage the long-term use of bottled water, propose enforcement mechanisms, and provide for repairs. New regulations pertaining to drinking-water access in schools should support existing code requiring one plumbed drinking fountain per 75 students and ensure water-quality standards. One enforcement strategy is to incorporate drinking-water evaluation criteria in the school certification process.[44] Capital funding may be needed to reactivate plumbed drinking-water infrastructure potentially supported by policy actions prompting the state agency that allocates state funds for new school buildings and repairs to prioritize drinking-water infrastructure upgrades and repair.

Prior to 2010, federal policy largely was silent on the issue of drinking water in schools. Current federal school nutrition policy only addresses access to water in areas where meals, including lunch and snack, are served. Nationally, a policy shift is required to recognize access to safe drinking water throughout the school day as a core part of school nutrition as has been done in Massachusetts. Although passage of the LCCA in 1988 brought attention to school water quality and spurred testing, the LCCA's currently unenforceable remediation provisions could be revitalized if federal funding for plumbing infrastructure upgrades in school buildings is made available and tied to compliance with the substantive portions of the law.

Limitations and Study Considerations

Estimates of costs of updating drinking-water infrastructure in Massachusetts are based on the best available evidence. There is limited comprehensive and detailed information on current drinking-water infrastructure and quality or other types of local school drinking-water policies in public schools throughout Massachusetts. Reporting of water-testing results is requested, but not mandated, by state authorities. Estimates of costs of water-delivery options in 2010 dollars are specific to Massachusetts and may fluctuate based on existing drinking-water infrastructure.

Additionally, scenarios for the provision of water via a water fountain without making a cup available do not account for lower efficiency of water delivery via a water fountain and may underestimate actual water cost. Estimates from a 1978 study suggest that water fountain users consume approximately 1.8 ounces per 3–6 second use time but that water wastage can be extensive.[41] Providing cups at plumbed drinking-water fountains, currently not required by federal law, may improve efficiency and signal a water-delivery system that also can be used at a lower cost than bottled water throughout a school building.

Conclusion

Reforms at the school district, state, and federal levels will help ensure access to low-cost drinking water in school settings. Water-provision strategies that rely on safe, quality tap water have considerably lower long-run cost. Key state agencies with oversight of school building environments and public health must determine the scope of need and prioritize interventions within districts. Water quality and access could be included as part of school licensing and accreditation processes. State environmental-protection agencies might consider targeted water-quality testing, prioritizing older school buildings or those that have identified need. Ensuring safe, free drinking water in school buildings will be essential to the success of water-promotion activities.

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Support Among U.S. Adults for Local and State Policies to Increase Fruit and Vegetable Access

Jennifer L. Foltz, MD, MPH, Diane M. Harris, PhD, MPH, Heidi M. Blanck, PhD

Background: Few American children or adults meet national objectives for consumption of both fruits and vegetables (FV). State and local policies that support community access to FV can help support individuals and families in having easier access to FV for purchase and ultimately consumption.

Purpose: To assess U.S. adult support for state and local policies designed to increase community-level access to FV.

Methods: Data were analyzed from the 2008 HealthStyles survey of U.S. adults (N=5181), in which participants were asked how likely they would be to support four types of changes to local or state policies: those that would create farmers' markets and community gardens, or increase FV offerings in small stores and public sector venues. Respondents' answers were collapsed into three categories ("supportive," "neutral," and "unsupportive"); the prevalence of support for each type of policy was determined, and logistic regression was used to calculate ORs for support of each by selected demographic variables.

Results: Overall, 62.1% supported farmers' markets, 57.7% supported the public sector, 54.3% supported small stores, and 47.2% supported community garden policies. Support for policy changes was relatively high among women, Hispanics, and non-Hispanic blacks.

Conclusions: Although some variation in support exists, the majority of Americans support state or local policy changes designed to increase community access to FV. Future research should augment this work by including questions on willingness to pay, trade-off methods, or referendum-style questions to inform priorities among FV policy initiatives.

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Background

A balanced diet high in fruits and vegetables (FV) has been associated with a reduced risk for several leading causes of death and found to play a role in weight management[1,2]; however, few children and adults consume recommended amounts.[3,4] Residence in neighborhoods with poor access to healthier foods such as FV has been associated with poorer diet quality, obesity, and chronic disease.[5,6] Improving access and promotion of a wide variety of affordable, high-quality FV may allow families to choose and consume more FV.[7] Policy and environmental approaches to increase consumption include expanding farm-to-consumer programs in venues such as farmers' markets; improving access to and products sold in retail venues (stores); ensuring ready access to FV in worksite food service; and supporting community gardens.[5,8,9] Few policies are documented to currently exist that address FV access.[10]

Although policies could help improve U.S. adult access to FV, such policies may not be developed or enacted without evidence of effectiveness and/or public backing.[11] To the authors' knowledge, the degree of support for local or state policy changes designed to increase FV access has not been previously assessed on a national scale. The present study therefore assessed U.S. adult support for policies that may increase community-level FV access and tested for differences by sociodemographic characteristics.

From the Epidemic Intelligence Service (Foltz) and Division of Nutrition, Physical Activity, and Obesity (Foltz, Harris, Blanck), CDC, Atlanta, Georgia

Address correspondence to: Jennifer L. Foltz, MD, MPH, Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC, 4770 Buford Hwy NE, MS K-25, Atlanta GA 30341-3724. E-mail: jfoltz@cdc.gov.

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Methods

The 2008 HealthStyles consumer panel survey of U.S. adults aged ≥18 years was used for this study. The Styles surveys were developed by Porter Novelli, a social marketing and public relations firm, with input from agencies including the CDC, which aided in survey-question development. Styles 2008 is a population-based market research survey administered in two waves. The first, ConsumerStyles, is a survey about general media habits, product use, interests, and lifestyle. The second survey, HealthStyles, focuses on health orientations and practices. The sampling and data collection are conducted by Synovate, Inc., an international research company, which recruits and maintains a demographically representative panel of 340,000 individuals who have agreed to participate in periodic mail surveys. Demographic data were collected at the time of recruitment into the panel.

From May through June 2008, the ConsumerStyles survey was mailed to a stratified random sample of 20,000 panel members; 10,108 returned the survey (response rate=51%). From those, a random sample of 7000 was chosen to receive the second-wave HealthStyles survey from July through August 2008. The main sample (n=5500) was balanced as to age, gender, marital status, race/ethnicity, region, household size, and population density. In addition to the main sample, a low-income/minority supplementary sample (n=1500) was oversampled to ensure adequate representation of this group. Data on degree of policy support were collected as part of the HealthStyles survey. Responses were received from 5399 individuals (response rate=77%).

Participants were asked to indicate on a 5-point Likert-type scale (*very likely*, *likely*, *neutral*, *unlikely*, or *very unlikely*) how likely they would be to support changes to local or state policies that would do each of the following: (1) create local community markets or farmers' markets; (2) create a program that helps small food stores have fresh FV; (3) create community gardens or plots for raising FV; and (4) require city/county government agencies to favor the purchase of locally grown FV to serve in cafeterias and at meetings (i.e., policies that increase FV in public sector venues).

Statistical Analysis

Frequencies of being supportive (*very likely* and *likely*); neutral; and unsupportive (*unlikely* and *very unlikely*) were assessed overall and by demographic characteristics (Table 1), including region of the U.S. (based on Census Bureau divisions)[12] and population density (nonmetro, metro <500,000; metro 500,000–1,999,999; metro ≥2,000,000). Logistic regression was used to test for associations and determine AORs and 95% CIs of being supportive versus neutral/unsupportive by demographic subgroups. Population density was included in the final adjusted model; however, the results are not presented because of little variation in support.

A weighting variable was used so that results reflected U.S. Census proportions based on the 2007 Current Population Survey. Respondents who had missing data for any question about proposed changes or selected demographics were excluded (n=218). The final analytic sample included 5181 individuals. Data were analyzed with SAS, version 9.2, using appropriate methods to account for the sampling design.

Results

The overall prevalence of support for the proposed policy changes intended to increase FV access ranged from 47.2% to 62.1%; further, 25.0%–29.5% of respondents were neutral toward the proposed changes, and 12.3%–23.3% were unsupportive (Figure 1). Support was highest for farmers' markets policies (62.1% overall; range by demographic subgroup=55.5%–67.6%), followed by public sector policies (57.7%; range=49.5%–67.7%); small stores (54.3%, range=43.9%–64.3%); and community gardens (47.2%, range=38.0%–57.9%; Table 1). Variation in support was found among subgroups.

Adjusted logistic regression results showed women to be more supportive of farmers' markets and public sector policies than men (Table 2). Compared to non-Hispanic whites, Hispanics were more likely to support small stores, public sector, and community gardens policies, and non-Hispanic blacks were also more likely to be supportive of small stores and community gardens policies. Lower-income subgroups tended to be more supportive compared to those with a household income ≥$85,000, especially for small stores and community gardens policies. College graduates were more supportive of farmers' markets policies than all other education categories. Finally, as compared to residents in the Pacific region, those who were more supportive were residents of the Middle Atlantic, South Atlantic, and East South Central region; prevalence of support was also high across strategies in the West South Central region.

Discussion

Americans generally favored policy changes to increase community FV access, with some options being more popular than others such as farmers' markets. Across subgroups, almost half or more were supportive of FV access policies. Few respondents were unsupportive, and most respondents who did not support these policies were neutral rather than unsupportive. They represent a group that may with further information formulate an opinion on these policies. Even though policymakers may consider policy change, many have noted that such changes are unlikely to be implemented without political will and popular support.[11] As the findings of the present study indicate substantial public support for FV policies exists, increased FV access through policy change may be one approach to improve diet and reduce obesity and risk for chronic disease.

Some variation in support existed by demographic factors. In general, findings indicated that support for policy changes was relatively high among women, blacks and Hispanics, younger adults, people with lower incomes, and residents of the East South Central, West South

Table 1. Percentage of U.S. adults who were unsupportive, neutral, and supportive of fruit and vegetable policy changes by demographic characteristics, HealthStyles 2008 survey

Demographic characteristics	Total *n* (%)	Farmers' markets			Small stores			Community garden			Public sector		
		U	N	S	U	N	S	U	N	S	U	N	S
Total	5181 (100)	12.3	25.6	62.1	17.3	28.4	54.3	23.3	29.5	47.2	17.3	25.0	57.7
Gender													
Female	2877 (55.5)	10.7	24.6	64.7	15.4	28.0	56.6	20.8	30.0	49.2	14.1	25.5	60.4
Male	2304 (44.5)	14.0	26.6	59.4	19.5	28.8	51.8	26.0	28.9	45.1	20.8	24.5	54.7
Age (years)													
18–34	633 (12.2)	12.7	28.1	59.1	15.9	27.6	56.5	19.8	31.9	48.3	14.9	25.6	59.6
35–44	1045 (20.2)	10.2	25.4	64.4	15.4	28.9	55.7	21.3	31.0	47.8	15.2	24.9	59.9
45–54	1587 (30.6)	12.4	25.1	62.5	17.3	29.7	53.0	21.8	29.2	49.0	16.6	26.5	57.0
55–64	957 (18.5)	11.4	22.7	65.9	18.0	27.4	54.6	24.5	28.3	47.1	18.9	25.0	56.1
≥65	959 (18.5)	14.4	24.4	61.2	21.8	28.5	49.7	33.3	24.5	42.2	24.1	22.2	53.7
Race/ethnicity													
Non-Hispanic black	639 (12.3)	7.4	30.6	62.0	8.6	27.1	64.3	14.3	28.4	57.3	8.1	29.8	62.0
Hispanic	629 (12.1)	12.5	25.6	62.0	14.4	25.4	60.2	17.4	24.7	57.9	12.8	22.6	64.6
Other	381 (7.4)	11.0	26.7	62.2	15.0	29.9	55.0	20.9	26.6	52.5	16.4	30.5	53.1
Non-Hispanic white	3532 (68.2)	13.2	24.6	62.2	19.6	29.0	51.4	26.2	30.9	42.9	19.9	24.2	56.0
Household income ($)													
<25,000	1373 (26.5)	15.2	27.1	57.8	16.4	23.8	59.8	21.3	27.4	51.3	16.7	22.1	61.2
25,000–59,999	1117 (21.6)	10.6	25.2	64.2	16.1	29.1	54.8	23.2	27.5	49.3	14.4	26.5	59.1
60,000–84,999	1299 (25.1)	10.6	25.1	64.3	17.1	28.7	54.2	22.6	32.6	44.9	17.2	24.0	58.9
≥85,000	1392 (26.9)	12.8	25.2	62.0	20.0	31.9	48.1	26.3	30.4	43.3	21.3	27.6	51.1
Education													
Less than high school	342 (6.6)	13.0	31.5	55.5	14.6	30.6	54.9	16.8	33.0	50.2	11.8	24.5	63.8
High school graduate	1323 (25.5)	15.2	28.5	56.3	17.3	28.8	54.0	26.6	27.6	45.9	17.7	24.1	58.2
Some college	1924 (37.1)	11.1	26.1	62.8	16.1	27.8	56.1	21.0	31.0	48.1	15.9	24.7	59.4
College graduate	1592 (30.7)	11.4	21.8	66.8	19.4	28.3	52.2	25.1	28.4	46.5	19.8	26.1	54.0
Region													
New England	168 (3.2)	16.8	25.9	57.3	20.6	35.0	44.4	29.5	28.5	41.9	25.4	25.0	49.5
Middle Atlantic	784 (15.1)	9.8	25.8	64.4	12.4	29.4	58.2	23.1	24.9	52.0	14.2	24.1	61.7
East North Central	875 (16.9)	13.9	26.3	59.8	18.4	24.5	57.1	23.6	31.8	44.6	18.5	23.3	58.2
West North Central	338 (6.5)	18.5	21.8	59.7	22.6	29.6	47.7	23.6	29.1	47.4	21.0	26.7	52.3
South Atlantic	1008 (19.5)	8.9	25.5	65.6	13.9	30.3	55.8	21.7	31.5	46.8	16.6	26.4	57.0
East South Central	326 (6.3)	8.8	23.5	67.6	13.8	24.5	61.7	19.5	27.5	52.9	11.7	20.6	67.7
West South Central	546 (10.5)	10.1	26.1	63.8	13.2	26.5	60.3	21.1	25.3	53.5	14.3	24.6	61.2
Mountain	400 (7.7)	16.4	27.9	55.7	22.8	26.9	50.3	27.9	34.1	38.0	22.1	25.4	52.5
Pacific	736 (14.2)	14.5	25.8	59.7	24.9	31.2	43.9	24.5	30.7	44.8	18.7	27.9	53.4

Note: Proportions are weighted. Weighting variable is based on gender, age, income, race, and household size so that results reflected U.S. Census proportions based on the 2007 Current Population Survey.
N, neutral; S, supportive; U, unsupportive

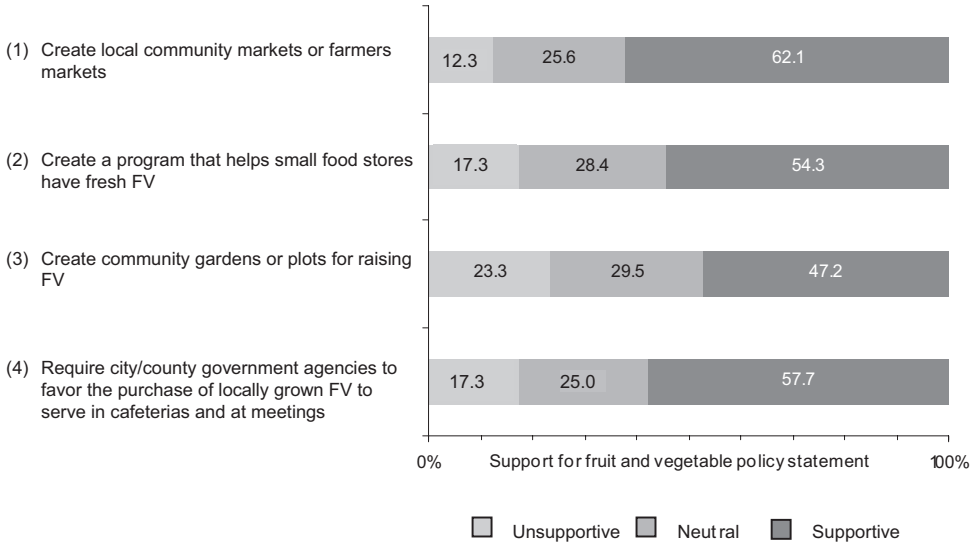

Figure 1. Proportion of support for each statement about FV access policies

Note: Respondents were asked: *How likely would you be to support changes to local or state rules or policies that would do each of the following?*
FV, fruits and vegetables

Central, and Middle Atlantic regions. Some subgroups with relatively high support for policy changes were the same subgroups who have been found to have lower FV consumption and/or access.[3,5] Policies aimed to increase affordable FV access, though potentially beneficial to all Americans, may be most useful for disparate populations.

Policy support may have differed had respondents been provided with descriptions and potential benefits or actions for each policy approach. Farmers' markets provide economic opportunity, link urban and rural economies, promote public health, create active public space, and bring together diverse people.[13] Supporting the creation of farmers' markets with subsidies and zoning policies provides increased FV offerings. Also, benefits of farmers' markets may be extended for low-income people, who may have lower vegetable consumption,[3] by policies that encourage markets to install Electronic Benefits Transfer machines, accept Supplemental Nutrition Assistance Program benefits, and establish programs that offer voucher coupons for FV purchase.[14] Policies that increase FV in small stores such as smaller convenience stores, corner stores, and specialty stores have been another approach to improve FV access, especially in food deserts. Policymakers can support and promote state policies that offer healthy-food retailers incentives like tax exemptions and credits,[15] improve transportation to these venues, upgrade store facilities to carry more forms of FV, and increase supply and shelf space dedicated to quality and affordable FV.[10] Additionally, policies supporting community gardens can increase FV consumption through education and engagement as well as access for some individuals because of proximity. Policymakers can examine and modify existing zoning regulations relevant to community gardens and/or develop new regulations as necessary. Finally, policies designed to increase FV purchase in government worksites can support production of locally grown FV, improve access for workers, and serve as a model for other worksites. Food-service and meetings' policies may be established to promote FV, require a certain proportion of FV, or encourage preferential pricing for FV. Those who are employed spend an average of 7.5 hours working daily[16]; thus, a substantial portion of food may be consumed at work.

Previous studies on support for public health policies related to chronic disease can be informative for FV policy research. Support for breastfeeding policies in various settings ranges from 27% to 52% among Americans overall; support was generally higher among African Americans and those with lower household incomes.[17] Support for a tax on sugary drinks ranges from 37% to 72%; support was highest when respondents were told the revenue would be used for obesity prevention.[18] Thus, the level of support in the current study is at a prevalence that might be expected for public health policies, subgroups indicating support were similar across studies, and explanations can increase support. In another study[19] on public opinion, the U.S. regions with the highest level of support for workplace breastfeeding policies also had high levels of public knowledge about breastfeeding and positive attitudes toward it. Additionally, longitudinal study results have shown that implementation of smoking restrictions in public places tended to be more comprehensive in areas with more favorable attitudes and strong support for comprehensive regulations.[20] Findings suggest that among people who understand the

Table 2. Odds of supporting[a] fruit and vegetable policy changes among U.S. adults by demographic characteristics, AOR (95%CI)

Demographic characteristics	Farmers' markets	Small stores	Community garden	Public sector
Gender				
Female	1.29 (1.08, 1.53)[b]	1.14 (0.96, 1.36)	1.09 (0.93, 1.29)	1.22 (1.03, 1.45)[b]
Male (ref)	—	—	—	—
Age (years)				
18–34	0.85 (0.65, 1.11)	1.13 (0.86, 1.48)	1.12 (0.86, 1.46)	1.12 (0.85, 1.48)
35–44	1.07 (0.86, 1.32)	1.19 (0.97, 1.46)	1.18 (0.96, 1.45)	1.23 (1.00, 1.51)
45–54	1.04 (0.86, 1.25)	1.15 (0.96, 1.38)	1.34 (1.11, 1.61)[b]	1.16 (0.96, 1.39)
55–64	1.20 (0.98, 1.47)	1.20 (0.99, 1.47)	1.23 (1.01, 1.50)	1.10 (0.90, 1.34)
≥65 (ref)	—	—	—	—
Race/ethnicity				
Non-Hispanic black	0.93 (0.69, 1.25)	1.48 (1.09, 2.00)[b]	1.59 (1.20, 2.11)[b]	1.13 (0.84, 1.52)
Hispanic	1.10 (0.82, 1.46)	1.49 (1.14, 1.94)[b]	1.84 (1.41, 2.40)[b]	1.40 (1.07, 1.83)[b]
Other	1.03 (0.74, 1.43)	1.30 (0.94, 1.79)	1.53 (1.09, 2.15)[b]	0.96 (0.68, 1.34)
Non-Hispanic white (ref)	—	—	—	—
Household income ($)				
<25,000	1.00 (0.77, 1.29)	1.47 (1.13, 1.90)[b]	1.37 (1.07, 1.77)[b]	1.28 (0.99, 1.65)
25,000–59,999	1.26 (0.99, 1.61)	1.23 (0.98, 1.55)	1.28 (1.02, 1.61)[b]	1.23 (0.98, 1.55)
60,000–84,999	1.21 (0.98, 1.49)	1.26 (1.02, 1.54)[b]	1.09 (0.89, 1.34)	1.30 (1.06, 1.60)[b]
≥85,000 (ref)	—	—	—	—
Education				
Less than high school	0.62 (0.40, 0.97)[b]	0.83 (0.53, 1.32)	0.89 (0.57, 1.37)	1.25 (0.80, 1.97)
High school graduate	0.59 (0.48, 0.74)[b]	0.88 (0.71, 1.10)	0.86 (0.69, 1.07)	1.04 (0.83, 1.29)
Some college	0.80 (0.65, 0.99)[b]	1.02 (0.83, 1.25)	0.96 (0.79, 1.18)	1.12 (0.91, 1.37)
College graduate (ref)	—	—	—	—
Region				
New England	0.93 (0.55, 1.57)	1.11 (0.69, 1.80)	1.03 (0.64, 1.66)	0.84 (0.50, 1.41)
Middle Atlantic	1.28 (0.94, 1.76)	1.86 (1.36, 2.55)[b]	1.46 (1.08, 1.99)[b]	1.42 (1.03, 1.95)[b]
East North Central	1.05 (0.76, 1.44)	1.70 (1.25, 2.31)[b]	1.07 (0.79, 1.45)	1.15 (0.84, 1.57)
West North Central	0.98 (0.66, 1.45)	1.18 (0.80, 1.75)	1.26 (0.85, 1.85)	0.92 (0.63, 1.36)
South Atlantic	1.33 (1.01, 1.75)[b]	1.59 (1.21, 2.09)[b]	1.11 (0.85, 1.46)	1.11 (0.84, 1.46)
East South Central	1.45 (0.93, 2.24)	1.95 (1.30, 2.93)[b]	1.43 (0.96, 2.13)	1.64 (1.08, 2.49)[b]
West South Central	1.21 (0.88, 1.65)	1.80 (1.32, 2.44)[b]	1.34 (0.99, 1.82)	1.20 (0.88, 1.65)
Mountain	0.81 (0.57, 1.14)	1.27 (0.89, 1.82)	0.76 (0.54, 1.06)	0.89 (0.62, 1.26)
Pacific (ref)	—	—	—	—

Note: Logistic regression model adjusted for gender, age, race/ethnicity, household income, education, region, and population density.
[a]Odds of supporting (versus neutral or unsupportive)
[b]95% CI does not include 1

rationale for implementing policies and experience the benefits, public support and compliance increases over time.[20] Lastly, results of a study among officers responsible for enforcing laws restricting youth access to tobacco showed that those who supported the laws were more likely to enforce them.[21] The success of policies designed to increase public access to FV may similarly depend on the support of those charged with implementing the policies.

The data analyzed in the current study did not include questions on how much respondents would be willing to pay for policy initiatives. Other areas of study such as gun control and health insurance have used the approach of public economics such as contingent valuation.[22] However, no other studies were found that had this information specific to FV policies to help interpret the findings of the present study. Future research could benefit from this type of assessment.

Key components of a contingent-valuation study that would help the likelihood of producing reliable results[23] include the use of referendum formats that ask respondents to vote on a hypothetic government program; for example: *Suppose that you were asked to vote for or against a new program in your state to increase FV offerings. This program would make it easier for families to purchase quality produce. It would improve diets and help reduce obesity by X%, but taxes would be increased to pay for it. If it would cost you an extra $X in annual taxes would you vote for or against this new program?* Other techniques that could be tried include: trade-off methods (whether a person values A over B [e.g., a farmers' market over a community garden]) or establishing a basic budget and using that context with questions such as, *Would you be willing to pay $X for a farmers' market?* It should be noted that some economic researchers have trepidation about contingent-valuation research overall in that respondents have no incentive to take questions seriously because they relate to theoretic situations.

Limitations

This study had limitations. As discussed, there was no elaboration on questions or definitions for respondents who were unfamiliar with FV access policies. Further, the questionnaire did not explore if respondents would take monetary or nonmonetary actions to support policy development, such as joining a coalition, writing their congressman, or submitting an editorial. In addition, there are limitations in the survey approach. Although the sample was selected randomly from a stratified consumer panel, this sampling design may have certain nonrandom characteristics that affect its representativeness of the general U.S. population. However, the strength of the sample is that it is population-based, has an adequate sample size to stratify, and is weighted to represent the distribution of the U.S. population. Additionally, the survey questions are novel and this may be the first nationwide survey to assess popular support for FV access policies.

Conclusion

This snapshot of Americans' opinions found almost half supporting various state or local policy changes to increase community access to FV. Further research on inclusion of costs and willingness to pay or through a referendum approach could benefit this area of policy research.

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Convenience Stores and the Marketing of Foods and Beverages Through Product Assortment

Joseph R. Sharkey, PhD, MPH, RD, Wesley R. Dean, PhD, Courtney Nalty, MSPH

Background: Product assortment (presence and variety) is a key in-store marketing strategy to influence consumer choice. Quantifying the product assortment of healthier and less-healthy foods and beverages in convenience stores can inform changes in the food environment.

Purpose: To document product assortment (i.e., presence and variety of specific foods and beverages) in convenience stores.

Methods: Observational survey data were collected onsite in 2011 by trained *promotora*-researchers in 192 convenience stores. Frequencies of presence and distributions of variety were calculated in 2012. Paired differences were examined using the Wilcoxon matched-pairs signed-rank test.

Results: Convenience stores displayed a large product assortment of sugar-sweetened beverages (median 86.5 unique varieties); candy (76 varieties); salty snacks (77 varieties); fried chips (44 varieties); cookies and pastries (19 varieties); and frozen sweets (21 varieties). This compared with 17 varieties of non–sugar sweetened beverages and three varieties of baked chips. The Wilcoxon signed-rank test confirmed a ($p<0.001$) greater variety of sugar-sweetened than non–sugar-sweetened beverages, and of fried chips compared with baked chips. Basic food items provided by convenience stores included milk (84% of stores); fresh fruit (33%); fresh vegetables (35%); canned vegetables (78%); white bread (71%); and deli-style packaged meat (57%). Healthier versions of milk, canned fruit, canned tuna, bread, and deli-style packaged meat were displayed in 17%–71% of convenience stores.

Conclusions: Convenience stores in this area provide a greater assortment of less-healthy compared with healthier foods and beverages. There are opportunities to influence consumer food choice through programs that alter the balance between healthier and less-healthy foods and beverages in existing convenience stores that serve rural and underserved neighborhoods and communities.
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Introduction

The prevalence of childhood obesity has increased steadily over the past 2 decades, and this trend has been more marked among socioeconomically disadvantaged groups, such as Mexican-American children, than among the general population.[1] Studies of Mexican-origin households in economically deprived Texas–Mexico border areas have shown an association between obesity and the severity of food insecurity.[2] Overall, childhood obesity and reduced diet quality have paralleled the growth in consumption of less-healthy snack foods and sugar-sweetened beverages.[3]

A recent study in the Texas border region found that Mexican-origin children who reported very low food security consumed greater amounts of calories, fat, and added sugars than food-secure children.[4] In response to an imbalance in availability between healthier and less-healthy foods, research has focused on aspects of the neighborhood food environment, primarily spatial access to supermarkets.[5] However, convenience stores may provide greater access to foods and beverages than supermarkets or small grocery stores and thus influence food choice and consumption, especially in underserved areas and among children and adolescents.[6–10]

Limited access to healthier food is being addressed in urban areas through a variety of policy options to

From the Program for Research in Nutrition and Health Disparities and Texas Nutrition and Obesity Policy Research and Evaluation Network Collaborating Center, School of Rural Public Health, Texas A&M Health Science Center, College Station, Texas

Address correspondence to: Joseph R. Sharkey, PhD, MPH, RD, School of Rural Public Health, MS 1266, College Station TX 77843-1266. E-mail: jrsharkey@srph.tamhsc.edu.

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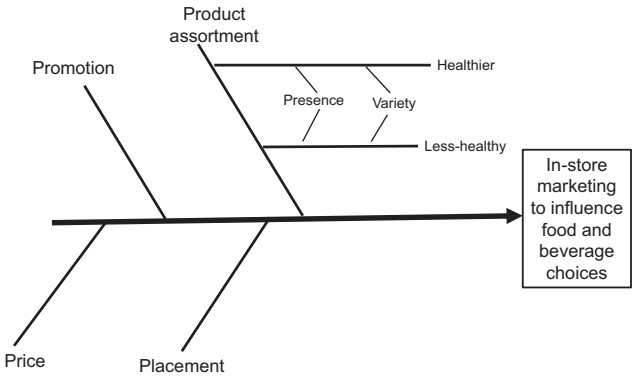

Figure 1. Conceptual model of in-store marketing strategies

increase spatial access to a wider variety of healthier foods through store placement by encouraging the location of supermarkets and/or restricting fast foods.[11] However, these policy options overlook in-store marketing of foods and beverages, which influences consumer behavior.[12–14] There are four main in-store marketing strategies that are understood to influence food and beverage choice: product assortment, placement, promotion, and price (Figure 1).[15,16] As a key marketing strategy, product assortment (product presence and variety) is used to influence consumer choice and increase sales once customers are in the store, and is the focus of the present study.[15,16]

The frequent purchase of items, such as less-healthy (energy-dense) snack foods and sugar-sweetened beverages, results from multiple trips to conveniently located stores. These products are also considered impulse items, and their purchase is more susceptible to in-store decision making than basic products, such as bread and milk.[14] In many areas, convenience stores, which primarily retail limited categories of foods, are the most prevalent food-access points and offer the least access to healthier foods.[8,17,18]

In rural and underserved areas, convenience stores located within walking distance from home provide ample opportunity for frequent use by children and families with limited transportation and greater intra-month variation in household food supplies.[8,19] In the Texas border region, there is much greater spatial access, in terms of proximity (minimum distance) and coverage (number of different opportunities), to convenience stores than to other types of retail food stores (supercenters, supermarkets, grocery stores, or dollar stores).[8] For example, the median distance to the nearest convenience store was 0.08 miles (compared with 3 miles to a supermarket or supercenter), whereas the median number of convenience stores within 1 neighborhood mile was two (compared with no supermarkets or supercenters).[8]

Since convenience stores are smaller than supermarkets or grocery stores and have limited display space, the cumulative shelf-space availability (product assortment) of both healthier and less-healthy foods and beverages is important.[20] However, there are apparently no studies that examine the presence and variety of foods and beverages in convenience stores, especially in areas that serve the growing population of Mexican-origin children and adults, such as the expanding *colonias* (substandard residential areas developed from subdivided agricultural lands in response to a deficit in low-income housing) along the Texas–Mexico border.[8] Sugar-sweetened beverages and less-healthy snack foods, such as chips, cookies, and candy, are not usually present in *colonia* households[19]; however, Mexican-origin children regularly purchase beverages and snacks for immediate consumption, most frequently from neighborhood convenience stores (JRS, unpublished observations, 2012). This is similar to prior reports that among children, intake of unhealthy snacks, such as high fat/sugar snacks, cookies, candies, and carbonated/sugared beverages was positively associated with purchase by children themselves.[10,21]

Although there are a number of regulatory and taxing policy options to reduce consumption of less-healthy snacks and sugar beverages, a voluntary approach is being utilized in urban corner stores.[17] Cultural and economic acceptability by customers and storeowners, degree of in-store change in stocking, and sustainability beyond the intervention have been key to the success of these approaches.[17] However, it is unclear how urban corner store approaches will translate into policy development and adoption by convenience stores in low-income *colonia* areas. Factors that influence the various decisions behind food-purchasing behavior must be well understood in order to develop policies and guidance for convenience stores in rural and underserved areas that will help eliminate barriers to healthy eating and improve the availability of healthier foods to children. As a first step, this formative study uses observations of product assortment completed within Texas-border convenience stores to directly measure the presence and variety of beverages and foods.

Methods

Setting

The Hidalgo County TX study area included communities and small towns that ranged in population from <1000 to ~35,000; greater than 90% of the population is of Mexican origin.[22] Much of the area is located outside a small town or city, with legal authority at the county level. Using the 2007 North America Industry Classification System (NAICS) and prior experience gained from ground-truthing,[8,23] the convenience store category included con-

venience stores (code 445120); meat markets (code 445210); and gasoline stations with convenience stores (code 447110).

In 2011, all roads in the study area were driven systematically by four *promotora*-researchers (indigenous community health workers trained in research methods) to identify convenience stores or food marts (n=198) that primarily engage in retailing a limited line of goods that generally include milk, bread, soda, and snacks. Teams of two *promotora*-researchers entered each store and asked permission to conduct an observational survey of beverages and foods; 97% (N=192) of store owners/managers consented (six convenience stores refused).

In-Store Observational Survey

The survey instrument was developed to capture product assortment: presence (whether a food or beverage category or subcategory was offered) and variety (number of unique items within a category or subcategory). Variety did not include the number of different packages or liquid container sizes. The instrument was reviewed by a nutritionist for face validity, translated into Spanish, reviewed by four *promotora*-researchers, modified, and pilot-tested in six stores. Four *promotora*-researchers received 8 hours of classroom and in-store training over 2 days. During pilot-testing, reliability was examined, and a half-day of supplemental training was provided.

Beverage categories included sugar beverages (carbonated soft drinks, fruit drinks, sports drinks, energy drinks, flavored milk/milk drinks, coffee and tea with added sugar, flavored/sugar-sweetened water, and other sugar-sweetened beverages); 100% juice (fruit juice, vegetable juice, and juice blend); and water (plain water and flavored/unsweetened water). Snack foods included candy; salty snacks (chips, nuts, *chicharrone*/pork rinds, popcorn, crackers, and salted meat snacks); sweet snacks (candied nuts and sugar-sweetened snack mix); prepackaged cookies and pastries (snack cakes, doughnuts, and fruit pies); baked items not in packages; and frozen sweets (popsicles and ice cream novelties). Basic food items included milk (whole, 2%, and 1% or nonfat); fresh fruit; fresh vegetables; canned fruit (in syrup and in juice); canned vegetables; tuna (in oil and in water); canned poultry (chicken or turkey); bread (white, whole grain, or whole wheat); brown rice; and deli-style ham, bologna, turkey, or chicken (regular or low-fat).

Data Analysis

Descriptive statistics were performed in 2012 using Stata, version 11. Store size was described using a count of cash registers present. Frequencies were calculated to describe presence of a specific food or beverage category or subcategory, and medians, means, and SDs were calculated to describe product variety as the number of unique items within a category or subcategory. Wilcoxon matched-pairs signed-rank test was used to test equalities in mean, median, and distribution of variety measures.

Results

Using a count of cash registers, 143 (74.5%) convenience stores were considered small (one register); 33 (17.2%) medium (two registers); or 16 (8.3%) large (three to four registers). Table 1 shows the presence and variety of beverages and snack foods in 97% of all convenience stores in the study area (N=192). All convenience stores marketed sugar-sweetened beverages (median variety of 86.5 unique sugar beverages). Sugar-containing soft drinks provided the greatest variety, followed by sports drinks, energy drinks, and fruit drinks. The product assortment of sugared soft drinks included Mexican soft drinks (e.g., Jarritos, Yoli, Charritos, Mexican Coca-Cola), which contain granulated natural sugar, are sold in glass bottles, and are popular among Mexican-Americans.

Convenience stores marketed a median variety of 17 non–sugar sweetened beverages (combination of juices and unsweetened waters). In addition, convenience stores marketed a greater variety of sugar-sweetened beverages compared with non–sugar sweetened beverages ($p<0.001$), regardless of store size. All convenience stores marketed candy, with a median variety of 78 unique candies; 81% of stores marketed candy from both the U.S. and Mexico. Convenience stores marketed a large variety of salty snacks (median 77); fried chips (median 44); sweet snacks (median 4); cookies and pastries (median 18); and frozen sweets (median 21). The variety of baked chips was limited to a median variety of three unique items, which differed from the variety of fried chips ($p<0.001$).

Table 2 shows the presence of basic food items for 192 convenience stores and by store size. The food items most frequently present were milk, canned vegetables, white bread, canned tuna, deli-style packaged meat, and canned fruit in syrup, which were displayed in a greater percentage of medium- or large-size convenience stores compared with smaller stores. One third of all stores provided fresh fruit (primarily avocados or mangos), and 35% provided fresh vegetables (primarily tomatoes or onions). Canned vegetables (primarily green beans, black beans, or refried beans) were available in 150 stores. Healthier types of food items were displayed in a larger percentage of medium and large stores: canned fruit in juice, canned tuna in water, whole grain or whole wheat bread, and low-fat deli-style packaged meat.

Discussion

A thorough understanding of the influence of the neighborhood food environment on food choice and nutritional health requires knowledge of food stores frequented by children and families and the foods and beverages marketed within these stores. Prior work in this region as well as another rural Texas region demonstrated that convenience stores provided greater spatial access (distance and number of shopping opportunities) to food items than supercenters, supermarkets, or grocery stores.[7,8] Although there are a greater number of convenience or corner stores than supermarkets in both urban and rural areas,[7,8,24–26] few studies have examined

Table 1. Product assortment (presence and variety) of beverages and snacks in convenience stores (N=192)

Beverages	Presence[a] *n* (%)	Variety[b] M (SD)	Variety[b] Median	Snack foods	Presence[a] *n* (%)	Variety[b] M (SD)	Variety[b] Median
SUGAR-SWEETENED BEVERAGES	192 (100)	91.4 (47.0)	86.5	**Candy**	192 (100)	108.8 (83.8)	76
Soft drinks	192 (100)	30.8 (13.4)	29	U.S.-brand	191 (99.5)	78.2 (65.3)	55
U.S.-brand	191 (99.5)	23.6 (11.3)	21	Mexico-brand	184 (95.8)	32.4 (25.4)	25
Mexico-brand	176 (91.7)	8.0 (4.3)	8	**SALTY SNACKS**[c]	192 (100)	83.1 (38.1)	77
Fruit drinks	174 (90.6)	11.7 (10.4)	10	**Chips, fried**	192 (100)	46.9 (22.1)	44
Sports drinks	189 (98.4)	12.3 (6.7)	12	Potato	191 (99.5)	26.4 (18.2)	24
Energy drinks	185 (96.3)	12.5 (9.4)	10	Cheese/corn	191 (99.5)	14.8 (8.7)	12
Flavored milk/milk drinks	171 (89.1)	6.7 (5.7)	5	Chicharrón	185 (96.3)	6.1 (3.5)	5
Coffees and teas[d]	184 (95.8)	9.6 (6.8)	8	**Chips, baked**	83 (43.2)	3.5 (3.1)	3
Water[d]	113 (58.8)	5.1 (3.7)	4				
Other drinks	165 (85.9)	8.8 (6.5)	7	**SWEET SNACKS**[e]	171 (89.1)	4.6 (3.7)	4
NON–SUGAR SWEETENED BEVERAGES	192 (100)	19.8 (11.0)	17	**Cookies and pastries**	189 (98.4)	23.6 (18.7)	19
Juice, 100%	186 (96.9)	13.3 (8.0)	11	Cookies	188 (97.9)	17.0 (14.5)	14
Fruit juice	184 (95.8)	6.7 (3.9)	6	Snack pies/cakes	142 (74.0)	8.7 (8.7)	6
Vegetable juice	168 (87.5)	2.5 (1.6)	2				
Juice blend	154 (80.2)	5.3 (4.8)	3				
Water	192 (100)	6.9 (4.2)	6	**Frozen sweets**	178 (92.7)	22.9 (10.2)	21
Plain	192 (100)	4.2 (2.3)	4	Popsicles	175 (91.1)	9.9 (6.0)	9
Flavored	160 (83.3)	3.3 (2.5)	3	Ice Cream	176 (91.7)	13.3 (7.0)	12

[a]Presence = number and percentage of convenience stores in which the product category or subcategory was present
[b]Variety = number of unique items present within a product category or subcategory; calculated on convenience stores where the product is present and reported as M (SD)
[c]Salty snacks includes chips, nuts, popcorn, crackers, and salted meat snacks
[d]With added sugar
[e]Sweet snacks includes candied nuts and sugar-sweetened snack mix; *Chicharrón* is deep-fried pork rind

in-store marketing to document exposure to healthier and less-healthy foods and beverages in small stores.[24] Farley, Rose, and colleagues[20,24] measured the linear shelf-space to determine exposure in small stores in southeastern Louisiana and Los Angeles County; however, this measurement does not take into account multilevel shelves and product assortment (presence and variety).[20,27]

Findings from the current study expand the understanding of an important component of in-store marketing of healthier and less-healthy foods and beverages: product assortment. This is apparently the first study to document the presence of specific food and beverage categories and subcategories and variety (number of unique items within each category or subcategory) in convenience stores known to be frequented by Mexican-origin adults and children. Results present evidence of a large assortment of sugar-sweetened drinks and energy-dense snack foods in neighborhood convenience stores, regardless of size. The greater presence and variety of different types of beverages and snack foods suggest more options for purchase, which could lead to increased impulse purchases and greater consumption of less-healthy choices, especially by children and adolescents.

In the current study, there were 198 convenience stores, with 192 agreeing to participate in the study. Although convenience stores are frequented by both adults and children, convenience stores have been identified by Mexican-origin children (aged 6–11 years) as the most popular (i.e., convenient) place to purchase snacks on weekdays and weekends (JRS, unpublished observations, 2012). This has been confirmed by studies[10,28] that report that convenience stores provide ample opportunities for children to purchase and consume energy-dense foods,

Table 2. Presence of basic food items in convenience stores (N=192), overall and by store size,[a] *n* (%)

	Overall (N=192)	Small (*n*=143)	Medium (*n*=33)	Large (*n*=16)
Milk				
Regular	162 (84.4)	114 (79.7)	32 (97.0)	16 (100.0)**
2%	133 (69.3)	87 (60.8)	30 (90.9)	16 (100.0)***
1%	11 (5.7)	0 (0)	3 (9.1)	8 (50.0)***
Fresh fruit	65 (33.8)	41 (28.7)	16 (48.5)	8 (50.0)*
Fresh vegetables	68 (35.4)	51 (35.7)	14 (42.4)	3 (18.7)
Canned fruit				
Syrup	110 (57.3)	71 (49.6)	25 (75.8)	14 (87.5)***
Juice	70 (36.6)	41 (28.7)	17 (53.1)	12 (75.0)***
Canned vegetables	150 (78.1)	105 (73.4)	30 (90.9)	15 (93.7)*
Canned tuna				
Oil	134 (69.8)	91 (63.6)	28 (84.8)	15 (93.7**
Water	117 (61.3)	82 (57.7)	21 (63.6)	14 (87.5)
Canned poultry (chicken or turkey)	17 (8.8)	10 (7.0)	2 (6.1)	5 (31.2)**
Bread				
White	136 (70.8)	95 (66.4)	25 (75.8)	16 (100.0)*
Whole grain	48 (25.0)	22 (15.4)	13 (39.4)	13 (81.2)***
Whole wheat	50 (26.0)	25 (17.5)	10 (30.3)	15 (93.7)***
Brown rice	18 (9.4)	13 (9.1)	3 (9.1)	2 (12.5)
Deli-style packaged meat				
Regular	110 (57.3)	73 (51.0)	24 (72.7)	13 (81.2)**
Low-fat	32 (16.7)	16 (11.2)	6 (18.2)	10 (62.5)***

Note: A chi-square test was used to calculate difference in presence by store size.
[a]Store size determined by a count of the cash registers present: small (one); medium (two); and large (three or four)
*$p<0.05$ **$p<0.01$ ***$p<0.001$

such as chips, candy, and sugar-sweetened beverages. This may be attributed to convenience stores being within walking distance and having the best availability of foods and beverages marketed to youth.[29]

In the present study, the data illustrate the great imbalance between healthier and less-healthy food and beverage assortments in convenience stores, regardless of size. This is of serious concern considering that increased spatial proximity of convenience stores to the residence is associated with greater risk of overweight/obesity and an increase in BMI among children.[30] The influence of convenience stores may well be a result of large assortments of less-healthy foods and beverages and minimal assortments of healthier options.

Strengths

There are a number of strengths of the present study. First, there were fewer refusals for stores to be observed (3%) than previously reported for Louisiana (28%) and Los Angeles County (34%).[20] This was due in large part to the study's trained *promotora*-researchers, who are accepted and trusted by the community.[4,31] Second, this is apparently the first study that focused on product assortment, a key in-store marketing strategy, in a variety of types and sizes of convenience stores. Third, prior work focused on convenience stores in proximity to schools[32]; however, in areas where children and adolescents primarily take the school bus, school proximity is not as important for snack purchase as residential proximity (JRS, unpublished observations, 2012).

Finally, Texas border *colonias* are a population of great demographic importance. They are an archetypal example of the many new-destination Mexican-immigrant communities expanding throughout the U.S. These data are relevant for voluntary, as well as regulatory, policy approaches that seek to educate convenience-store owners of the marketing benefits of a larger selection of healthier beverages and foods, both for the success of the store and the health of the community.

Limitations

There are several limitations that warrant mention. Data were collected during one season of the year, which limits the ability to determine seasonal variation in product assortment. This could have important implications during periods when children spend more time at home,

such as the summer months. Second, data were not collected on stocking frequency or the factors that influence space allocation. Third, the observation of convenience stores did not include consumer measures, which would assist in the determination of the frequency of store visits, or the relationship of in-store marketing and frequency of store visits on purchase and consumption. Fourth, information was not collected on promotion, placement, or price, which may influence the number of purchases by children. Finally, data were not collected on the variety of basic food items, which limits comparisons of product assortment between basic food items and beverages and snack foods.

Conclusion

Despite these limitations, the results of this study further the understanding of in-store marketing of sugar-sweetened beverages and snack foods to adults and children, especially Mexican-origin children who are at great risk for poor nutrition and nutrition-related health conditions. Convenience stores offer greater spatial access to foods and beverages; in this area, they market a greater assortment of less-healthy compared with healthier foods and beverages. There are opportunities to influence consumer food choice through programs that alter the balance between healthier and less-healthy foods and beverages in existing convenience stores that serve rural and underserved neighborhoods and communities.

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Understanding Policy Enactment
The New Orleans Fresh Food Retailer Initiative

Vanessa M. Ulmer, MSc, Adrienne R. Rathert, MPH, Donald Rose, PhD

Background: Healthy-food financing initiatives have been endorsed as a way to improve food access, but relatively little research exists on understanding the formulation of such policies.

Purpose: This paper investigates the development of the New Orleans Fresh Food Retailer Initiative (FFRI) to highlight factors that enabled and impeded its enactment.

Methods: In 2010 and 2011, semistructured interviews were conducted with 22 key informants with firsthand experience of this case, including representatives from the private sector, nonprofit organizations, and government. A participant-observer approach was used to synthesize these observations with archived written materials and the authors' own observations.

Results: Historical disparities in food access in New Orleans were exacerbated by Hurricane Katrina, which also generated neighborhood activism and a pressing need to rebuild the city. A Food Policy Advisory Committee (FPAC) was formed from diverse groups. This paper describes the evolution of FPAC, its deliberations and report to the City Council, and actions to promote a financing initiative, as well as delays encountered in the process.

Conclusions: Enactment of the FFRI was facilitated by a window of opportunity that opened in the storm's aftermath, broad-based stakeholder buy-in, the existence of political champions, and policy-relevant information that was simple and convincing. Impediments to success included the constant turnover of city staff, a skeptical state bureaucracy, and the many competing priorities in New Orleans. This study highlights the importance of having a clear policy objective to address a well-defined and illustrated problem, key advocates in diverse organizations, and broad-based support for its implementation.

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Introduction

Research and recommendations from authoritative groups, including the IOM, indicate a need for policy action to ensure access to affordable and healthy foods.[1–5] However, there is relatively little research on the process by which such policies are developed. Recent studies have used regression analysis[6] and key-informant interviews[7] to examine factors that enable and impede the enactment of childhood obesity legislation at the state level. Although there have been useful accounts of a previous food financing initiative,[8,9] more work is needed to understand the context and details of the policy-making process in other locales.

This paper presents a study of policy formulation and adoption to create the New Orleans Fresh Food Retailer Initiative (FFRI).[10] In March 2011, the City of New Orleans (City) began this program to provide low-interest and forgivable loans for food retailers that locate in underserved neighborhoods and commit to selling fresh fruits and vegetables. The program is administered by The Food Trust (Food Trust) and the Hope Enterprise Corporation (Hope) through a public–private partnership, with combined funds of $14 million. In describing the development process for the initiative, including facilitators and barriers to the policy's enactment, the objectives are to improve understanding of the policy-formulation process, to inform the development of future obesity prevention policies at the local level, and to provide guidance to other communities about enacting a food financing program.

From the Woodrow Wilson School of Public and International Affairs, Princeton University (Ulmer), Princeton, New Jersey; and the School of Public Health and Tropical Medicine, Tulane University (Rathert, Rose), New Orleans, Louisiana

Address correspondence to: Donald Rose, PhD, School of Public Health and Tropical Medicine, Tulane University, 1440 Canal Street, Suite 2301, TW-19, New Orleans LA 70112. E-mail: diego@tulane.edu.

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Methods

In 2010 and 2011, a total of 22 semistructured interviews were conducted with key informants who were knowledgeable about the FFRI enactment process. Informants were selected purposively from a variety of organizations and included city agency staff, city council members, grocers, representatives from trade associations and financial institutions, public health professionals, and food advocates. IRB approval from Tulane University was granted, and informed consent was given for the interviews, which averaged 50 minutes and were guided by an instrument of 18 questions adapted from the Advocacy Coalition Framework.[11] The interview guide is available from the authors on request. A participant-observer approach[12] was used to synthesize these observations with archived written materials (e.g., meeting minutes and presentation slides, reports, city documents) and the authors' observations.

Results

The New Orleans Context

In 2005, Hurricane Katrina devastated New Orleans, flooding 80% of the city's area, causing billions of dollars in property damage, and displacing the city's entire population.[13,14] Katrina raised the visibility of the tremendous disparity in living conditions between affluent and low-income residents of the city, particularly the limited opportunities of the city's large impoverished African-American population.

The retail food landscape was affected dramatically by the storm. A year after Katrina, only 40% of the supermarkets were in operation. Before the storm, predominantly African-American neighborhoods were half as likely to have a supermarket as were other neighborhoods.[15,16] By 2007, the disparities in access to supermarkets had worsened.[16]

The storm also created an opening for political changes in New Orleans. An extraordinary level of civic activism arose soon after Katrina. Citizens groups pressed for broad policy changes and for resources to rebuild their neighborhoods. Recovery efforts pursued by the city included a series of planning processes at the city, planning district, and neighborhood levels. But the plans produced a laundry list of needs, including those related to food access, housing, infrastructure, health care, police protection, and education, without clear indication of how they should be prioritized.

Emergence of the Food Policy Advisory Committee

Begun in 2006, two initiatives built momentum for food-policy work in the city. Grow New Orleans, a networking group on community food issues, was organized by the nonprofit New Orleans Food and Farm Network. A second collaboration of public health, food security, and social service organizations focused on increasing access to healthy foods. The creation of the New Orleans Food Policy Advisory Committee (FPAC) in 2007 brought together these groups along with other public and private sector actors to develop a policy agenda around neighborhood food access.

Table 1 illustrates the timeline of events that followed the creation of the FPAC. This effort was initiated by the Tulane University Prevention Research Center (TUPRC), with advice from Food Trust. Both organizations committed substantial staff resources to policy work on healthy-food access in New Orleans, and recognized the need to convene a broader local planning group. Seven organizations formed this core group: Second Harvest Food Bank of Greater New Orleans and Acadiana, Louisiana Public Health Institute, City Health Department, Renaissance Project, New Orleans Food and Farm Network, TUPRC, and Food Trust.

Although their missions varied, these organizations agreed to adopt a strategic focus on improving access to fresh-food retail outlets, defined broadly to include not only supermarkets and grocery stores but also small food stores and farmers' markets. This struck mid-ground between the "supermarkets campaign" that Food Trust had pursued in Pennsylvania[8] and the food systems approach taken by Grow New Orleans.

To enhance legitimacy, advocates sought and received endorsement by the New Orleans City Council (council). TUPRC established a strong working relationship with the office of Councilmember Arnie Fielkow, who became a consistent champion for the initiative. With Fielkow's support, representatives from the planning group testified before the council's economic development committee. In response, the council unanimously passed a resolution supporting the creation of the New Orleans FPAC, which would be composed of "advocates, retailers, bankers and planners" and would "study the problem of a lack of access to healthy food among New Orleans families."[17] It requested a final report with recommendations by January 2008.

The Study Process

The FPAC study process was led by a core group of individuals from the above-mentioned agencies. They identified and recruited a panel of 32 leaders from diverse fields, including food retail, alternative food systems, public health, social services, and government. The recruitment goal was to get leaders from a diversity of organizations in these fields who were interested in different aspects of food access and would commit to four meetings from June to December 2007. Table 2 lists the organizations involved in the FPAC. Over a 6-month span, participants framed the problem of food access,

discussed the barriers and possible solutions, and agreed on final recommendations.

One important TUPRC activity was the preparation of data to communicate the problems of food access in New Orleans. This consisted of synthesizing national studies on the relationships between access, consumption, and health into simple bullet points that were clear to a nonacademic population. Another important tool was a simple map of New Orleans with neighborhood boundaries that illustrated where supermarkets had not returned. Anyone familiar with New Orleans could see at a glance that most of the city, particularly the poorest sections, remained underserved by supermarkets.

Another important aspect of the process was the broad-based stakeholder engagement. FPAC recommendations were developed and vetted by representatives from diverse groups with relevant experience, giving them more legitimacy. The diverse nature of the FPAC also meant that advocacy and support for the committee's recommendations would come from a wide spectrum of city organizations.

Table 1. Timeline of important events in the development and adoption of the New Orleans FFRI

Month	Year	Event
April	2007	"Partnership to Pursue a Food Policy Advisory Committee" presented to City Council's Economic Development Committee
May	2007	City Council supports creation of FPAC, requests report by Jan 2008
June–December	2007	FPAC studies retail food access with four full meetings and three optional meetings
January	2008	FPAC presents ten recommendations to City Council Economic Development Committee
January	2008	City Council supports FPAC recommendations, approves creation of implementation task force
February	2008	FPAC task force begins monthly meetings that continue through April 2009
April	2008	ORDA suggests FPAC provide input on food-access projects
June	2008	ORDA identifies food access projects for funding in long-term recovery plan, including $7 million for fresh-food retail
July–September	2008	Tulane University Prevention Research Center assists ORDA to develop FFRI project for State application process
May	2009	Application for FFRI submitted to state
June	2009	City releases RFP to administer the FFRI
July	2009	State approves $7 million in disaster recovery funding for FFRI project
December	2009	RFP for FFRI administration withdrawn because of City contracting policy
January	2010	RFP for FFRI re-advertised
April	2010	TFT and Hope Economic Corporation (Hope) selected by City to administer the FFRI
May	2010	Mayor Landrieu takes office
August	2010	New administration prioritizes FFRI among 100 possible projects for implementation
August–December	2010	City, TFT, and Hope negotiate terms of cooperative endeavor agreement; signed in mid-December
January–March	2011	FFRI implementation details worked out
March	2011	Mayor Landrieu announces initiation of the FFRI

FFRI, Fresh Food Retailer Initiative; FPAC, Food Policy Advisory Committee; ORDA, Office of Recovery and Development Administration; RFP, request for proposal; TFT, The Food Trust

Committee Recommendations

In January 2008, FPAC presented its findings, including ten policy recommendations, one of which advised providing grants and loans to fresh-food retail projects located in underserved areas, as a priority for comprehensive neighborhood development.[18] The council unanimously adopted a second resolution, supporting the FPAC recommendations and approving creation of a task force to develop strategies for their implementation.[19] The FPAC task force was organized by the TUPRC and included staff from the City Office of Recovery and Development Administration (ORDA); other city agencies; and representatives from civic and private sector organizations active in the FPAC pro-

Table 2. Organizational members of the New Orleans Food Policy Advisory Committee

Sector	Agencies/organizations
Grocery sector	Associated Grocers, Breaux Mart Supermarkets,[b] Circle Foods, Louisiana Retailers Association, New Orleans Food Co-op, Robert Fresh Market, Rouses, Supervalu, Vietnamese Market, Zuppardo's Family Supermarket
Farmers markets and local agriculture	Grow New Orleans, Marketumbrella.org, New Orleans Food and Farm Network (NOFFN)[a]
Nonprofit organizations	Agenda for Children, Bright Moments, Catholic Charities Archdiocese of New Orleans, The Ruth U. Fertel Foundation, Second Harvest Food Bank of Greater New Orleans and Acadiana,[a,b] Share Our Strength, The Food Trust,[a] The Renaissance Project,[a] The Urban Conservancy, Volunteers of America Greater New Orleans
Public health agencies and local government	The Louisiana Public Health Institute,[a] City of New Orleans Health Department,[a] City of New Orleans Office of Recovery and Development Administration (ORDA), New Orleans City Council
Academic institutions	Louisiana State University Agricultural Center, Tulane University Prevention Research Center (TUPRC)[a]
Financial institutions	Capital One Bank; Hope Enterprise Corporation (Hope); Enterprise Community Partners; Francis Financial Group Capital Management (FFC Capital Management); Small Business Administration; Minority Business Development Agency

[a]Members of the core planning group
[b]Food Policy Advisory Committee co-chairs

cess. The task force met monthly from February 2008 to April 2009 to promote healthy-food retail development policy.

Funding for a Retail Incentive Initiative

Having involvement from ORDA turned out to be an important element in the development of funding for the initiative. This city office was created in November 2007, and tasked with coordinating the recovery program, connecting policy at the highest levels of city government with the implementing agencies.[20] The administration managed more than $400 million in federal Community Development Block Grant disaster recovery funds (hereafter recovery funds) that were allocated from the federal level through the state, and budgeted for New Orleans' recovery.

The first head of this office was a well-known planner and proponent of development that supported healthy lifestyles. He charged the Director of Disaster Mitigation Planning with leading the food-access development efforts. Subsequently, the director and several colleagues were invited to become members of the FPAC task force. It was the director who helped to connect the dots between the ORDA funds and the needs articulated by this task force. In April 2008, she suggested that the committee provide input on specific food-access programs for which recovery funds could be sought.

A conference call with committee members and city officials was organized quickly to develop a proposal that included many of the characteristics of the later-adopted initiative. By June 2008, ORDA officially identified $7 million for this retailer initiative and an additional $3 million combined for separate community markets and gardens initiatives. The council later approved the projects for the 2009 budget.

Delays in Enactment

The excitement over this apparent victory was followed by close to 3 years of administrative and political delays. Staff turnover was a substantial part of this. ORDA lost the staff person in charge of food access. This was critical, because recovery funds, even though allocated to New Orleans, required separate state approval for each initiative, including a tedious two-stage proposal process. TUPRC assisted with staff time to prepare information for a retail incentive proposal, which was forwarded to the state in September 2008.

In an environment where multiple priorities were competing for the attention of government officials, the food-access projects represented less than 2% of recovery funds and were complicated to administer—so they stalled. State officials, who expected recovery funds to be spent on "bricks and mortar" infrastructure (e.g., rebuilding fire stations), were less familiar with revolving loan programs, and generated extensive back-and-forth questioning. At about the same time, the Director of Disaster Mitigation Planning's office was moved out of ORDA, thus limiting her role as an internal champion for the project. Final state approval for the initiative came in July 2009; almost 9 months after supporting information had been submitted.

The city released a request for proposals to administer the financing initiative, but this was delayed when federal

auditors raised concerns about the city's contracting process. Ultimately, this request was cancelled and reissued when the city revised its contracting policy for the recovery funds. By April 2010, the city had selected Food Trust and Hope to jointly administer the new program. By this point, the outgoing Nagin administration was in its final month, and a contract was not finalized before Mayor Nagin left office.

A New Mayor

Incoming Mayor Landrieu wanted to overhaul the organizational structure at City Hall and to review the allocation of recovery resources. By August 2010, there were 100 projects that the new administration was trying to prioritize for implementation. TUPRC and other FPAC members revived their advocacy for the recovery fund food-access projects. As it turned out, there were strong supporters of improving food access on the new council, and within the Landrieu administration, including the mayor himself.

Because the Landrieu administration wanted to review and fine-tune all recovery efforts, the city met extensively with Hope and Food Trust, the implementing partners. Negotiations among the three parties moved forward, but there were many details in developing such a large proposal, especially one that was based on recovery funds, which require compliance with various federal standards. Moreover, these funds are released on a reimbursement basis, necessitating more-complex administrative procedures between the city and its partners. By December 2010, an agreement had been developed and signed by the major parties. Another quarter was needed to draft program policies, procedures, and promotional materials at all levels. Finally, in March 2011, Mayor Landrieu announced the new FFRI.

Discussion

Factors Facilitating Enactment

Four broad factors facilitated enactment of the FFRI policy. First, there was a window of opportunity that opened in the aftermath of Katrina. There was a clear need for a policy response to rebuild New Orleans, and an unparalleled degree of civic engagement by citizens in the rebuilding process. This included a focus on improving neighborhoods, both their economic viability and their ability to support healthy lifestyles. There were also federal emergency development funds that became available in response to Katrina.

The broad-based stakeholder buy-in, channeled through the New Orleans FPAC, was a second main facilitator to successful enactment, as it focused energies on a specific cause: improvement of the retail food sector. Getting authorized by the council, but operating as an advisory body, gave FPAC the necessary political legitimacy, yet allowed it to move swiftly at a time when city agencies were still crippled from the storm. This swift action would not have been possible if not for the dedicated staff time made available by both the TUPRC and Food Trust, and the other core organizations involved.

A third important facilitator was the existence of political champions, both on the council and in city government, who endorsed the measure from the beginning and pushed hard to make it happen. Councilman Fielkow was a committed advocate of fresh-food financing, giving an opening to advocates to present at early committee meetings, marshaling support on the council for the FPAC resolution, and monitoring progress of the initiative throughout its journey to enactment. A senior ORDA official, in the city administration, was a key actor in making the link to funding through emergency block grants.

Finally, information and analysis was important to the process because it was made available early on in a simple, clear, and convincing manner. Documentation of the food-access problem with maps showing a reduction of supermarkets in many areas of the city convinced policymakers of the need for the action to improve the food environment, as did a simple summary of national-level studies linking neighborhood food access to improved diet and health. The experience of the food retail initiative in Pennsylvania[8,21] gave confidence to stakeholders that such an initiative could be successful in New Orleans, and helped navigate the challenges of enactment.

Factors Impeding Enactment

The constant turnover of city staff was one of several factors that impeded success of the initiative. There was a continuing need to re-educate staff about the importance of FFRI, the specific contents of the initiative, and what was needed for it to pass each of the subsequent administrative hurdles. In this regard, a second impediment was the lack of a stable internal champion in the city administrative bureaucracy. Such a person could have prioritized continued action on the initiative and perhaps kept the delays in enactment to a minimum.

A third impediment was the presence of a skeptical state bureaucracy that was unfamiliar with the public–private partnerships involved in financing new retail food development. This skepticism translated into administrative delays. A final impediment to progress on the initiative was the existence of many competing priorities in New Orleans. The devastation of Katrina affected every sphere of city life including housing, education, health care, police protection, and infrastructure. Although there was no real opposition to a food financing initiative,

these other issues often demanded and received more immediate attention.

Insights Into Other Situations

Despite the specific nature of this New Orleans study, there are general lessons to be learned for those seeking to influence policy, particularly that related to healthy-food financing. A window of opportunity that created political will and available financing was a key facilitator of policy enactment. Katrina was unique, but there are many crises or focusing events that bring government attention to a problem and create windows of opportunity for change.[22] Such windows may be precipitated by changes in political leadership, by dramatic changes in economic conditions, or by the strength of popular mobilizations (such as the Tea Party or Occupy movements) to shift the national mood. They also can be facilitated by the organizing power of recent changes in social media and technology. In crisis-prone areas, policy advocates can plan ahead for windows of opportunity, even though the specific timing of a new event is unknown.

Identifying and cultivating political champions is a key part of policy work, as is obtaining broad-based stakeholder input and support. Local food-policy advisory committees,[23] as well as Prevention Research Centers,[24] exist throughout the country and can be at the forefront of marshaling support for initiatives to improve food access for underserved populations. Information and analysis is important to the policy process, especially when it is timely and clearly presented.

Impediments to the policy enactment process in New Orleans also have broader resonance. Although Katrina was a rare event, it generated the same range of competing priorities that might be found in many localities where funding is tight and human resources are limited. Moreover, enablers and impediments are often interrelated. Champions within city government facilitated policy enactment, yet it was the restructuring of this very bureaucracy that removed critical support and delayed progress.

To overcome obstacles to progress, the experience from New Orleans highlights the importance of having a clear policy objective that addresses a well-defined and illustrated problem, with motivated champions and a collaboration of organizations that can develop broad-based support for its implementation.

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Tools for Healthy Tribes
Improving Access to Healthy Foods in Indian Country

Sheila Fleischhacker, PhD, JD, Randi R. Byrd, BA, Gowri Ramachandran, BS, Maihan Vu, DrPH, Amy Ries, PhD, Ronny A. Bell, PhD, Kelly R. Evenson, PhD

Abstract: There is growing recognition that policymakers can promote access to healthy, affordable foods within neighborhoods, schools, childcare centers, and workplaces. Despite the disproportionate risk of obesity and type 2 diabetes among American Indian children and adults, comparatively little attention has been focused on the opportunities tribal policymakers have to implement policies or resolutions to promote access to healthy, affordable foods. This paper presents an approach for integrating formative research into an action-oriented strategy of developing and disseminating tribally led environmental and policy strategies to promote access to and consumption of healthy, affordable foods. This paper explains how the American Indian Healthy Eating Project evolved through five phases and discusses each phase's essential steps involved, outcomes derived, and lessons learned.

Using community-based participatory research and informed by the Social Cognitve Theory and ecologic frameworks, the American Indian Healthy Eating Project was started in fall 2008 and has evolved through five phases: (1) starting the conversation; (2) conducting multidisciplinary formative research; (3) strengthening partnerships and tailoring policy options; (4) disseminating community-generated ideas; and (5) accelerating action while fostering sustainability. Collectively, these phases helped develop and disseminate *Tools for Healthy Tribes*—a toolkit used to raise awareness among participating tribal policymakers of their opportunities to improve access to healthy, affordable foods. Formal and informal strategies can engage tribal leaders in the development of culturally appropriate and tribe-specific sustainable strategies to improve such access, as well as empower tribal leaders to leverage their authority toward raising a healthier generation of American Indian children.
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Background

The rapid rise in obesity has forced researchers and policymakers to re-evaluate existing public health interventions, which have traditionally focused on improving an individual's food and physical activity attitudes, knowledge, and behaviors.[1] Expert reports have called attention to the social determinants of health and have specifically identified how the rapidly changing food and physical activity environments may be negatively contributing to an increase in energy intake, a decrease in physical activity, and the drastic rise in obesity and related chronic diseases.[2–6] Promising approaches put forth are policy and programmatic changes that help make the healthy choice the easy choice.

Even though calls for government obesity prevention action have increased over the past 5 years, the role of tribal governance is often overlooked.[2–6] The U.S. founding fathers acknowledged a special government-to-government relationship of the federal government with Indian tribes (Const., Art. 1, §8). The Supreme Court determined in 1913 that the Constitution afforded federally recognized tribes certain inherent rights of self-government and entitlement to federal benefits, services, and protections.[7] More than 16 states have granted tribes state recognition even though the tribes are not federally recognized.[8]

Overlooking tribal governance is problematic because tribal leaders may have untapped potential to address American Indians' elevated risk for obesity through tribal resolutions and culturally appropriate community

From the American Indian Center (Byrd), the Center for Health Promotion and Disease Prevention (Fleischhacker, Ramachandran, Vu, Ries, Evenson), Department of Nutrition (Fleischhacker, Ries), Department of Epidemiology (Evenson), University of North Carolina, Chapel Hill; and the Maya Angelou Center for Health Equity, Wake Forest School of Medicine (Bell), Winston-Salem, North Carolina.

Address correspondence to: Sheila Fleischhacker, PhD, JD, Center for Health Promotion and Disease Prevention, University of North Carolina-Chapel Hill, 1700 Martin Luther King Jr. Blvd, CB #7426, Chapel Hill NC 27599. E-mail: sheilafly9@gmail.com.

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changes.[9,10] American Indian preschoolers were found to have the highest prevalence of obesity among five major racial/ethnic groups in a recent cross-sectional study using a nationally representative sample of U.S. children, born in 2001 with height and weight measured in 2005: American Indian/Native Alaskan, 31.2%; Hispanic, 22.0%; non-Hispanic black, 20.8%; non-Hispanic white, 15.9%; and Asian, 12.8%.[11]

An 8-year obesity prevention program called Pathways was designed specifically to address the alarming rates of obesity among American Indian schoolchildren.[12] The intervention focused on increasing physical activity and healthy-eating behaviors among schoolchildren in Grades 3 to 5, primarily through activities targeting the individual, family, and school. No changes in obesity prevalence rates were found. Pathway investigators recommended that future interventions employ more culture- and tribe-specific strategies, as well as integrate more sustainable environmental interventions and public policy approaches. Since the Pathway findings were published almost 10 years ago, little attention has been focused on how to engage tribal leaders in creating supportive environments to reduce obesity.

This paper presents an approach for integrating formative research into an action-oriented strategy of developing and disseminating tribally led environmental and policy strategies to promote access and consumption of healthy, affordable foods. This paper explains how the American Indian Healthy Eating Project evolved through five phases and discusses each phase's essential steps, outcomes derived, and lessons learned. The project was created through partnerships between seven North Carolina American Indian tribes and a multidisciplinary research team at the University of North Carolina, Chapel Hill (UNC). Through the support of a Robert Wood Johnson Foundation grant, the project aimed to build the partnerships and evidence base necessary to improve access to healthy, affordable foods within North Carolina American Indian communities. The focus of this project was improving access to healthy, affordable foods, with the hope that further work would be conducted to understand tribally led ways to promote active living.

Approach

The approach was based on Social Cognitve Theory[13], ecologic frameworks,[14–16] consumer behavior models, along with various theories and concepts trying to explain politicial decision-making and public policy participation. Figure 1 illustrates the project's evolution and identifies essential steps and key outcomes of the following five phases of the American Indian Healthy Eating Project.

Phase 1: Starting the Conversation

Using community-based participatory research,[17,18] researchers at UNC established contacts in fall 2008 with members of the NC Commission of Indian Affairs (www.doa.state.nc.us/cia/). The commission is a division of the NC Department of Administration created by the state's General Assembly to advocate and assist its American Indian citizens. The commission suggested using Talking Circles (i.e., facilitated discussions commonly used among American Indian communities) to initiate conversations with tribal leaders.[19] The NC American Indian Health Board (ncaihb.org) was also a part of these initial discussions and helped develop a research ethics review process for the current study.

The modified Talking Circle was designed to initiate conversations about research ethics, as well as tribally led approaches to improving access to healthy, affordable foods within tribal communities. The one federally recognized tribe in the state opted out of the project, citing existing obesity prevention programs. The following seven state-recognized tribes invited us to host a modified Talking Circle and through these discussions agreed to participate in the American Indian Healthy Eating Project: Coharie Indian Tribe, Haliwa-Saponi Indian Tribe, Lumbee Tribe of NC, Occaneechi Band of the Saponi Nation, Meherrin Indian Tribe, Sappony, and Waccamaw Siouan Tribe.

Phase 2: Conducting Multidisciplinary Formative Research

Formative research was conducted by combining methodologies from public health, regional and urban planning, and public health law.

Qualitative methodologies. The project used modified Talking Circles, as well as key informant one-on-one interviews to build relationships and garner insights from tribal leaders and key stakeholders because a variety of qualitative approaches was a recommended approach to building trust and gathering input from American Indians.[12] Qualitative research is also a recommended approach to gathering input on the local food environment, particularly from a variety of perspectives.[20] Two community liaisons, along with community advisors from participating tribes, assisted with the development of the modified Talking Circle protocol. One community liaison faciliated all seven modified Talking Circles. This liaison, in addition to two additional community liaisons, recruited and faciliated all key informant interviews.

Tribal leaders were recruited for the Talking Circles and were identified by each tribe. The categories of key informants were chosen by community advisors, and the individuals recruited were identified by community advi-

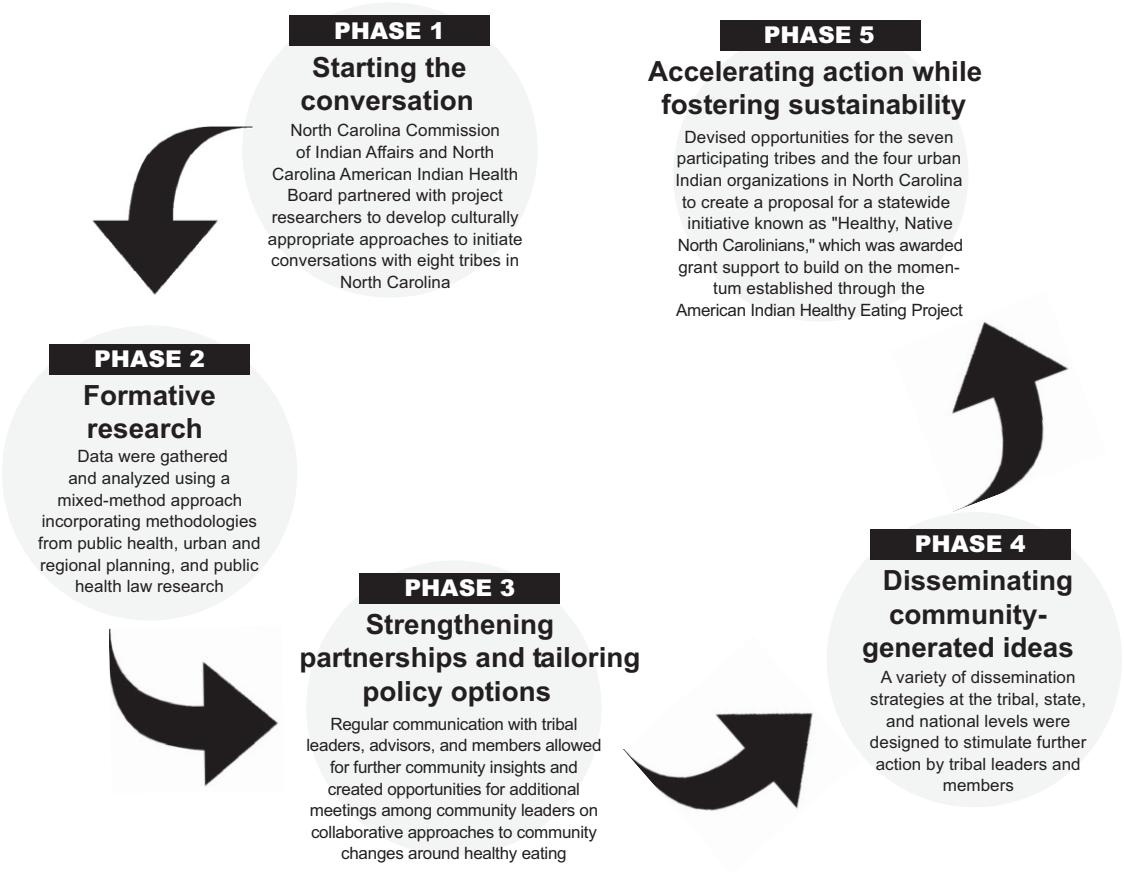

Figure 1. Essential steps and key outcomes, by phase, of the American Indian Healthy Eating Project

sors, tribal leaders, or responded to seeing a recruitment flyer. Common themes arising during the modified Talking Circle discussions included concerns about obesity among tribal youth, facilitators and barriers to purchasing and preparing affordable, healthy meals, and the role of the family, church, and tribal community in moving forward healthy-eating initatives.

Additional community insights were garnered from 40 key informants through one-on-one interviews with community and spiritual leaders ($n=13$); health professionals ($n=8$); Indian educators ($n=10$); food-sector professionals ($n=5$); and parents ($n=4$). Key informants who were also parents were asked about their insights on these issues as parents too, totaling 13 parent participants. The key informants added invaluable perspectives on how to utilize Native traditions and empower tribal leaders to improve access to healthy eating within tribal communities.

Spatial analysis. Food-environment assessments were conducted to identify the types and locations of all food retail outlets within each of the seven participating tribal communities.[21] Information was gathered from secondary data sources (i.e., health county food-registry lists and state agriculture registry lists, Dun & Bradstreet,® InfoUSA, and online Yellow Pages) and through a canvass by car of all primary roads within each of the communities. More than 1502 miles were canvassed; 711 food outlets were identified; evidence for validity of secondary food retail data sources was calculated; and inter-rater reliability of the methods was verified. The food landscapes of the tribal communities were characterized by country stores, gas stations with convenience stores, and fast-food restaurants.[22] Two tribes had to travel more than 15 miles to reach the nearest full-service grocery store.

Public health law research. Informed by the qualitative and spatial preliminary findings, the American Indian Healthy Eating Project used methodologies from public health law research to identify the authority, as well as develop suggestions for feasible community changes that the participating tribes can implement to improve access to healthy, affordable foods within their tribal communities. Specifically, a systematic online collection and analysis of constitutions and websites of more than 500 tribes and urban Indian organizations in the U.S. was conducted. Three researchers coded with high agreement if and how constitutions, resolutions, and websites discussed food, nutrition, and health.

Preliminary findings indicate that tribal constitutions acknowledge the role of tribal government in health. For the more than 300 tribes with official websites, the health programs featured were the DHHS Indian Health Services and the U.S. Department of Agriculture Food Distribution Program on Indian Reservations. Some examples of obesity policies or resolutions were identified through website reviews such as Cherokee Nation's Healthy Nation initiative (healthynation.cherokee.org). To develop appropriate guidance for participating tribes, expertise was sought from several participating tribal leaders, Indian health law scholars, and relevant agencies that promulgate regulations regarding Indian health, home preservation and canning, farmers' markets, and Pow Wow concessions (i.e., food sold at a special form of gathering of North American Native Americans).

Phase 3: Strengthening Partnerships and Tailoring Policy Options

To avoid historical and contemporary research ethics-related injustices experienced by American Indians,[12, 23–25] the research and community partners worked informally and formally to regularly meet and discuss the data and how they should be disseminated to the participating tribes. Tribal leaders expressed their appreciation of the project's frequent in-person and written communications. The participating tribes were generally led by volunteers who often had a full agenda of items to discuss at their Tribal Council meetings, so the project regularly created short project updates in written or oral form.

Through intermittent review of preliminary findings (Table 1) and of the proposed toolkit table of contents, several suggestions were provided by tribal liaisons and leaders in person, over the phone, and via e-mail that assisted the success of the dissemination of policy options within the tribal communities. For example, a number of tribes requested that the toolkits be visual, integrating pictures of and artwork by tribal members. A website was also regularly requested as a way to make accessible, for multiple people, the study results and suggested policy strategies.

During conversations with tribal leaders, the name of the project itself emerged to emphasize American Indian and healthy eating versus the original name that focused more on food access. Further, the tribes felt it was important to continue discussions with relevant community partners, especially spiritual and church leaders. Although the project's main focus was healthy eating, to respond to frequent requests about ideas for promoting physical activity, the toolkit and project website provided ideas on improving active living in general and, more specifically, about creating or renovating places to be physically active within tribal communities.

Table 1. Community-generated ideas translated into American Indian Healthy Eating Project actions

Revitalizing Traditional Ways: "I want there to be resurgence and a re-education of young Indian families to understand how we ate traditionally." ● Integrated traditional messages, stories, and information on existing American Indian programs into the toolkit on traditional food preparation and preservation practices
Empowering Tribal Council and Community Sparkplugs: "The people don't want to be beat down and beat down and beat down with what they need to do. The people need to be empowered on how they can do what they do with what they got." ● Created opportunities for tribal liaisons, community liaisons, and tribal members to engage in the project and take leadership roles in shaping the project process and outcomes
Using Intergenerational Approaches: "If we incorporate our elders and especially our women, then we'll make change. But not only our elders because they're dying out. We need to also incorporate the children. And a lot of times people focus on the elders and children and they leave out the middle generation so there needs to be something done with the ones who are being affected right now." ● Emphasized the whole family, as well as extended family activities and ways to negotiate healthy habits among family members and friends
Facilitating Economic Development: "Working with the youth, empowering the youth around healthy nutrition, empowering the youth around the health benefits from produce, empower the youth around economic opportunities with fresh produce." ● Joined several community change healthy-eating ideas with community and economic development and job creation facets in the toolkit, website, and during informal and formal presentations
Addressing Historical Trauma: "So the problem is . . . how do you create real big catalyst for someone to really understand that getting sugar diabetes isn't a fate of your whole entire family, that you actually can break that generational curse so to speak by just changing a mindset." ● Emphasized American Indian youth and adults who live long and healthy lives
Organizing the American Indian Community: "If you can bring these minds together, you're gonna get more of a consensus. So . . . think about planning a general round table discussion about this issue with everybody that you interview and meet with." ● Supported collaborative workshop among the seven participating tribes and project partners to discuss possible next steps and coordinated proposal that was awarded funding to further project momentum

Note: Themes and quotes are drawn from the seven modified Talking Circles (n=33) or key informant interviews (n=40).

Overall, tribal leaders expressed that they felt their opinions were valued since they were regularly asked for their opinions. More importantly, they felt their insights and ideas were reflected in the project as it evolved. The frequent engagement encouraged further interest and action on this project, along with other health endeavors among community partners and members.

Phase 4: Disseminating Community-Generated Ideas

A toolkit and web-based resources known as "Tools for Healthy Tribes" (americanindianhealthyeating.unc.edu/tools-for-healthy-tribes/) was created. The kit's format and content was largely based on community insights on the local food environment and ways to stimulate action by their tribal leaders and at the grassroots level, because community members felt dissemination should be leveraged to stimulate action, not just hand out information. Tribal leaders and members grew increasingly interested in the project as opportunities to disseminate the project's process and products developed.

Leaders and members also appreciated the "empowering tone" and how dissemination materials focused on what tribes can do, rather than just describing a problem "they are all well aware of." Showing the food-assessment results using maps was helpful but often not as interesting to community members who expressed that they "know where they eat and why." Many leaders expressed more interest in hearing about low-cost, immediate approaches they can take to address both economic development and health.

Phase 5: Accelerating Action While Fostering Sustainability

Building awareness about the project and its potential within the seven participating tribes helped accelerate action while fostering sustainability. State-recognized tribes are not recognized by the federal government and thereby not permitted to participate in the Indian Health Services or the Food Distribution Program on Indian Reservations. Both of these programs increasingly provide opportunities, funding, and staff to focus on obesity prevention strategies. The support in data, technical assistance, as well as direct financial support of time, space, and staff, helped provide some critical funds to tribes to take action on healthy- eating strategies.

The Haliwa-Saponi Indian Tribe invested their grant support and additional grant funds awarded through another art project into their tribally owned and operated farmers' market and started a community garden. These were great achievements considering state budget cuts at the time laid off the farmers' market manager, who was instrumental in moving healthy-eating ideas forward. Finally, the American Indian Healthy Eating Project benefited from transitioning into Healthy, Native North Carolinians, a capacity-building project funded by Kate B.

Table 2. Translating lessons learned from the American Indian Healthy Eating Project into recommendations

Lessons learned	Recommendations for future research and practice
Building awareness among tribal leaders about their authority and opportunity to create community changes for improving access to healthy, affordable foods can stimulate ideas and partnerships that can help address health disparities in Indian Country while addressing historical trauma	Use culturally appropriate strategies to initiate conversations with tribal leaders and develop guidance that is tailored to their unique authority and opportunity to develop policies and resolutions within their tribal communities that can improve access to healthy, affordable foods
Tailoring the partnership building process and approach to identifying particular community change strategies for an individual tribal community is necessary	Learn to recognize commonalities and differences among American Indian tribes from recognition status, governance structure, key sparkplugs and champions, community priorities and resources, and means of moving an idea forward
Changing political dynamics of a tribe's leadership can alter the direction the tribe was currently pursuing regarding healthy-eating community changes	Create and re-create relationships with tribal policymakers as they are elected and re-elected
Connecting tribes to learn from and work together on community changes about healthy eating can maximize project potential	Stimulate discussions and partnerships within and among tribal communities while recognizing long-standing working relationships among particular tribes or historical or contemporary conflicts
Seeking approval for each step taken and dissemination strategy is not necessary if memorandums of understanding clearly identify when and how tribal approval is needed on a specific dissemination activity	Seek guidance from American Indian researchers and tribes with active research programs occurring within their communities on developing an operating memorandum of understanding that formally governs all aspects of the project including dissemination strategies and how the data can be used in further programs, presentations, papers, and grant proposals

Reynolds Charitable Trust. This initiative directly supports the seven tribes, as well as the four urban Indian organizations in that state to develop, implement, and evaluate feasible and sustainable community changes regarding healthy eating and active living. This tribal government–state government–university collaborative project also provides support and technical assistance to strengthen capacity for meaningful, sustainable, and measurable changes.

Lessons Learned and Recommendations for Future Research and Practice

To our knowledge, this is one of the first projects that began working with multiple tribes in one state to explore the potential for tribally led efforts to maximize environmental and policy strategies to improve access to healthy, affordable foods. In addition, although toolkits and other forms of guidance on developing and implementing obesity prevention strategies have been increasingly created for policymakers, few of these guidance-oriented projects have shared the process by which they worked to engage policymakers—successfully or unsuccessfully—in developing evidence-based strategies to promote equitable access to healthy, affordable foods.[26,27]

Key lessons learned about initiating and sustaining partnerships with tribal communities to foster community changes regarding healthy eating were identified and translated into recommendations for future actions to address the alarming obesity and type 2 diabetes rates within Indian Country (Table 2). In addition, the project process and emerging products have been shared through in-person, phone, and e-mail consultations with other initiatives focusing on tribal or rural food access. That is, these findings have been discussed with more than 50 tribal leaders and stakeholders interested in responding to the call to action from Let's Move! in Indian Country[28] and maximizing funding opportunities such as the Association of American Indian Physicians' Communities Putting Prevention to Work mini-grants.[29]

Conclusion

This innovative process has relevance to advancing the role of tribal-level obesity prevention strategies within participating communities and throughout Indian Country. Specifically, the steps taken to develop *Tools for Healthy Tribes* raised awareness at the tribal, state, and federal levels on the importance of engaging tribal leaders in obesity prevention and the need to "make it Native." Future research is needed on how to engage tribal leaders and grassroots movements to prevent obesity in Indian Country.

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Menu-Labeling Policy in King County, Washington

Donna B. Johnson, RD, PhD, Elizabeth C. Payne, MPH, RD, Molly A. McNeese, PhD, Deborah Allen, PhD

Background: Food eaten away from home now accounts for about one third of total calories consumed in the U.S. Policy change could lead to sustainable improvements in restaurant and other nutrition environments. Broadly described, policy development is one of the three core functions of public health, and there is a need to more fully understand and evaluate this function. Policy process research has developed frameworks and models that can be used to understand the policy development process.

Purpose: To describe policy processes associated with the passage of restaurant menu-labeling regulations in order to inform nutrition policy development in other settings.

Methods: Document reviews and interviews with 12 key players in the policy process were conducted and analyzed between June 2009 and October 2010.

Results: Policy process actors primarily belonged to two advocacy coalitions: a public health coalition and an industry coalition. Within the coalitions there were shared values and beliefs about the appropriate role of governmental regulation in protecting the health of the population and the need for environmental change. The process was adversarial at times, but "policy learning" built the trust needed for collaboration to negotiate agreements. Expert technical assistance moved the process forward.

Conclusions: Elements that contributed to the success of a menu-labeling policy initiative in a large, urban health department have been identified. The King County case study can inform the work of others who seek to build healthier nutrition environments through policy change.
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Introduction

Policy interventions can make environments more conducive to health-enhancing choices,[1] and policy development is one of the core functions of public health.[2] Although the complexity of policy change presents theoretic and analytic challenges,[3] the field of policy research in health promotion has yet to fully "acknowledge critical concepts that would help to shed light on the policy process."[4] This makes it difficult to study policy development[3] and to improve future policy processes.[5] The field of policy process research, which is the study of interactions among people and public policy, has developed theories, models, and frameworks[6] that can be used to analyze complex patterns of policy development.

Food eaten away from home now accounts for about one third of total calories consumed in the U.S.[7,8] Nearly three quarters of total restaurant visits are to fast-food and other chain restaurants.[9] These visits are associated with large portion sizes, high intake of calories and saturated fat, consumption of sugar-sweetened beverages, limited access to health-promoting foods, and adverse health outcomes.[10–15] Public health agencies have taken several approaches to changing restaurant nutrition environments.[16–19] Some local health authorities have rule-making authority to regulate restaurants and other food environments,[20] and a limited number of jurisdictions have required restaurants to make changes such as providing menu labeling and banning artificial trans fats. Other jurisdictions have encouraged restaurants to voluntarily improve nutrition environments.[18,19,21,22]

In King County in Washington State, the board of health passed a menu-labeling regulation that required chain restaurants with 15 or more locations nationwide to

From the University of Washington (Johnson, Payne); Assessment, Policy Development and Evaluation, Public Health - Seattle & King County (McNeese); and Thurston County Public Health and Social Services (Allen), Olympia, Washington

Address correspondence to: Donna B. Johnson, RD, PhD, Nutritional Sciences, Box 353410, University of Washington, Seattle WA 98195. E-mail: djohn@uw.edu.

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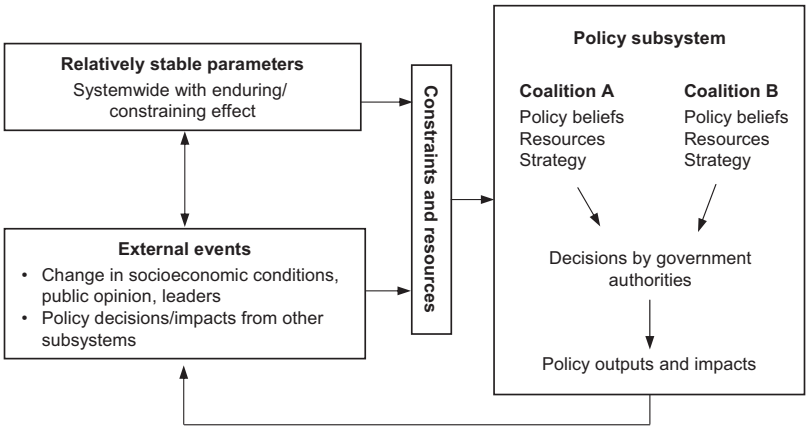

Figure 1. The Advocacy Coalition Framework
Note: Adapted, with permission, from Breton et al.[5]

provide calorie, saturated fat, carbohydrate, and sodium information to customers starting January 1, 2009. At several stages of the policy process, public health employees organized researchers and nutrition experts to provide the board with information about low levels of nutrition literacy in the population and the needs of consumers with health conditions such as diabetes. King County was the second jurisdiction to require menu labeling after New York City, and the national and state restaurant associations strongly opposed the initiative in both New York City and King County.

The purpose of this case study is to describe a specific nutrition policy development process in order to inform nutrition policy development in other settings. The current paper applies theoretic constructs from the field of policy process research[23] to study the development of restaurant menu-labeling regulations in King County, Washington.

Historical Context

The complex process of developing public policy is driven by interactive elements that evolve over time.[6] Many policy-change models, often including similar elements, have been developed by the field of policy sciences. These include punctuated-equilibrium theory, multiple-streams theory, policy networks theory, and social constructions theory.[24] Organizational and explanatory methodologies for policy development have been developed and tested in diverse settings, so that policy scientists can apply various theoretic perspectives in various situations.[4,5] A distinction can be made between models and frameworks,[24] with theories and models being grounded in frameworks that provide a foundation for analysis by specifying classes of variables and general relationships among them.[24]

The Advocacy Coalition Framework (ACF) positions policy development as the interactions over time between *advocacy coalitions*, whose members are brought together by common values and beliefs to advocate for a common policy outcome.[23] In an article summarizing the results of more than 80 applications of the ACF, Weible and colleagues[25] wrote that the ACF is an "analytical tool that can be used to generate better descriptions and explanations in public policy and administration." The framework has several components and many subtle interpretations, but in general, it is based on the understanding that each *policy subsystem* that is focused on a specific policy arena is composed of networks of advocacy coalitions (Figure 1).

Mature policy subsystems evolve over several years.[6] Within each policy subsystem there may be two to five different advocacy coalitions, which may or may not be defined distinctly. Actors from these coalitions may perceive the same information in different ways because of differences in beliefs and values; when trust is lost within the subsystem, there may be a "devil shift" where actors view their opponents as less trustworthy and more "evil."[6] Key components of the model include the following:

- relatively stable parameters: factors external to the policy subsystem that are stable over long periods of time;
- external events: dynamic external factors that influence advocacy coalition efforts to affect policy change;
- constraints and resources: combinations of relatively stable parameters and external events that create the constraints and resources that act on the policy subsystem;
- beliefs: the overarching driver for policy actors, categorized as: (1) deep core beliefs— essentially unchangeable deeply held personal beliefs about freedom, the role of distributive justice, human nature, and similar constructs; (2) policy core beliefs—fundamental policy positions concerning the articulated policy goals of an advocacy coalition; (3) secondary beliefs— concerned with issues related to the administration and implementation of policy;

- policy-oriented learning: occurs within the subsystem as a result of direct challenge to an advocacy coalition, accumulated experience, confrontation, and compromise;
- technical knowledge: does not always drive the policy process, but influences policy development in cases when coalitions have the organizational capacity to use technical information and experts are brought into the process early.[26]

Understandings of the elements of the ACF have continued to evolve since 1988 in response to criticism and advances in policy sciences. In a critique of the ACF, Gagnon and colleagues[3] suggest augmenting the model with *Institutional Constructs*, referring to the official structure and procedural and regulatory dimensions of policy subsystems and *Political Dimensions*, referring to the impact of the concerns of governmental leaders and citizens.

The ACF is applied in the present study because it appeared to offer the best-fit explanatory model for the specific policy actions around restaurant labeling in King County, but other policy models and constructs can be applied to restaurant menu labeling. For example, it is important to acknowledge the full range of policy entrepreneurs who have been working nationally to define potential policy solutions and promote restaurant labeling, and who made a substantial contribution to the opening of the King County "policy window" as described by John Kingdon.[27]

Methods

Data were collected through interviews and document review. The project was guided by members of the University of Washington Nutrition and Obesity Policy Research and Evaluation Network (WA NOPREN), who were an essential component of the NOPREN work at the University of Washington from the beginning of the NOPREN in October 2009. The current study specifically was informed by a WA NOPREN subcommittee that volunteered to work on research about the process of restaurant policy development. The subcommittee included county-level public health practitioners who had been involved in restaurant initiatives and university-based researchers. This subcommittee identified the key stakeholders to interview for the study. Interview participants were recruited following the process described by Dillman.[28] E-mails that introduced the project were sent to potential participants. An e-mail or phone call requesting an interview was sent 3 days later. Anyone who did not respond to the initial request for an interview was sent a second request 3 days after the initial request.

Oral consent was obtained using procedures approved by the University of Washington IRB. One of the authors had completed eight interviews between June 2009 and August 2009 as part of an internal King County public health evaluation; three King County participants were interviewed again for the current study. These interviews and four additional stakeholder interviews were conducted by phone between March 2010 and August 2010. Semistructured, open-ended interview guides were developed to facilitate the responsive-interviewing approach and to elicit information about the classes of variables specified in the Advocacy Coalition Framework.[29,30]

Results were analyzed with a two-stage process shortly thereafter.[29] First, interviews were professionally transcribed and reviewed for key concepts and themes; then an initial coding structure was developed. This coding structure was refined through an iterative process of duplicate coding and discussions. Data were analyzed in ATLAS.ti, version 6. Data were explored both within and across cases, analyzing patterns and linkages. Documents included Board of Health meeting minutes and agendas, the menu-labeling regulation, annual division-planning reports, project summaries and timelines, planning documents and project proposals, project evaluation data, media reports, press releases, and other marketing and outreach materials. Interview data were triangulated with written materials.

Results

Respondents

Twelve people were interviewed. These included a representative of the Washington Restaurant Association who participated in the negotiations with the Board of Health; three public health practitioners (two involved in policy-making and one involved in enforcement); four members of the Board of Health; and four restaurant owners. Nine other key stakeholders were invited but not interviewed. Two attorneys from the prosecuting attorney's office were unable to complete interviews because of attorney–client privilege. One public health practitioner involved in enforcement never responded to requests for an interview, and three other public health practitioners (one involved in policy making and two involved in enforcement) refused. Two other representatives of the Washington restaurant association refused, and one restaurant operator refused.

The Policy Subsystem

The policy subsystem included two advocacy coalitions that were composed of actors brought together by their common values and beliefs to advocate for a common policy outcome. The public health coalition included the Director of Public Health, health department Healthy Eating and Active Living and Environmental Health staff, representatives from community health organizations and health advocacy groups, academic researchers, healthcare providers, and the Center for Science in the Public Interest. The industry coalition was composed of restaurant owners and the restaurant association.

Parameters and External Events

Policy actors generally agreed on the parameters influencing the work with restaurants. These included the increasing prevalence of obesity and diabetes, the importance of meals eaten away from home as a determinant of

dietary quality, and the need for restaurant businesses to be profitable. External events played an important role; the impact of the economic recession was mentioned by most respondents, and the influence of external funding that had helped to build capacity for policy, systems, and environmental change was acknowledged by public health practitioners. The New York City menu-labeling policy process was also influential. New York City's success opened a path for the exchange of technical information with public health practitioners and legal experts that enhanced the county's policy efforts.

Core Policy Beliefs

Core policy beliefs appeared to be major drivers for each of the policy actors that were interviewed. The tensions between values played out across three major dichotomies: industry freedom versus the consumer's right to know; use of educational versus regulatory approaches; and the importance of environmental change to make it easier to choose healthy foods versus a reliance on individual responsibility to select healthier foods among an array of less-healthy foods. Public health coalition members believed that it was appropriate to use regulation when necessary to protect the health of the community, that population health is a priority, that humans are resistant to change so we need environmental change to make it easier for them to change, and that citizens are entitled to nutrition information. Industry coalition members believed that regulations are bad for the economy, that voluntary mechanisms are more appropriate than regulation, and that it is unfair to "single out" restaurants.

The Policy Subsystem: Beliefs and Institutional and Political Context in Action

In King County, the 12 members of the board of health include three county council members, three Seattle city council members and two mayors; the additional four positions are filled by health professionals. Board composition influenced beliefs and how these played out in the political context. Study respondents who were members of the board of health agreed that public health regulation is an appropriate way to improve population health and that health should be a governmental priority. Because they had the backing of the board of health and health department leadership, King County actors had the capacity to work with the restaurant industry to forge compromises that were seen as both politically and institutionally feasible.

Policy Learning

Substantial policy learning took place between the coalitions within the policy subsystem. At one point in the process it seemed that a classic "devil shift" was underway, with the restaurant industry members portraying themselves as unjustly victimized by the process. The policy process included heated discussions about specific menu-labeling requirements, dramatic testimony before the board of health about the harms that might be done to restaurants, and an attempt by the restaurant association to get preemptive legislation passed in the state legislature.

The state legislature stipulated that the board of health and the restaurant association work together to develop a menu-labeling regulation that was acceptable to both sides. Representatives of both subsystems came together in several meetings, heard each other's point of view, and were able to reach compromises on parts of the regulation such as details about the public display of menu information and the number of restaurant locations that determined the need for a restaurant to have to comply with menu-labeling regulations. Public health interviewees spoke about the need to establish trust and build relationships with industry representatives throughout the process. One respondent stated, "By the time of the last stakeholder process [meeting], [it] went from a really adversarial, angry first meeting to people who were hugging goodbye saying how good they felt about the process."

The Role of Technical Knowledge

The King County Board of Health had received technical knowledge about population-based nutrition and obesity issues for several years through public testimony, committee study, and materials developed by public health staff. The board had taken other actions on nutrition and obesity before concerns about restaurant foods were brought before them. During the board's consideration of this issue, public health staff played a major role in developing scientific briefing papers and providing technical assistance about policy implementation issues.

Discussion

The King County menu-labeling case study can inform nutrition policy processes. The Advocacy Coalition Framework helped to identify the variables that may be most informative in this case. Results suggest that other policy development efforts might benefit from the following:

Analysis of coalitions and policy beliefs: In King County, the strong public health advocacy coalition included health department leadership, policy mentors, and the medical community. These actors were brought into collaborative action through their shared policy beliefs in health as a policy priority and a proactive role for

public health in the promotion of healthy environments. These beliefs may have arisen from deeply held personal core beliefs and probably are reinforced by the progressive nature of Seattle politics in general. This kind of action may not be possible in jurisdictions where there are insufficient advocacy-coalition members who share these kinds of policy beliefs.

Political landscape: In King County, the board of health included several nonelected health professionals who had the political freedom to emphasize the value of health, even when some of the electorate may have painted the regulations as anti-business.

Policy learning: Within the policy subsystem in King County, the coalition actors were able to move from a lack of trust, the "devil shift," to collaboration that made negotiated agreements possible. This policy learning set the stage for ongoing relationships. Policy subsystem members from both coalitions subsequently were able to work together to revise the regulations so that they would comply with national menu-labeling legislation.

Expert-based information: The King County case also illustrates the impact of expert-based information early in the process. Health department staff had been working on policy, systems, and environmental change for several years. Because these public health practitioners had provided data and information about nutrition and obesity to the board all along, the board was well briefed when the issue of restaurant nutrition environments came to its attention.

Limitations

There are limitations to the ACF and to the application of the ACF in these cases. The framework has been criticized for its emphasis on the role of technical information and the role of experts without acknowledging the impact of other forms of knowledge that come from outside the specific policy system.[3] It also has been charged with focusing too much on normative and cognitive dimensions and not on institutional and political dimensions, as well as a need for more careful analysis of the relationships between political actors.[3] Any one framework cannot capture the full range of factors that influence policy processes,[6] and researchers and practitioners need to be able to draw from many analytic approaches to have a comprehensive perspective on policy processes.[4]

Conclusion

Elements that contributed to the success of a menu-labeling policy initiative in a large, urban health department have been identified. The King County case study can inform the work of others who seek to build healthier nutrition environments through policy change.

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Increasing Water Availability During Afterschool Snack

Evidence, Strategies, and Partnerships from a Group Randomized Trial

Catherine M. Giles, MPH, Erica L. Kenney, MPH, Steven L. Gortmaker, PhD, Rebekka M. Lee, ScM, Julie C. Thayer, MS, MPH, Helen Mont-Ferguson, MBA, RD, Angie L. Cradock, MPE, ScD

Background: Providing drinking water to U.S. children during school meals is a recommended health promotion strategy and part of national nutrition policy. Urban school systems have struggled with providing drinking water to children, and little is known about how to ensure that water is served, particularly in afterschool settings.

Purpose: To assess the effectiveness of an intervention designed to promote water as the beverage of choice in afterschool programs.

Design: The Out of School Nutrition and Physical Activity Initiative (OSNAP) used a community-based collaboration and low-cost strategies to provide water after school. A group RCT was used to evaluate the intervention. Data were collected in 2010–2011 and analyzed in 2011.

Setting/participants: Twenty afterschool programs in Boston were randomized to intervention or control (delayed intervention).

Intervention: Intervention sites participated in learning collaboratives focused on policy and environmental changes to increase healthy eating, drinking, and physical activity opportunities during afterschool time (materials available at www.osnap.org). Collaboration between Boston Public Schools Food and Nutrition Services, afterschool staff, and researchers established water-delivery systems to ensure children were served water during snack time.

Main outcome measures: Average ounces of water served to children per day was recorded by direct observation at each program at baseline and 6-month follow-up over 5 consecutive school days. Secondary measures directly observed included ounces of other beverages served, other snack components, and water-delivery system.

Results: Participation in the intervention was associated with an increased average volume of water served (+3.6 ounces/day; $p=0.01$) during snack. On average, the intervention led to a daily decrease of 60.9 kcals from beverages served during snack ($p=0.03$).

Conclusions: This study indicates the OSNAP intervention, including strategies to overcome structural barriers and collaboration with key actors, can increase offerings of water during afterschool snack. OSNAP appears to be an effective strategy to provide water in afterschool settings that can be helpful in implementing new U.S. Department of Agriculture guidelines regarding water availability during lunch and afterschool snack.

Trial registration: This study is registered at clinicaltrials.gov NCT01396473.

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From the Department of Society, Human Development and Health, Harvard School of Public Health (Giles, Kenney, Gortmaker, Lee, Thayer, Cradock) and Food and Nutrition Services, Boston Public Schools (Mont-Ferguson), Boston, Massachusetts

Address correspondence to: Catherine M. Giles, MPH, Department of Society, Human Development and Health, Harvard School of Public Health, 401 Park Dr, 4th Floor West, Boston MA 02215. E-mail: cgiles@hsph.harvard.edu.

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Introduction

An estimated one third of children aged 6–11 years in the U.S. are overweight or obese,[1] and growing evidence indicates that the calories children consume via beverages contribute substantially to this problem.[2–5] Replacing sugary beverages with noncaloric beverages such as water can result in reduced caloric intake,[6] and increasing water access could reduce the prevalence of child overweight.[7]

National data indicate that many children consume less water than recommended[8,9] and recent experimental research suggests that increasing water intake may improve children's cognition and memory.[10] Promoting water and reducing sugar-sweetened beverage consumption among children have emerged as important topics among researchers and public health professionals focused on obesity prevention. Studies have documented increases in water consumption following targeted interventions in middle and elementary schools during regular school hours,[7,11,12] and a ban on sugary drinks in Boston Public Schools (BPS) led to reduced sugar-sweetened beverage intake among high school students.[13]

Tap water is an inexpensive option for providing hydration to children in school settings. However, many schools have difficulty accessing safe, potable water.[14] In Boston, 32% of public schools provide access to municipal water through plumbed drinking fountains; the remaining schools provide bottled water (ALC and HMF, unpublished data, 2011). This history of limited water access in BPS necessitated the development of innovative strategies in the current study. Afterschool programs are important, but understudied, places for promoting children's healthy-beverage consumption. According to the Afterschool Alliance, approximately 8.4 million children participate in afterschool programs[15]; in Boston, nearly half of school-aged children participate.[16] More than 1 million children at nearly 25,000 afterschool programs are provided with snacks via the National School Lunch Program (NSLP) and the Child and Adult Care Feeding Program (CACFP).[17] Although a few recent obesity-prevention studies have been situated in afterschool settings,[18–20] these interventions have been limited in duration and scope and have not addressed beverages specifically. The one study to date that focused on promoting water in afterschool settings relied on menu analysis.[21]

The Out of School Nutrition and Physical Activity Initiative (OSNAP), a community-based intervention, was designed to improve nutrition- and physical activity–related policies, environments, and practices in afterschool settings. The current study evaluates the impact of the intervention on the frequency with which water was served to children during afterschool snack.

Methods

Study Design

This group RCT occurred in 20 afterschool programs (ten intervention sites paired with ten matched controls) in Boston MA from fall 2010 through spring 2011 (Figure 1). Eligibility requirements for programs included program size (enrollment ≥39 children); length of the program (lasting mid-October through June 1); and willingness to be randomized to intervention or control (delayed intervention 1 year later) condition. Informed consent procedures were followed for all children. Parents (or guardians) gave permission for their child to participate; verbal assent was obtained from each child. The study was approved by the Harvard School of Public Health Committee on Human Subjects and the Boston Public Schools Research and Evaluation Department.

Afterschool Sites

Eligible programs were identified through lists obtained from Boston Public Schools Food and Nutrition Services (BPS FNS), BPS Department of Extended Learning Time and Services (DELTAS), the Greater Boston Young Men's Christian Association (YMCA), Boston Centers for Youth and Families (BCYF), and the Boys and Girls Club of Boston.

Prior to randomization, sites were matched on the type of agency overseeing the program (such as YMCA), snack provider, physical activity facilities, and school-level racial/ethnic and sociodemographic composition (school-level data obtained from administrative records). Twenty sites were randomized to intervention or control in October/November 2010 following baseline data collection. Control sites received no intervention and were given the opportunity to participate in the intervention the following school year.

The primary study contrast was between observations of water delivered to children in intervention and control programs with respect to changes from baseline (September–November 2010) to follow-up (April/May 2011). The primary endpoint was the aver-

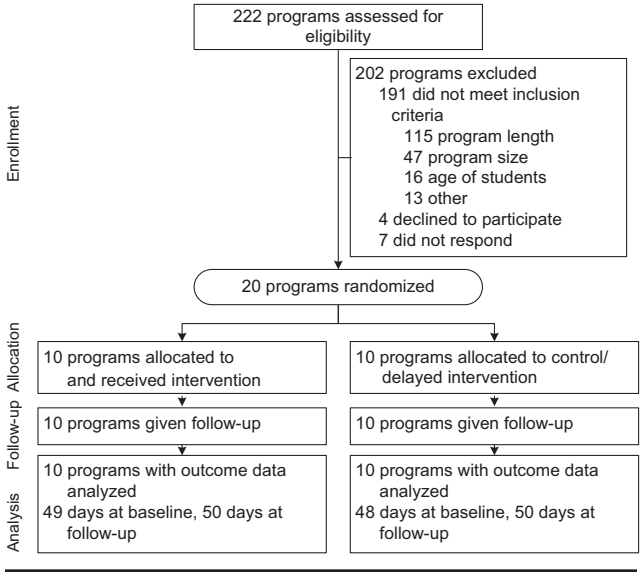

Figure 1. Out of School Nutrition and Physical Activity Initiative (OSNAP) flow chart

age change in ounces of water served at snack per day. Secondary measures were the average change in beverage kilocalories served at snack per day and changes in ounces of juice and milk served at snack per day. The average number of times each beverage was served at snack per day also was examined.

Intervention

The intervention was applied to several levels of influence in the afterschool programs, including food service, program policies, and staff practices. The research team partnered with the primary snack provider for participating programs to implement menu changes and water-delivery systems. Intervention sites participated in three learning sessions between December 2010 and May 2011 focused on setting goals, problem solving, and implementing policy, practice, and communication strategies related to each goal.

Theoretic Framework

OSNAP is an environmental and policy change intervention based on the social-ecological model and a community-based participatory research (CBPR) approach.[22,23] OSNAP aims to improve physical activity and nutrition practices, policies, and communications in afterschool programs, which, combined with staff participation in collaborative meetings and resulting outreach to parents, aims to lead to improved participant attitudes, behaviors, and health. Community research partners representing BPS, the Boston Public Health Commission, and community and municipal agencies sponsoring afterschool programs advised the OSNAP researchers in establishing nutrition and physical activity goals, adapted from previous work with the YMCA of the U.S.A.[21,24] This initiative also employed a CBPR approach by working with BPS to offer healthier snack options, building the capacity of afterschool staff to be agents of change in their programs, and sharing data with programs.

Food and Nutrition Services Change

Prior to the intervention, the OSNAP team partnered with BPS FNS to review snack menus and provide nutritional and price analyses to support modifications that were consistent with the OSNAP goals, while also feasible for school system implementation. These changes included decreasing the days per week juice was on the menu, serving water as a primary beverage, and increasing weekly offerings of whole fruits and vegetables. This menu was given to snack providers at intervention sites for implementation following baseline data collection.

Water beverage serving plans for each site were determined based on information provided by BPS FNS on site-level infrastructure issues, program size, and applicable costs. Six intervention sites had access to plumbed drinking water; four were dependent solely on bottled-water dispensers. Given these constraints, the intervention focused on two water-delivery systems: (1) filling insulated jugs with water from the tap and (2) filling pitchers with bottled water from water coolers.

When necessary, school-based BPS FNS staff placed jugs on food service carts to transport the insulated jugs from the water source to the program area and utilized pitchers to help fill jugs. The revised snack menus specified that BPS FNS staff purchase 8-ounce recyclable cups; their price (less than $0.01 each) was factored into the overall cost of the snack. In programs using insulated jugs, school-based BPS FNS staff sanitized and filled the insulated jugs each day. Afterschool staff members were responsible for sanitizing and filling the pitchers and serving water to children in their program.

Learning Collaborative

Over the 6-month intervention period, program directors and staff working directly with children from the intervention sites were invited to participate in a series of three learning-collaborative sessions. Staff were recruited to participate immediately following baseline data collection, and the first collaborative was held 1 month after baseline collection was complete. The meetings were hosted at participating sites and held at various times of the day to ensure participation; staff received a $40 stipend for attending. The meetings were led by the OSNAP research team, lasted approximately 3 hours, and followed the approach of the Institute for Healthcare Improvement Breakthrough Series[25,26] and the model for professional development used by DELTAS. Afterschool staff reviewed reports of baseline data related to water provision and other OSNAP goals at their programs.

After assessing their programs' current environments, staff set actionable goals to improve program practices, write relevant policies, and communicate changes using resources, including sample language and templates for parent communications, provided by the OSNAP team. These materials are available free of charge at www.foodandfun.org and www.osnap.org. Afterschool staff shared successes and challenges in completing goals with each other, received nutrition and physical activity skill development, and were offered training to implement the Food & Fun Afterschool Curriculum.[24] Sites received technical assistance, activity updates, and reminders via phone, newsletters, and e-mail between sessions.

Measures

Program and participant characteristics. The type of food service provider for each site (onsite BPS cafeteria, BPS outside vendor or program provided) was obtained from school administrative records. Program enrollment and staffing were reported by site directors on a questionnaire at baseline. Child age, race/ethnicity, and gender were reported by parents on informed consent forms at baseline.

Assessment of beverages served during snack periods. Trained observers recorded all beverage items served during snack, including information on volume, type, and brand, for 5 consecutive school days (the observation week) during designated snack time in each program at baseline and follow-up. When multiple beverages were offered during snack time, observers noted whether children were served all beverages or if they were instructed to choose one. Water was considered "served at snack" when data collectors observed that pitchers and cups or insulated jugs with water were provided by staff and delivered in small cups, bottles, or pitchers on the table or was available from a central cooler in the snack area, but was not considered served if it was available only via drinking fountains. Volume (in ounces) of beverage served was calculated based on package labeling for juice and milk and cup size for water.

Nutrition information, including kilocalories, was obtained from BPS FNS (37%); manufacturer's websites (43%); or from similar product listings in the U.S. Department of Agriculture (USDA) Nutrient Database.[27] If children had a choice among multiple beverages, the average volume in ounces, frequency of serving of each type of bever-

Table 1. Baseline characteristics of participating out-of-school programs (N=20), M (SD) unless otherwise noted

	Intervention	Control	*p*-value
Average child age per site, years	8.0 (0.6)	7.7 (0.7)	0.36
Average percentage of boys per site	48.5 (0.7)	51.1 (10.8)	0.58
Average percentage of Non-Hispanic whites per site	5.6 (6.6)	15.5 (17.5)	0.11
Average percentage of Non-Hispanic blacks per site	37.2 (36.2)	38.3 (25.4)	0.94
Average percentage of Hispanics per site	43.1 (34.5)	32.7 (21.3)	0.43
Number of staff per site	7.6 (6.8)	10.6 (11.4)	0.48
Number of children enrolled per site	62.1 (36.7)	83.0 (91.1)	0.51
Food service, *n* (%)			0.99
Onsite BPS cafeteria	4 (40)	3 (30)	
Outside BPS vendor	5 (50)	6 (60)	
Program-provided	1 (10)	1 (10)	
Sponsoring agency, *n* (%)			0.66
YMCA	4 (40)	4 (40)	
Boys & Girls Club	1 (10)	3 (30)	
Boston Center for Youth and Families	2 (20)	2 (20)	
None	3 (30)	1 (10)	
Program has a policy supporting water, *n* (%)	2 (20)	4 (40)	0.63
Ounces of water served per day	0.7 (1.0)	0.8 (2.0)	0.85
Servings of water per day	0.2 (0.3)	0.2 (0.3)	0.94

BPS, Boston Public Schools

age, and kilocalories were calculated across the beverage options. Data were collected during the 2010–2011 school year.

Data Analysis

The primary outcome, average daily ounces of water served, was calculated by averaging the volume of water served per day observed across the observation week and then dividing by the number of valid observation days. Secondary outcomes of average daily volume of juice and milk (in ounces) and average number of times per day each type of beverage was served were calculated similarly. Both primary and secondary outcomes were calculated for baseline and follow-up periods, and differences from baseline to follow-up were calculated for both intervention and control sites.

Linear regression models, accounting for multiple observations per site, were used to evaluate the impact of the intervention on change in the primary and secondary outcomes. To adjust for the matched design, nine indicator variables were included for the ten randomized pairs. The SAS (version 9.3) procedure PROC REG was used to estimate all models. Analyses were conducted on the basis of initial assignment to control or intervention status regardless of observed level of water delivery at the site (intent-to-treat). Data were analyzed in 2011.

The outcome variables were averages over the 5 days of observation (4 days in a few cases as noted). The day-to-day measures within sites were substantially correlated, averaging 0.73 at baseline among intervention and control programs. Previous research has found that direct visual observation can assess validly the serving of beverages during meals.[28]

Results

Number of Valid Observation Days

At baseline, 97 days of snacks served were observed across the 20 sites; 17 programs were observed for 5 days, and three programs were observed for 4 days, because of holiday schedules. At follow-up, 5 days of snacks and beverages were observed across the sites, resulting in 100 days of beverage observations.

Baseline Characteristics

Study programs served racially, linguistically, and economically diverse populations. Schools at which the programs were located were 37.7% black, 10.6% white, and 37.9% Hispanic. On average, 81.2% of children qualified for free/reduced-price lunch. The mean enrollment across afterschool programs was 72.0 children and the mean child age was 7.8 years. There were no differences in any of the demographic or primary and secondary outcome variables at baseline (Table 1).

Intervention Implementation

Eight programs participated in all three learning-collaborative sessions. One program missed the first two learning sessions and met with study staff to review the intervention materials; a second program missed the third learning session. One to three staff members from each site participated.

All ten intervention sites chose providing water as a beverage at snack every day as a primary goal. Action steps set to achieve this goal included creating policies in family handbooks requiring serving water at snack, announcing new practices at staff meetings and assemblies,

communicating beverage changes with families via newsletters and during program events, and increasing child enthusiasm for drinking water with art activities and weekly water-helper duties.

Primary and Secondary Outcomes

Adjusting for the matched design, the intervention led to an increase of 3.6 ounces of water served per day ($p=0.01$, 95% CI=1.3, 5.9) and a decrease in beverage calories served by 60.9 kilocalories ($p=0.03$, 95% CI=4.5, 117.4; Table 2). Servings of total ounces of milk and total ounces of 100% fruit juice served were each reduced by 2.5 ounces; however, these reductions were not significant. The frequency with which water was served increased significantly, by an additional 0.6 servings per day ($p=0.01$, 95% CI=0.2, 1.0), while there was a nonsignificant decrease of 0.2 servings of juice per day ($p=0.12$) and a borderline nonsignificant decrease of 0.3 servings of milk per day ($p=0.06$).

Discussion

At the 6-month follow-up, programs that participated in the OSNAP intervention served 3.6 more ounces of water on average per child per day, decreased calories available from beverages, and served water more frequently during snack than did control programs that did not participate in the intervention. Compared to control programs, the water availability increases in intervention programs were equivalent to having served water three additional times over a 5-day school week. At follow-up, intervention programs served 60.9 fewer beverage calories per day than control programs.

The present study, to the authors' knowledge, is the first RCT of an intervention to increase the amount of water in afterschool programs. Previous studies promoting water consumption during school have demonstrated increases in water availability and consumption during the day.[7,12] One intervention focused on increasing water

Table 2. Changes in average servings of beverages in intervention and control afterschool programs (N=20)

	Baseline, M (SD)	Follow-up, M (SD)	Crude change	Adjusted change[a] (95% CI)	*p*-value
Ounces of water per day					
Intervention	0.6 (0.9)	4.3 (2.1)	+3.7	+3.6 (1.3, 5.9)	0.01
Control	0.8 (2.0)	0.9 (1.3)	+0.1		
Ounces of 100% juice per day					
Intervention	3.0 (1.7)	2.1 (1.7)	−0.9	−1.0 (−2.5, 0.6)	0.19
Control	2.8 (1.4)	2.9 (1.5)	+0.1		
Ounces of milk per day					
Intervention	3.3 (3.7)	1.0 (0.9)	−2.3	−2.5 (−5.1, 0.1)	0.06
Control	2.0 (1.8)	2.2 (2.5)	+0.2		
Kilocalories from beverages served per day					
Intervention	101.9 (48.4)	46.6 (29.1)	−55.4	−60.9 (−117.4, −4.5)	0.03
Control	75.0 (20.5)	80.6 (37.5)	+5.6		
Times water served per day					
Intervention	0.2 (0.3)	0.8 (0.3)	+0.6	+0.6 (0.2, 1.0)	0.01
Control	0.2 (0.3)	0.2 (0.3)	+0.04		
Times 100% juice served per day					
Intervention	0.6 (0.4)	0.5 (0.4)	−0.2	−0.2 (−0.5, 0.1)	0.12
Control	0.6 (0.3)	0.6 (0.3)	+0.04		
Times milk served per day					
Intervention	0.4 (0.5)	0.1 (0.1)	−0.3	−0.3 (−0.6, 0.01)	0.06
Control	0.3 (0.2)	0.3 (0.3)	+0.03		

[a]Adjusted change represents the difference in change in outcomes in the intervention compared to the control sites, controlling for randomization pair indicator variables (nine indicators).

at lunch found an increase of 0.8 ounces served per child per meal.[11] Another intervention focused on increasing water at afterschool snacks found a nonsignificant increase of an additional 0.4 servings per day based on menu analysis.[11,21]

The current study takes a replicable, multiple-level approach to changing beverages in afterschool programs. Researchers worked with school food service staff to set up standard operating procedures including water-delivery systems (including cups, pitchers and jugs) and menu changes that would be sustainable after the study was complete. At the program level, afterschool staff implemented action plans to ensure that water would be served with the snack moving forward.

The primary mechanisms for increasing water accessibility included modifications to the snack menu and program environments. Modified menus specified both water and cups daily, and promoted water as the primary beverage, while program-site staff ensured availability of water during snack time. Cups were provided as part of the snack, as previous research has found provision of cups by food service to lead to higher water consumption.[11] The current study noted a high level of compliance in afterschool staff attendance at learning-collaborative sessions, and in staff servings of water at snack, consistent with previous water interventions during schools meals.[7] Food service staff reported that filling and sanitizing the jugs did not interfere with completion of other responsibilities.

The present study adds to the body of evidence that water is a relatively easy target for change and should be a top priority for programs and policy makers.[7,11,12] Recently, new policies at both the state and national levels have required that schools make free, potable water available to children both throughout the school day and at meals served through the NSLP, including the Afterschool Snack Program.[14,29] Nationally, organizations such as the YMCA of the U.S.A. and the Partnership for a Healthier America (www.ahealthieramerica.org) and ChildObesity180 have included serving water as a healthy goal.

The current study also indicates that the USDA Afterschool Snack Program can decrease the caloric impact of beverages by promoting water as the beverage served. An additional benefit to this intervention is potential financial savings in serving water instead of other beverages. Previous analyses of afterschool snack menus indicate a potential cost savings of $0.21 per snack per child by offering water rather than 100% juice.[30] The USDA might therefore consider strengthening its regulations regarding water to recommend water as either the only beverage or as a complementary served beverage to increase children's consumption of water. The present study indicates that such a strategy can increase access to drinking water for children to help close the gap in drinking water intake.

Study Considerations and Limitations

The intervention was assessed over 1 school year, so it is unclear whether its effects will be sustained. However, intervention components included food service and policy changes to ensure institutionalization; for example, the provision of recyclable cups was chosen to ensure sustainability, given previous findings related to sustainability concerns of student-brought refillable bottles.[11] The intervention changes made to the BPS FNS afterschool snack menu are being implemented systemwide. Cost-saving strategies identified by Cradock et al. can help ensure sustainability.[31]

The current study has important strengths. By design, RCTs aim to distribute variables that might affect intervention outcomes randomly across sites. Researchers randomized matched pairs after baseline data collection was complete. Trained observers collected data on beverages served rather than relying on self-report or menu analysis; observers were blinded to intervention status at follow-up. The longitudinal follow-up allowed the research team to determine changes in beverages served over time.

Although announcements regarding the Healthy Hunger-Free Kids Act of 2010 and Massachusetts state regulations requiring water availability occurred midway through the intervention, neither policy went into effect until after follow-up data collection. The present study only included programs serving elementary-aged children, mostly school-based; the results of this study may not be generalizable to afterschool programs serving adolescents or programs with specific foci (e.g., the arts, computer training, or seasonal sports programs). As this is a preliminary study on the intervention impacts on serving water, future studies can build on this work by measuring changes in children's consumption of water and other beverages.

Conclusion

The current study provides evidence for the potential to make systematic changes to afterschool snack to offer children a no-calorie healthy beverage: water. The results demonstrate that the policies and systems implemented to encourage water as a beverage during afterschool snack can be implemented successfully in a large urban school district.

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A Review of Obesity-Themed Policy Briefs

Elizabeth A. Dodson, PhD, MPH, Amy A. Eyler, PhD, Stephanie Chalifour, BA, Christopher G. Wintrode, Esq, MHA

Context: Policy approaches are one of the most promising population-based means of addressing the epidemic of obesity in the U.S., especially as they create supportive environments for healthy living. Policy briefs can be an effective means of disseminating research information to inform obesity prevention efforts; however, they are often ineffective because of length, density, and inaccessibility. The purposes of this project were to identify a collection of obesity-related policy briefs, analyze the content, and make recommendations for model policy briefs.

Evidence acquisition: In 2010, online searching strategies were developed with criteria that included a primary topical focus on obesity, written between 2000 and 2010, targeting any population age group, including a policy-change message, and being readily available online. The research team developed a coding tool and used it to analyze briefs. A subsample of the briefs was used for further analysis on dissemination.

Evidence synthesis: Analyses were conducted on 100 briefs. Most (72%) were developed between 2005 and 2010; the average length was five pages. The majority had no tables, few figures, and only 36% included photos. The average reading level was high. A lack of monitoring or evaluating dissemination efforts prevailed.

Conclusions: Policy briefs represent an effective, often-preferred, potent tool for public health practitioners and researchers to communicate information to policymakers. Recommendations include presenting information clearly, using a concise format, including design elements, noting reference and contact information, employing active and targeted dissemination efforts, and conducting evaluation.

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Context

In the U.S., more than 63% of adults and 27% of children are now overweight or obese, contributing to more than $147 billion, in 2008 dollars, in medical costs annually, or nearly 10% of all healthcare costs.[1–3] Environmental and policy approaches represent one of the most promising means of addressing this problem. The nature of policy interventions makes them useful for several reasons. Unlike interventions designed to address specific individuals, policy interventions are aimed at changing physical and sociopolitical environments; as such, policy interventions have potential to affect entire populations.[4]

Also, policy interventions are designed to provide opportunities, support, and cues to help people develop healthier behaviors and make healthy choices. Policies may directly affect behaviors. For example, research[5] shows that when the price of tobacco is increased, tobacco consumption decreases. Additionally, policies may alter social norms. This can be observed in the way that policies regarding the creation or design of sidewalks and bike lanes may increase the presence of physically active people in public spaces, which can encourage others to engage in physical activity.[4] Finally, policies are often more permanent and far-reaching than many public health programs that are focused on individual-level behavioral change.

As researchers and public health practitioners work to identify and measure effective policies, they populate the scientific literature with their results. Unfortunately, those in positions to implement effective policies are rarely exposed to the dissemination outlets used by researchers (e.g., peer-reviewed research journals and scientific conferences). Indeed, researchers and policymakers operate in very different worlds, using dissimilar types

From the Prevention Research Center in St. Louis, Brown School, Washington University in St. Louis (Dodson, Eyler, Chalifour); and SSM Health Care (Wintrode), St. Louis, Missouri

Address correspondence to: Elizabeth A. Dodson, PhD, MPH, Brown School and Prevention Research Center in St. Louis, Washington University in St. Louis, 660 S. Euclid Avenue, Campus Box 8109, St. Louis MO 63110. E-mail: edodson@wustl.edu.

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of communication and working on vastly different timelines.[6] For example, although researchers share important information in long, written reports or publications, policymakers rely on oral communication and brief summaries of crucial details.[7] Further, policymakers indicate a preference for information that is presented clearly and concisely (e.g., materials are one to two pages long and use bullet points rather than long paragraphs), includes tables and figures, and provides references and contact information for follow-up and more in-depth study.[8–10]

Researchers and practitioners are identifying important research findings with policy implications that may be translated to those in positions to introduce and enact policies. With limited time and resources, it is crucial to understand how to most effectively and efficiently communicate this information to policymakers. Policy briefs, which include brief reports or summaries of information relevant to policy issues, are a common means of doing so.[10]

There are many benefits to disseminating evidence through policy briefs in advance of peer-reviewed publications. Indeed, the issue of timing is an important one that will likely best be addressed through system changes that improve the timeliness with which evidence can be published. The advantages of producing policy briefs before published papers include the alacrity with which important findings can reach policymakers, who often need to make decisions immediately. Unfortunately, if journals require that authors agree not to publish findings in advance of journal publication, authors may be limited in their ability to quickly disseminate findings and important, time-sensitive decisions may be made without all the evidence.

Regardless of when policy briefs are created, researchers are still faced with questions such as, What makes a good policy brief? Through what channels should they be shared? What information should they include and in what format? Are researchers and practitioners producing materials that incorporate policymakers' stated preferences? To address some of these questions, the goals of this project were to identify a selection of readily available obesity-related policy briefs, analyze the content, evaluate whether the briefs reflect current knowledge about what policymakers want, and make recommendations for model policy briefs.

Evidence Acquisition

The research team, experienced in health communication and policy content analysis, began by determining criteria to search for policy briefs. These criteria included a primary topical focus on obesity, being written between 2000 and 2010, targeting or discussing any population age group, having a message about policy change, and being readily available online. Materials that were designed as annual or full reports or program plans were excluded in favor of those serving as fact sheets or briefs.

The team also devised a search protocol designed to locate a wide range of obesity-related policy briefs from a variety of websites. Initial searches included the websites of the following organizations, which are leaders in chronic disease prevention research or advocacy, and/or which are respected resources for policy information: Active Living Research, American Cancer Society, American Heart Association, National Association of Chronic Disease Directors, National Conference of State Legislatures, Center for Science in the Public Interest, CDC, and National Policy and Legal Analysis Network. The second tier of searches included websites of state health departments and Prevention Research Centers. Search terms included *policy brief* and *obesity*, *physical activity*, or *nutrition*. Finally, searches were conducted using Google online search engine.

A set of evaluation criteria for analysis of the briefs was also developed through several iterations and in consideration of current knowledge about policymaker preferences. The criteria included a variety of characteristics about the briefs: year published; numbers of pages, tables, figures, text boxes, and photos (count); whether briefs contained personal stories or quotations (yes/no); whether briefs referred to the Ecologic Model (yes/no)[11]; use of color (yes/no); font size; provision of contact information for readers seeking additional information; citation of a funding source (yes/no); average words per page (calculated by exporting policy briefs into Microsoft Word and dividing total number of words by number of pages); and number of references cited (count). The Flesch-Kincaid grade level was also determined for each brief by exporting it into Microsoft Word and utilizing the reading-level function.[12,13]

The briefs were also evaluated based on more-subjective characteristics, such as ease of access based on number of mouse-clicks needed to locate brief from an agency's home page: (<3=easy; ≥ 3=challenging); clarity of message (clear/unclear to the reader, evaluated on whether an obvious, understandable message was well conveyed); quality of tables, figures, and photos (high/low quality evaluated by whether visual presentation of data was clear and understandable to the reader); whether the brief could be modified or tailored for other audiences (yes/no; could messages be changed or targeted for different audiences); and whether the message was actionable (yes/no; were specific actions suggested that readers could take to address the issue described).

Two additional criteria regarding dissemination were evaluated in a subsample of the policy briefs ($n=50$). The subsample was selected by ordering the briefs alphabetically by title and selecting every other brief for inclusion. Telephone numbers and e-mail addresses provided on the policy briefs (or websites, when no contact information was given) were used to contact authors or collaborators to inquire about the method of dissemination that was used with the briefs, and whether dissemination efforts had been evaluated.

To ensure consistency in analysis of the briefs, four coders were trained to use the evaluation criteria. As part of the training, all coders analyzed the same set of briefs and then compared results. Based on this process, the evaluation tool was revised by the team of coders until all four were in agreement and confident about how to use it. The evaluation tool was then entered into an online survey system. Using this system, each of the four coders completed analysis of 25 briefs each (N=100). Ten percent of the briefs were double-coded to verify reliability. All entered data were exported to SPSS, version 17.0, and basic

Table 1. Summary of obesity-related policy-brief characteristics, N=100

Characteristic	% or M (range)
Year	
None given	17
1999–2004	11
2005–2010	72
Is brief easy to access? (Less than three mouse-clicks needed to locate brief from agency's home page), *yes*	68
Number of pages[a]	
1–2	35
3–6	40
7–18	25
Number of tables	
0	73
1–3	27
Number of figures	
0–2	84
3–8	16
Number of boxes	
0–2	75
3–11	25
Quality of tables and figures (3-point scale: clear, somewhat clear, unclear/confusing), *clear*	92
Number of photos	
0	64
1	16
2–9	20
Quality of photos (2-point scale: high/low-quality), *high*	76
Brief contains personal stories or quotes, *yes*	15
Brief refers to the Ecologic Model, *yes*	27
Use of color, *yes*	85
Font size (point)	
9	10
10	46
11	34
≥12	10
Brief provides contact information	
Name	39
USPS address	45
Phone	62
E-mail	39
Website	65
None	14
Brief is actionable (specific actions were suggested for reader to take to address issue described), *yes*	78
Funding sources are cited, *yes*	39
Flesch-Kincaid grade level	13 (6–19)
Average words per page	420 (78–722)
≤305	25
≥427	50
Number of references cited, *n*	14 (0–68)

[a]M=5.
USPS, U.S. Postal Service

frequencies were run. Percent agreement was calculated on the ten briefs that were double-coded for reliability.

Evidence Synthesis

A total of 100 policy briefs were collected and coded from February 2010 through June 2010 (Appendix A, available online at www.ajpmonline.org). Many other materials were identified but were excluded from the analysis because they were deemed annual reports or program plans rather than fact sheets or policy briefs. Reliability analysis resulted in 70% agreement on two items; others had 80% or 90% agreement.

Seventy-two percent of the policy briefs were published between 2005 and 2010 (Table 1). The mean number of pages in the briefs was five, but 25% had between seven and 18 pages. Although tables and figures can be helpful ways to convey ideas and decrease the amount of text in a brief, 73% of briefs had no tables and 44% of briefs had no figures. Further, although 36% of briefs included at least one photo, 24% of photos were determined to be of poor quality. Many policy briefs were easy to access (68%) and made use of color (85%).

Fifteen percent of policy briefs included stories or quotes. Fourteen percent of briefs provided no contact information at all, and only 65% provided a website address. The grade reading level of briefs varied widely

(6–19), with a mean of 13. The average number of words per page also varied (78–772), with a mean of 420. Although the goal of many policy briefs is to incite some action, almost one quarter of the briefs did not contain messages that were deemed actionable.

When contact was initiated with half of the policy-brief authors ($n=50$) to ascertain whether and how policy briefs had been disseminated and if dissemination efforts had been evaluated, almost half of those contacted did not respond after multiple attempts ($n=24$). Thirteen of the briefs chosen for this subset did not provide any contact information. The remaining 13 briefs contained contact information that was used to successfully discuss dissemination with policy-brief authors or others who had worked with the materials.

Most of those contacted said that the briefs were passively disseminated on websites. Several respondents said that briefs were made available at various events attended by stakeholders and the media. Others mentioned that briefs were mailed (e-mail or paper copy) to school districts, school board members, health staff in state legislatures, targeted congressional offices, and those they thought might be interested in the topic. Finally, some said they disseminated their briefs through community partners, e-newsletters, and the media. Of the 13 contacts who responded, 12 said they did not evaluate dissemination efforts. Only one organization had a dissemination evaluation plan, which included keeping extensive media-tracking logs of press coverage and hits from the materials they create as well as tracking the number of downloads of policy materials they make available online.

Discussion

The purpose of the present study was to review existing obesity-themed policy briefs readily available online, analyze their contents and formats, report on application of current knowledge about how policymakers prefer to receive information, and use findings to make recommendations about model policy briefs. The majority of policy briefs identified had been created since 2005, which may indicate an increase in the use of the Internet as a means of policy brief dissemination, as well as a growing awareness of the utility of policy to address obesity. Many policy briefs were easy to access and colorful, but almost one quarter did not provide actionable steps, leaving readers without specific guidance on practical ways to apply information. Other characteristics of policy briefs reviewed, however, were less optimal when considered in light of policymakers' stated preferences reported in the literature.

In one such study, researchers sought to identify public health decision makers' preferred format for receiving research evidence to inform decisions. This work revealed that respondents value systematic reviews, research summaries, and clear, concise explanations of real-world research implications.[9] However, the mean grade reading level of policy briefs identified in the current study was 13, which is considerably higher than what is generally recommended for materials created for a wide audience (i.e., experts suggest using reading levels two to five grades lower than those of intended audience).[14]

Additionally, 73% and 44% of briefs reviewed did not use tables or figures, respectively, despite the utility of these tools to clearly communicate data and ideas while minimizing text. This may impede the likelihood that these policy briefs or research summaries are "clear and concise." Other studies suggest that there are benefits to using narrative communication and personal stories to communicate policy information and persuade policymakers.[15,16] However, only 15% of the policy briefs examined in this review made use of personal stories.

Another set of studies has examined the relative effectiveness of policy dissemination through various communication methods. Sorian and Baugh[8] reported on a survey of nearly 300 state government policymakers that sought to understand their methods of obtaining information about policy topics. Respondents in this study discussed being overwhelmed with information and therefore never even reading 35% of what they receive.[8] Policymakers also reported finding summaries and brief reports more useful than e-mail lists, conferences, and press releases. State policymakers in this survey were divided regarding preferred information media, with younger (aged <30 years) respondents reporting much more frequent use of electronic information compared to the hard-copy materials preferred by older officials.

Given the clear preferences of policymakers for *brief* reports, the fact that 40% of the briefs reviewed for the current study were three to six pages long and an additional 25% were seven to 18 pages long indicates that those creating policy briefs must make every effort to produce materials with only the most important points (i.e., one page front/back maximum).[9] One way to accomplish this is to create policy briefs with bullet points of main ideas and ample resources indicating where additional information can be found. In fact, policymakers say that they prefer brief materials that include ways to find more information when they have interest[7,8]; however, 14% of briefs provided no contact information, and only 65% provided a website address. Researchers and practitioners creating policy briefs should take care to provide clear, updated contact information and additional resources where more information about the topic can be obtained.

A few study limitations warrant mention. First, the research team was unable to determine the intended audience of most policy briefs; thus, some evaluation criteria may be less applicable to certain briefs. Second, although the research team took care to search widely and diversely for obesity-related policy briefs most likely to be found by researchers and practitioners using the same search engine and terms, the process could have missed briefs not caught by the search terms or have been biased to larger organizations or those appearing nearer the top of a list on an Internet search engine. Also, other policy-brief authors may have dissemination plans in place but were unable to be reached by the study team; thus, the numbers of those reporting dissemination activities and evaluation may be under-represented.

Further, dissemination efforts may be determined by organizational capacity (e.g., amount of staff, funding, and other resources), which was not captured in the present study. In spite of these limitations, the authors believe this study provides insight into the most readily available briefs. These are the briefs most likely to be obtained by a nonresearcher or practitioner in a simple website search.

Conclusion and Recommendations

Most of the dissemination activities described in the current study are passive and often less effective at ensuring that the intended message is clearly and accurately communicated to the desired audience.[17] After working hard to create clear and concise policy-brief materials for decision makers, researchers and practitioners should employ more active, intentional dissemination activities (e.g., sharing policy briefs with targeted health staff in legislatures, key congressional offices, and those they think might have a special interest in the topic). Also, such dissemination activities should be evaluated, where possible, to measure the impact of policy materials created by researchers and public health practitioners. Quantifying this impact can encourage additional policy communications and may even help ensure that adequate resources are allocated to the communication of research to policymakers. Additionally, tracking and evaluation can help provide information for changes and updates of the briefs.

Obesity is an overwhelming public health problem in the U.S., and policy interventions are a powerful means of addressing it (e.g., increasing usable sidewalks and bike lanes, ensuring healthy foods are available at schools and worksites). Evidence-based interventions tested by researchers are often not effectively shared with those in positions to implement policy interventions. Policy briefs represent an effective, often-preferred, and potent tool for public health practitioners and researchers to communicate this information to policymakers.

Even though the briefs reviewed in the present study varied greatly, several key points emerged that can be used to make communication through policy briefs more effective:

- The information in the briefs should be clear and concise;
- One to two pages inclusive of tables, figures, and photos should be a target length for most policy audiences;
- The briefs should include references and contact information for follow-up;
- Authors of policy briefs should use active, targeted means of dissemination;
- Dissemination should be monitored and evaluated.

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Appendix

Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.amepre.2012.05.021.

Nutrition Policy Research That Can Lead to Reduced Childhood Obesity in the U.S.

Steven L. Gortmaker, PhD, Mary Story, PhD

Introduction

One of the clear insights from obesity prevention research over the past few years is the potential for impactful, sustainable, and cost-effective policy change. This insight draws on lessons of the campaign to reduce tobacco use in the U.S. The tobacco campaigns clearly demonstrated the power of policy and regulatory change to promote healthier behavior. Although treatment and educational programs also have helped to reduce smoking, three key sets of policies drove down smoking rates in the U.S.: (1) the ban on advertising cigarettes on television; (2) the imposition of substantial taxes on tobacco; and (3) smoking restrictions in public spaces.[1] The combination of these policies has saved countless lives. Policy-based strategies have been a powerful method of tobacco control and also have formed the basis of many other successful public health achievements such as vaccinations, motor-vehicle safety, safer foods, and safer workplaces. Thus, using policy approaches to modify the food environment could be a powerful tool to reduce obesity at the population level. As with tobacco control, addressing the epidemic of obesity in the U.S. will require major policy and contextual changes.

Although dietary and eating behavior and obesity development are complex and are influenced by multiple factors, policy approaches to promote healthy eating provide important tools that can be applied in many settings where children and adults spend their time. Policy change at local, state, and national levels can make it more likely that healthy choices are the easy choices[2] and that both children and adults can reduce their excess intake of nutritionally empty or harmful foods and beverages and decrease their obesity risk. The authors in the accompanying eight papers in this supplement to the *American Journal of Preventive Medicine* provide a wide range of examples of how policies can improve access to and improve the selection of healthy foods and beverages.[3–10] These include studies based in tribal settings,[3] in small stores in rural Texas,[4] and a study on menu labeling with a county board of health in Washington State.[5] Other papers discuss developing a fresh food retailer initiative in New Orleans[6] and describe the successes and challenges of increasing access to water in school and afterschool settings in Boston.[7,8] These papers provide a useful glimpse into the broad and varied policies and regulatory changes that can be used to promote healthy eating and drinking and reduce obesity at a population level—reaching large numbers of people.

Nutrition and obesity policy research is vitally important— because it can provide answers to which policy approaches are most effective, including evidence of effectiveness and impact, cost and cost effectiveness, feasibility, sustainability, and impact on disparities. Policy research can indicate which approaches potentially are wasting resources that could be better spent on other strategies, and which interventions have the greatest impact on population health and priority subpopulations (such as racial/ethnic minorities and children/youth), which then can be used to inform policy decision making and resource allocation. Yet, obesity policy research is relatively new and still in an embryonic stage[11] and much is to be learned about the effectiveness of proposed or implemented obesity prevention policies.

What are the critical needs of nutrition and obesity policy research? One continuing need is for the careful evaluation of new interventions as well as of existing policies. Policymakers want to know whether an intervention is effective, what it costs, and whether it is feasible; they ideally want an assessment of its cost effectiveness, its "value for money."[12] There are many and varied obesity prevention policy efforts that are taking place at national, state, and local levels, such as menu labeling initiatives; federal procurement guidelines for healthier foods and beverages in government buildings; the Healthy Hunger Free Kids Act (school meal programs and foods sold outside school meals); efforts to promote

From the Department of Society, Human Development, and Health (Gortmaker), Harvard School of Public Health, Boston, Massachusetts; the Division of Epidemiology and Community Health (Story), University of Minnesota School of Public Health, Minneapolis, Minnesota

Address correspondence to: Steven Gortmaker, PhD, Department of Society, Human Development, and Health, Harvard School of Public Health, 677 Huntington Ave, Boston MA 02215. E-mail: sgortmak@hsph.harvard.edu.

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breastfeeding via Baby-Friendly hospitals; state and local initiatives to implement nutrition, physical activity, and screen-time standards in child care settings; and state and community programs funded through stimulus funds and the Affordable Care Act that have provided information to decision makers to consider policy change that focuses on increasing physical activity and improving dietary intake.[13] However, evaluation of these initiatives is often limited or nonexistent.

There are many opportunities to conduct evaluations as new policies constantly arise. Policy evaluations can often make use of powerful "natural experimental" and "rapid response" designs as noted in the article in this supplement by Blanck and Kim.[14] Policy research also can use predictive mathematical modeling to develop mathematical simulations of an intervention and can estimate potential impact.[15] Economic research also is critical in estimating the cost of interventions, food pricing and its influence on food consumption, and the effects of food taxes or financial incentives to encourage healthy food choices.

An additional need is for evaluations to use some common metric of effect when looking at the impact of varied nutrition- and obesity-focused policies. Current discussions may refer to "evidence-based" strategies, but because results are expressed in a wide range of different outcomes, comparisons are difficult. A promising approach makes use of "energy gap" models that express results in a common metric (e.g., kilocalories/day) and that can be used to translate energy imbalance into change in body weight.[16]

Another need is for new and innovative policy interventions. Ideally, these policies should affect population health; demonstrate sustainability, reach, and cost effectiveness; and be able to be implemented in communities where they are most needed (e.g., low-income communities) throughout the U.S. Policy change is evolving continually, and new opportunities constantly arise along with technologic and cultural change. For example, in the mid-2000s, there was a move to promote bottled water as a counter to sugar-sweetened beverages. Now because of ecologic and environmental concerns, the push is on to increase access to fresh public drinking water through water fountains, hydration stations, and cups and pitchers in schools,[7] after school,[8] and early child care centers. At the same time, there is a focus on reducing the ecologic impact by reducing the use of plastic bottles in favor of recyclable materials for serving water. As policy ideas and options keep evolving and changing, researchers need to continually build the science base and evaluate policies that are important to decision makers and have the potential to reduce obesity and improve the population health of Americans.

More food and nutrition policy research is clearly needed to identify the most cost-effective and high-impact policy and environmental change strategies to turn around the child obesity epidemic, especially among populations most affected. This information is needed to inform policymaking and resource allocation. This will require transdisciplinary research teams and more funding opportunities. To date, a good deal of the nutrition and obesity prevention policy research has been funded by the Robert Wood Johnson Foundation's Healthy Eating Research program; the CDC (e.g., the Nutrition and Obesity Policy Research and Evaluation Network or NOPREN); and the National Collaborative on Child Obesity Research (NCCOR, including RWJF, CDC, USDA, and NIH). Do current trends in research funding mean that policy research funding will decline over the next few years? It is hard to see how science can help reverse the obesity epidemic in the U.S. if funding to evaluate the most promising levers of change is declining. This is another set of policy changes worth evaluating.

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