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Policies that change environments are important tools for preventing chronic diseases, including obesity. Boards of health often have authority to adopt such policies, but few do so. This study assesses 1) how one local board of health developed a policy approach for healthy food access through vending machine guidelines (rather than regulations) and 2) the impact of the approach. Using a case study design guided by “three streams” policy theory and RE-AIM, we analyzed data from a focus group, interviews, and policy documents. The guidelines effectively supported institutional policy development in several settings. Recognition of the problem of chronic disease and the policy solution of vending machine guidelines created an opening for the board to influence nutrition environments. Institutions identified a need for support in adopting vending machine policies. Communities could benefit from the study board’s approach to using nonregulatory evidence-based guidelines as a policy tool. Top Experts increasingly call for policies to prevent chronic diseases, including obesity. Such policies aim to improve access to healthy food and physical activity opportunities, making it easier for the population to adopt healthier behaviors (1,2). Local boards of health (LBOH) often have authority to adopt policies that could influence institutions such as government offices and worksites, housing, and recreational facilities (3,4). Most local health departments engage in policy-making activities (eg, preparing issue briefs, providing public

testimony) (5). Nearly half report policy making specific to obesity or chronic disease (5). However, fewer LBOHs engage in policy making than are authorized to do so (6). The form and policy-making authority of the approximately 3,200 LBOHs in the United States vary. More LBOHs are allowed to adopt regulations than to impose taxes, for example (5). Public health practitioners could benefit from studies that deepen understanding of the feasibility, adoption, and implementation of policy approaches (7–10). Well respected theoretical frameworks (11,12) can inform such studies. This article examines the case of an innovative LBOH policy tool in King County, Washington, in the form of nonregulatory nutritional guidelines for food and beverages sold in vending machines, and we provide insight into the tool's development and initial use. Top Using a qualitative case study design, this study assesses how one LBOH developed a policy approach to address healthy food access in its community and the extent of the approach's initial use. The evaluation was designed through collaboration between public health practitioners and researchers affiliated with Washington's Nutrition and Obesity Policy Research and Evaluation Network (NOPREN), a project funded by the Centers for Disease Control and Prevention to support transdisciplinary policy research and evaluation across a continuum of policy identification, development, evaluation, and dissemination (http://www.hsph.harvard.edu/nopren). Data were collected through focus group, interview, and document review methods. We used Kingdon's "three streams" theory (11) to describe the adoption of the King County Healthy Vending Guidelines (Guidelines) by the King County Board of Health (KCBOH). Kingdon's constructs of "problem," "policy," and "political" streams are applied to consider whether and how local factors created a "policy window" for passage. We used the RE-AIM framework for policy impact (12) to guide an analysis of the use of the Guidelines by local jurisdictions (eg, cities) and organizations in the year following the adoption (Table 1). Data included transcripts from a 1.5-hour focus group (October 2011) with all 4 local health department staff who participated most in guideline

development, interviews with 4 LBOH members (February–August 2012; 3 local elected officials, 1 health expert), and interviews with representatives of 5 local jurisdictions and organizations that used the Guidelines (April–May 2012; 2 municipal staff members, 2 department directors, and 1 contract staff member). Nine women and 4 men participated. Interviews took 30 to 60 minutes. All but 2 were audio recorded; the interviewer took notes for each. Participants provided consent per protocol approved by University of Washington's Human Subjects Division. We also reviewed meeting minutes and videos, policy drafts, memos, and contract language related to the LBOH's adoption of the Guidelines and local jurisdictions' vending machine policy development. We developed code definitions based on the theoretical frameworks and research questions, and used Atlas.ti version 7.0 (ATLAS.ti GmbH) to code and analyze data. Two researchers coded the data, compared their coding, and resolved discrepancies as needed. One researcher reviewed and summarized the final coded passages. This same researcher reviewed policy documents and media reports to supplement data recordings from interviews, focus groups, and meetings. Two local health department staff reviewed the resulting narrative to vet data interpretation. Minor adjustments were made on the basis of feedback. Top KCBOH is charged to "set county-wide public health policy, enact and enforce local public health regulations, and carry out other duties of local boards of health specified in state law" (13). Membership comprises 8 elected officials from specified jurisdictions (eg, county, largest city, 2 suburban cities) and 3 appointed health experts. KCBOH and its corresponding local health department, Public Health Seattle-King County (PHSKC), cover a large urban county with 39 cities, including Seattle, the most populous city in the state. Addressing obesity was a high priority for PHSKC and KCBOH. Public health surveillance indicated that obesity was a problem in King County. "The board of health every year tries to look at how we're doing in King County," said one KCBOH member. "It became very clear that we had a rising problem of obesity." Broad-based community-wide prevention initiatives, such as

the Obesity Prevention Initiative (14) and Communities Putting Prevention to Work (CPPW), increased attention to these issues. For example, the Seattle-King County CPPW project was a $25.5 million federally funded initiative focused on preventing obesity and tobacco use through policy, systems, and environmental change from 2010 through 2012 (15). PHSKC and KCBOH were impressed with evidence that frequent eating outside the home contributed to obesity and therefore wanted to improve the quality of food in away-from-home settings. At the time, there was limited practical guidance for aligning these food environments with the 2010 Dietary Guidelines for Americans (DGA) (16). In 2010, KCBOH convened a Healthy Eating and Active Living (HEAL) subcommittee to examine potential actions to promote HEAL and prevent obesity. The subcommittee comprised 3 KCBOH members who were elected officials, 1 KCBOH member who was a health expert, and PHSKC staff members. The subcommittee created a list of approximately 25 best-practice policy strategies and selected several to implement, including guidelines for healthy vending. Strategies were chosen because they could reach many people, used approaches grounded in public health science, avoided redundancy, demonstrated leadership, and allowed flexibility for jurisdictions and businesses. Before 2011, KCBOH had 2 policy categories: 1) Rules and Regulations, which "have the force of law, are general and permanent in nature, and are codified" and 2) Resolutions, which are statements "in support of a current action or project" that are neither permanent nor have the force of law (17). In early 2011, at the suggestion of the PHSKC director, KCBOH adopted a third policy category: Guidelines and Recommendations. The new category was "designed to provide policy guidance where the Board does not have regulatory authority and to increase the reach of public health policy making to sectors that have not considered the public health impact of their policies in their sectors" (17). Members saw the category as allowing for greater specificity and impact than resolutions, without the legal and political complexity of a rule or regulation. A KCBOH member said, "We could

take more frequent action without having the legal consequences which sometimes seem to stymie government.” KCBOH used the category to create guidelines for healthy community planning and then for healthy vending. It took approximately 6 months to develop the guidelines. PHSKC staff reviewed vending and nutrition guidelines and spoke with nutrition policy experts from across the United States, vending machine company representatives, and entities experienced with healthy vending. The resulting Guidelines categorized foods as “limited” (ie, most processed; highest levels of sodium, sugar, fat, and salt), “healthier,” and “healthiest” (ie, least processed, nutrient-rich, no added sugar or salt) based on the DGA and recommended increasing the proportion of “healthier” and “healthiest” items in vending machines (18) (Figure). They also provided guidance on using the Guidelines for policy development. The subcommittee identified “early adopter” organizations to pilot the Guidelines and demonstrate support for the approach. Figure. Food and beverages in the categories of “limited,” “healthier,” and “healthiest” and nutrient levels for each category. [A text description of this figure is also available.] PHSKC staff members described the rationale for and an overview of the Guidelines and displayed sample items from each food category at the April 2011 KCBOH meeting. Seven stakeholders testified during the public hearing portion of the meeting. KCBOH then voted unanimously to adopt the Guidelines with the intention that local jurisdictions and organizations across the county use them to improve their vending machine policies and environments. King County is a solidly Democratic county. Residents are favorably disposed to an activist role for government in promoting health (19). An increasing number of local efforts focus on improving access to healthy food. KCBOH also has a history of using policy to address public health issues, including trans fat in restaurant food, menu labeling, healthy community planning, and tobacco use. Several KCBOH members have been active in local food system and policy development. KCBOH members generally expressed strong support for the Guidelines, citing a need for more healthy selections, a responsibility to make

evidence-based recommendations, and an appreciation for approaches that encouraged healthy behaviors rather than banning unhealthy options. One KCBOH member said, “It’s about choices . . . . It’s all things in moderation and in healthy amounts, but we’re not out to ban Snickers bars.” During testimony, stakeholders expressed a range of opinions about the Guidelines proposal (Table 2). Proponents (2 “early adopter” organizations and an obesity prevention advocacy group) described a need to increase the number of healthy vending machine options and an appreciation for the Guidelines as a resource to guide policy development. Vending machine companies ranged from cautiously supportive to opposed to the proposal; vendors expressed concern about their bottom lines, objected to price differentials between healthy and unhealthy foods, and anticipated a lack of demand for and availability of healthy products. One indicated that the company could “see the writing on the wall” and had started to “gear up” for the shift to healthier vending machine items. Washington’s Department of Services for the Blind (DSB) expressed concerns about anticipated profit decline. (DSB has the right of first refusal to contract for vending machines in government buildings, according to state and federal law; it uses vending machine profits to support its programs.) A KCBOH member reported that beverage industry representatives met with his staff to express similar objections. The Guidelines’ recommendation to move toward 100% healthy items in machines was the most contentious point. Both proponents and opponents cited evidence of sales declines after introducing more than 30% healthy items, but proponents emphasized that sales recovered. One KCBOH member suggested removing the targeted percentages of healthy foods, but others emphasized that the Guidelines were not legally binding and were based on the best science. One member said, “Our role as a board of health is really to tell citizens, ‘What do the facts say?’ We chose guidelines so we could work with people and make it happen. . . . I think we need to challenge ourselves and the industry.” KCBOH did not remove the targets. One PHSKC staff member later summed

up the advantages and disadvantages of the nonregulatory guidelines approach by saying, “It doesn’t have the force of law. We are able to do an enormous amount in terms of who the target audience is and where we set the bar for the best practice, but it also means that carrying this through to implementation . . . is going to be different for each organization and in some cases, it is going to be incredibly time-intensive.” Kingdon theorizes that a policy window “opens because of a change in the political stream . . . [or] because a new problem captures the attention of governmental officials and those close to them” (11, p. 168). KCBOH’s new Guidelines and Recommendations policy category provided an opening as obesity prevention and healthy food access were gaining attention and support. The Guidelines provided a feasible alternative to regulations that addressed the problem of unhealthy food away from home. PHSKC staff described this concept as a “window of opportunity which we anticipate will eventually close because [KCBOH’s] attention will change to something else.” Interviewees described measuring the reach of the Guidelines as a challenge, particularly for local jurisdictions and organizations with decentralized vending but noted that the potential reach was high. The networks to which KCBOH and PHSKC belonged (eg, jurisdictions represented by elected official KCBOH members, PHSKC partners) were seen as assets. Two PHSKC partners and 2 jurisdictions represented by KCBOH members used the Guidelines in the first year. Another KCBOH member said, however, “As [an elected official], I guarantee you, I would not go in and tell [my constituents] what vending machines they could have. I need to have an advocate from within.” Adoption of vending machine policies by the first 4 local jurisdictions and organizations using the Guidelines affected approximately 345 vending machines. The total number of people reached is unknown; however, in one housing organization, approximately 460 employees and residents of 3,200 units had access to its 83 machines (20). Effectiveness is hard to measure because of a lack of accessible vending machine sales data. Interviewees indicated effectiveness of the Guidelines could be enhanced by

outreach and technical assistance to promote and support use of the Guidelines as well as complementary behavioral change interventions. The Guidelines were incorporated into policy in several ways during the first year, including revised vending machine contracting requirements for 2 local jurisdictions and organizations and a county council motion for executive adoption of nutritional standards for vending machines (Table 3). Other local jurisdictions and organizations spent the first year considering policy options, including centralizing vending processes to make use of the Guidelines easier. Adopting organizations demonstrated strong fidelity to the nutritional guidelines and food categories, though several only required 50% healthy vending. Local jurisdictions and organizations pursued vending machine policy change adoption because it seemed feasible (eg, “an area over which they could have some influence,” “an easy win”) but also reported that adoption was more complicated than anticipated. Challenges included the time and resources required, pushback from employees, and the perception that healthy vending restricts choice. The beverage industry and vending machine companies lobbied larger jurisdictions to discourage them from adopting 100% healthy items in vending machines or price differentials, requesting subsidies (unsuccessfully) to offset the expected sales reduction and losses due to expired products, and negotiating higher percentages of revenue that the companies would receive from the machines. PHSKC staff supported use of the Guidelines through presentations, development of a tool kit, consulting on contracting language, and identifying sources of products that met guidelines (21). After approximately 2 years, 2 additional local jurisdictions and organizations adopted policies, including a city ordinance, requiring 50% healthy vending in all machines. A baseline evaluation of the ordinance reported that less than 10% of the city’s machines met the Guidelines initially (Perez J. Process evaluation report: City of Seattle implementation of King County Healthy Vending Guidelines [unpublished student report]. Seattle, Washington: Public Health Seattle King County; 2013). A local children’s hospital, community center,

and low-income housing nonprofit also began changing their vending machine policies based on the Guidelines (20,22). Top This case illustrates an innovative LBOH policy approach to promote healthy food access when neither legislation nor regulation is feasible or desirable. The Guidelines' format, along with recognized health concerns and an amenable political landscape, created a policy window for KCBOH to extend its influence in promoting evidence-based practice and affect the nutritional quality of vending machine products. The Guidelines catalyzed and supported several local jurisdictions and organizations in developing or strengthening vending machine policies with fidelity to the Guidelines, and thus to national dietary recommendations. Although there are no data to measure longer-term outcomes in this case, improvements to the nutritional quality of vending machine products have altered consumer behavior in the past (23). Although most LBOH policy making takes the form of regulation, regulations have limitations, including politicization and conflicts with or preemption by other laws (3). By using the Guidelines, KCBOH and PHSKC probably avoided some "nanny-state" concerns associated with other policy approaches (24). However, even the Guidelines produced some pushback from stakeholders. This qualitative study allowed for in-depth examination of the case, but the findings pertain to organizations with unique contexts and cannot necessarily be generalized to others. In recollecting events and reactions, or describing politically sensitive situations, some interviewees may have omitted important details. No sales or implementation cost data were collected. Also, vending machine company representatives declined to participate. As this study focused on the development and preliminary uptake of the Guidelines, future research could examine implementation of vending machine policies based on such guidelines as well as longer-term use of or changes made to nonregulatory tools based on evolving perceptions of the problem, tool, or political realities. Furthermore, studies could assess vending machine sales in particular jurisdictions over time and consider the health implications and facilitators and barriers to those changes. Experts have called for

policy approaches to prevent obesity and chronic disease by improving access to healthy food and addressing other determinants. LBOHs and communities could benefit from KCBOH's experience in using nonregulatory evidence-based guidelines as one policy tool toward this end. Top This project is supported through NOPREN by cooperative agreement no. 5U48-DP001911 from the Centers for Disease Control and Prevention. The findings and conclusions are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. Top Corresponding Author: Emilee Quinn, MPH, School of Public Health, Box 353410, University of Washington, Seattle, WA 98195. Telephone: 206-616-7362. Email: equinn1@uw.edu. Author Affiliations: Donna B. Johnson, Elizabeth Payne, University of Washington, Seattle, Washington; James Krieger, University of Washington, Seattle, Washington, and Action for Healthy Food, Seattle, Washington; Erin MacDougall, Bastyr University, Kenmore, Washington; Nadine L. Chan, Public Health – Seattle and King County, Seattle, Washington. During this study, James Krieger and Erin MacDougall were affiliated with Public Health – Seattle and King County, Seattle, Washington. Top Top a Implementation and Maintenance are not addressed in this study, given the focus on preliminary impact within the first year of Guidelines' use. Abbreviations: DSB, Washington State Department of Services for the Blind; HA, health advocates; LJOs, local jurisdictions and organizations; KCBOH, King County Board of Health, VC, vending companies.a Some stakeholders discussed thresholds whereby vending machines that had 30% to 50% healthier options would be likely to result in revenue loss, whereas vending machines with a lower percentage of healthy items might result in limited revenue loss. Abbreviations: DSB, Department of Services for the Blind; Guidelines, King County Healthy Vending Guidelines; KCBOH, King County Board of Health; RFP, request for proposal.a Details describe decisions made more than 1 year after Guidelines were adopted by KCBOH. Top The opinions expressed by authors contributing to this journal do not necessarily reflect the opinions of the U.S.

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