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Healthy eating policy strategies in Community Health Improvement Plans: A cross-sectional survey of US local health departments

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Abstract

Context: Policies (e.g. regulations, taxes, and zoning ordinances) can increase opportunities for healthy eating. Community Health Improvement Plans (CHIP) may foster collaboration and local health department (LHD) engagement in policy decision-making to improve local food environments. Limited research describes what policies supportive of healthy food environments are included in CHIPs nationally and relationships between LHD characteristics and participation in plans including such policies.

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Objectives: To determine the proportion of US LHDs that participated in development of a CHIP containing healthy eating policy strategies and assess the association between LHD characteristics and inclusion of any healthy eating policy strategy in a CHIP.

Design: A cross-sectional national probability survey.

Participants: Of the 209 US LHDs (serving populations <500 000) (response rate 30.2%), 176 LHDs with complete data on CHIP status, outcomes and covariates were eligible for analysis.

Main Outcome Measures: Thirteen healthy eating policy strategies were organized into three categories: increasing availability/identification of healthy foods, reducing access to unhealthy foods, and improving school food environments. Strategies and categories were identified from literature and public health recommendations.

Results: 32.2% of LHDs reported inclusion of ≥ 1 healthy eating policy strategy in a CHIP. The proportion of departments reporting specific strategies ranged from 20.8% for school district policies to 1.1% for sugar-sweetened beverage taxes. LHDs serving 25 000–49 999 residents (OR:5.00; 95% CI:1.71–14.63), 100 000–499 999 residents (OR:3.66; 95% CI:1.12–11.95), pursuing national accreditation (OR:4.46; 95% CI:1.83–10.83) or accredited (OR:3.22; 95% CI:1.08–9.63) were more likely to include ≥ 1 healthy eating policy strategy in a CHIP as compared to smaller LHDs (<25 000) and LHDs not seeking accreditation, respectively, after adjusting for covariates.

Conclusions: Few LHDs serving <500 000 residents reported CHIPs that included a policy-based approach to improve food environments, indicating room for improvement. Population size served and accreditation may affect LHD policy engagement to enhance local food environments.

Keywords

local health department; strategic planning; nutrition policy; community health improvement plan; obesity policy

Introduction

A large proportion of the United States (US) population does not adhere to dietary guidelines, which is associated with an increased risk of developing chronic health conditions.¹ Growing research demonstrates that food environments can affect access and consumption of both healthy (e.g., fruits and vegetables) and unhealthy (e.g., fast food) foods and chronic disease risk factors such as obesity.^{2–4} Unhealthy food environments are more pervasive in communities with lower socio-economic status and potentially contribute to health disparities.³

Diet can be improved through a range of strategies, but policy strategies are powerful tools to improve population health and address health disparities.⁵ Although much food policy is controlled at the federal and state level, recommendations for local government action recognize the value and constraints of crafting and implementing tailored policies to respond to the unique needs of local food environments, which can interact with and be preempted by state and federal policies.^{5,6} Policy strategies enacted by local jurisdictions, the loci of government action under federal and state levels (e.g., municipalities or counties), to

improve the food environment are categorized by their potential to increase the availability or identification of healthy foods, reduce access to unhealthy foods, or improve school food environments.^{6–9} Examples of strategies to increase healthy food choices include the Institute of Medicine’s (IOM) recommendation that local governments regulate menu labeling while other experts highlight municipal and local government actions that provide fresh produce incentives to Supplemental Nutrition Assistance Program beneficiaries or zoning ordinances permitting land use for farmers’ markets and healthy food retail outlets.^{5,8–15} A lack of access to healthy foods often coincides with a glut of unhealthy food sources, and the IOM and National Prevention Strategy suggest local governments adopt policies regulating fast-food restaurants and unhealthy food advertising to limit unhealthy food options and influence weight status.^{9,11,13,15,16} Local regulations and taxes on unhealthy dietary components such as sugar-sweetened beverages, sodium, and trans fats are contemporary approaches supported by the National Association of County and City Health Officials (NACCHO).^{9,13,14,17–19} In response to pervasive concerns about childhood obesity, the Guide to Community Preventive Services recommends school nutrition and multi-component policy interventions to increase fruit and vegetable consumption and reduce or maintain weight status.²⁰ Credible scientific organizations promulgate these evidence-based and promising policy strategies despite varying consistency and strength of evidence.^{8–11,17–22} To our knowledge, no study has described a wide spectrum of recommended healthy eating policy strategies selected for adoption at the local level.

Transforming local food environments can benefit from a data-driven approach and collaboration among stakeholders, including residents, businesses, advocates, and policy makers representing multiple government departments (e.g. land use planning and public health).^{5,8,11,12,19} A Community Health Assessment typically precedes Community Health Improvement Plan (CHIP) development, and incorporating findings from a community food system assessment data can help generate tailored food policy strategies by identifying the strengths and weaknesses of a local food environment.^{5,9} The CHIP process can galvanize collaboration among key stakeholders to establish shared goals, responsibilities, and commitments.^{23,24} It is important to note, however, that a CHIP process can be undertaken at several levels (e.g. a single municipality or multiple counties) where the policy-making processes can vary.^{6,23,24}

Local health department (LHD) participation in CHIP development has steadily increased over the past decade and coincides with calls made by national public health organizations for LHDs to promote healthy food environments through policy-based approaches.^{13,14,25} LHDs representing <500 000 residents account for 94% of all LHDs and serve nearly half of the US population, but are less likely to provide essential services or engage in policy/advocacy activities related to obesity prevention when compared to LHDs serving \geq 500 000 residents.^{25–27} Limited staff, resources, funding, and competing acute health priorities may explain why smaller LHDs are less likely to report involvement in food-related land use planning activities and policy areas in comparison to their larger counterparts.^{25,26} Variations in performance improvement characteristics, structure and governance further compound the challenges that smaller LHDs face with respect to evidence-based decision-making and policy activities for obesity prevention and thus merit closer investigator.^{25–28} Engagement in policy decision-making among LHDs and local jurisdictions may be

enhanced through the CHIP process, which guides the selection of contextually appropriate, evidence-based strategies and distribution of resources to address health priorities.^{24,29} LHDs have a potential role in promoting healthy food environments through strategic health planning initiatives. However, little is known about which types of policy strategies supportive of healthy eating have been included in CHIPs that LHDs serving <500 000 residents help develop and what LHD characteristics drive the selection of such strategies.

Research aims

This study aimed to determine the proportion of US LHDs serving populations of <500 000 residents that participated in development of a CHIP containing healthy eating policy strategies and to assess the association between LHD characteristics and the inclusion of any such strategies in a CHIP.

Methods

Study design

A cross-sectional, web-based, national probability sample survey of US LHDs serving less than 500 000 residents was administered between June–October 2017. The survey was part of a larger Physical Activity Policy Research Network Plus (PAPRN+) project that aimed to study local health department engagement in built environment policy decision-making. The PAPRN+ network is funded by the Centers for Disease Control and Prevention to advance policy research to increase physical activity. The University of Massachusetts Medical School Institutional Review Board approved this study.

Sampling design

To produce nationally representative estimates, a stratified random sample of US LHDs (n=693) was drawn from a list of US LHDs serving less than 500 000 residents that is maintained by the NACCHO (N=2 390). The list contained contact information for a representative of each LHD, usually the director or equivalent. Eight strata were defined by population size served (<40 000 or 40 000–499 999) and US Census geographic region (Northeast, Midwest, South, and West).

Survey development

The survey questions primarily focused on LHD participation in land use planning and transportation activities to increase opportunity for physical activity, but questions about healthy eating policy strategies were also included. Questions were developed based on literature review, iterative feedback from experts including a local food policy advocate, and cognitive testing with five LHD officials from across the US and thus demonstrated content and face validity.³⁰ We administered the web-based survey using Qualtrics software (Qualtrics, Provo, UT, October 2017), and the study team tested it for usability and timing; the estimated survey completion time was 10–20 minutes.

Survey administration

Potential respondents received a personalized e-mail invitation containing a unique survey link. The web-based survey included an introduction, instructions, consent language, and a gift card raffle invitation. We used a structured reminder protocol to improve the response rate and reduce potential selection bias. Non-responders received a follow up email after one week and up to three telephone reminders over subsequent weeks. Surveys were administered via telephone to four LHDs unable to receive our e-mail.

Variables

Community Health Improvement Plan status—LHDs must submit a CHIP dated within five years when applying for accreditation from the Public Health Accreditation Board.²⁹ Therefore, we recoded LHDs' categorical responses to "Has your local health department participated in developing a Community Health Improvement Plan?" into a dichotomous variable of "Yes, participated in a CHIP less than five years ago" or "No CHIP, or participated in a CHIP five or more years ago". We recoded responses of "Don't know" as missing.

Outcomes—Participants were asked whether any of thirteen healthy eating policy strategies, identified through a review of literature and public health recommendations^{5,8–16,20}, were present in a CHIP. Strategies were recoded as absent if the LHD did not participate in a CHIP within the past five years or at all. The thirteen healthy eating policy strategy outcomes were grouped into three categories. The category of *increasing availability and identification of healthy foods* included policies to increase Supplemental Nutrition Assistance Program benefits for fresh produce; menu labelling at unhealthy retail food outlets; and zoning or other ordinance/bylaw for community gardens, farmers' markets, urban agriculture, or healthy food retail. *Reducing access to unhealthy foods* included regulation of advertising or sales of unhealthy food or beverages in schools, government buildings, or community; sodium reduction or trans fat ban at retail food outlets; fast food outlets zoning or other ordinance/bylaw; and taxation of sugar-sweetened beverages. The last category, *improving school food environment*, included a single question about school district nutrition, procurement, and vending policies. Three dichotomous variables for each category were generated to indicate if at least one of the policy strategies under that category was included in a recent CHIP. A dichotomous summary variable was created to indicate if at least one of the thirteen policy strategies or none was included in the CHIP. Strategies and categories are listed in Table 1.

LHD characteristics—LHD characteristics included size of population served, US Census geographic region, structure, State and LHD governance, and Public Health Accreditation Board status. Research suggests these characteristics are important for public health engagement in evidence-based decision making and obesity prevention policy.^{25–27,31} Population size served was included as a categorical variable (<25 000, 25 000–49 999, 50 000 – 99 999, and 100 000 – 499 999 residents). LHD structure was collapsed due to small cell sizes into a three-category variable of municipal (city or town), county and city-county, or other health department (including regional, state-run, and public health network). LHD responses regarding participation in the Public Health Accreditation Board accreditation

program were collapsed into a categorical variable of “accreditation achieved,” “accreditation in progress or planned” or “not accredited.” LHDs that responded “Don’t know” were recoded as missing.

US Census geographic region (Midwest, Northeast, South and West) and State were obtained from NACCHO. The Association of State and Territorial Health Officials State and LHD governance classification³² was used to generate a four-category variable, which was collapsed into a dichotomous variable (decentralized vs centralized/shared/mixed) due to small sample sizes.

Statistical analysis

Weighting procedures—We applied inverse probability weights to obtain unbiased nationally representative estimates. The stratified sampling design, differential response rates by strata, and complete case analysis approach (i.e., analyzing LHDs with complete data on CHIP status, outcomes and LHD characteristics) were accounted for in the analysis. Stratum-specific sampling weights were calculated as the number of sampled LHDs divided by the total number of LHDs in each stratum. Stratum-specific response probability was calculated as the number of survey respondents in each stratum divided by the number of LHDs sampled in each stratum. Stratum-specific completion probability was the number of LHDs with complete data on CHIP status, outcomes and covariates divided by the number of survey respondents in each stratum. The final weight was the inverse of the realized sampling probability, the production of the sampling probability, response probability, and completion probability of each stratum. The final weights were proportionally scaled back, by multiplying the final weight by the proportion of 0.84 (2 390/2 814), so that the total of the weights equaled the population size (n= 2 390).

Statistical methods—The final analytic sample comprised LHDs with complete data and weights were applied in all statistical analyses. Unweighted proportions, weighted proportions and 95% confidence intervals were calculated for the following categorical variables: LHD characteristics, 13 healthy eating policy strategy outcomes, three healthy eating policy strategy categories, and the summary variable of at least one healthy eating policy strategy included in a CHIP in the past five years. We summed the number of healthy eating policy strategies each LHD reported and then calculated the weighted proportion of LHDs reporting 0, 1, or ≥ 2 strategies. We developed a multivariate logistic regression model to determine the association between LHD characteristics and the presence of at least one healthy eating policy strategy included in a CHIP within the past five years. LHD characteristics were selected for inclusion as covariates in the model if they changed the estimate of effect by $\geq 10\%$.³³ Goodness of fit was assessed by the Hosmer-Lemeshow test. Variance inflation factors were examined for each LHD characteristic to assess collinearity, with a cut-off of >10 . Sensitivity analyses were conducted comparing responders to non-responders, as well as LHDs that had missing data to those with complete data to assess for selection bias. All analyses were conducted using Stata/MP 13.1 (College Station, TX: StataCorp LP).

Results

The final analytic sample included 176 LHDs, which was representative of 2 390 US LHDs (<500 000 residents) after weights were applied. Of the 209 LHDs that completed the survey questions that were of primary focus (response rate 30.2% [209/693]), we excluded 33 LHDs that had missing data (CHIP status [n=12], LHD characteristics [n=7], or outcomes [n=14]). Results from two sensitivity analyses determined there were no statistically significant differences between LHD survey respondents and non-respondents nor between LHDs with complete data and missing data with respect to population size served, structure, governance, or geographic region ($p>0.05$).

Over one-third of LHDs in this sample served small jurisdictions (<25 000 residents) (see Supplemental Digital Content for Table 1). Most of the LHDs were county or city-county health departments. Less than a fifth (18.4%) had achieved national accreditation, and another quarter were either pursuing or planning to pursue accreditation. Most LHDs reported participating in a CHIP within the past five years.

One-third of all LHDs in the sample reported participating in a recent CHIP that contained any of the thirteen healthy eating policy strategies. Fewer than one in ten (8.6%) of all respondents reported participating in a CHIP that contained only one of these strategies, whereas a greater proportion of all LHDs (23.5%) reported participating in a CHIP that included two or more healthy eating strategies. With respect to the three categories of policy strategies, less than one-quarter included at least one policy strategy related to increasing availability and identification of healthy foods (21.3%), reducing access to unhealthy foods (22.9%), or improving school food environment (20.8%). The proportion of LHDs reporting each of the thirteen policy strategies included in a CHIP ranged from 20.8% for school district nutrition, procurement, and vending policies to 1.1% for taxation of sugar-sweetened beverages (Table 1).

Multivariate analyses found population size served and Public Health Accreditation Board status were significantly associated with the presence of at least one healthy eating policy strategy included in a recent CHIP (Table 2). Collinearity was not found and the model fit the data well ($p=0.35$). LHDs serving populations of 25 000–49 999 residents and those serving 100 000–499 999 were approximately 3.7 and 5.0 times as likely, respectively, to include at least one healthy eating policy strategy in a CHIP when compared to LHDs representing smaller populations (<25 000 residents) after adjustment. After adjusting for covariates, accredited LHDs and LHDs pursuing accreditation were more likely to include a healthy eating policy strategy than LHDs that were not accredited.

Implications for Policy & Practice

- The current study found a low proportion of LHDs that served <500 000 residents participated in a recent Community Health Improvement Plan (CHIP) that included local healthy eating policy strategies. Our findings suggest room for improvement.

- The Public Health Accreditation Board's (PHAB) process of voluntary accreditation for LHDs was associated with inclusion of healthy eating policy strategies and this may be explained because PHAB requires the development of a CHIP that incorporates policy changes to improve such social and economic conditions. The accreditation process is one approach to help LHDs engage in policy decision-making related to improving local food environments, but future research should investigate how to improve voluntary national accreditation among LHDs with fewer resources.
- Future qualitative research should be conducted to understand if and how smaller local jurisdictions prioritize and implement healthy eating policies.
- Local jurisdictions would benefit from stronger and more concise guidance on which types of policy strategies to improve diet are available for implementation, evidence for such policies, and the context in which such policies have been successfully adopted and implemented.

Discussion

We observed that few LHDs representing <500 000 residents reported participating in a recent CHIP that included at least one of thirteen recommended healthy eating-related policy strategies. The proportion of specific policy strategies ranged widely. LHD characteristics of population size served and accreditation were associated with inclusion of at least one healthy eating policy strategy in a CHIP.

The finding that policies that improve access to or identification of healthy foods were infrequently included in CHIPs is not surprising. Less than half of all US LHDs, including those serving populations \geq 500 000 residents, surveyed in 2016 reported involvement in land use planning activities that supported access to healthy food resources.²⁵ A policy inventory found few US municipal and town zoning ordinances permitted urban agriculture including community gardens or farmers' markets, although most ordinances permitted supermarkets.³⁴ Another inventory of US diet-based policies found a limited number of locally proposed or adopted subsidies for fruit and vegetable purchases at farmers' markets for Supplemental Nutrition Assistance Program recipients despite the strategy's effectiveness,^{22,35} potentially due to lack of capacity at the local-level or it may be managed at the state-level depending on the public health infrastructure. Although pending Federal regulations will preempt local menu labeling efforts, we found a small proportion of LHDs are considering menu label regulations possibly targeted at food establishments outside Federal purview.³⁵ While findings from policy inventories provide valuable insights on the key elements of policy design and decision-making, we cannot make direct comparisons, and none of the cross-sectional surveys in published literature addressed the role of strategic planning processes such as CHIPs.^{25,34–36}

LHDs also reported limited inclusion of policy strategies recommended to reduce access to unhealthy foods. The most commonly reported strategies in this category were regulations on promotion, advertising or sale of unhealthy food and beverages across multiple settings. Studies have evaluated similar regulations within specific settings. Although most US school

districts require or recommend prohibiting advertising of unhealthy foods or soft drinks in schools,³⁷ only two local jurisdictions in California proposed or regulated promotion of unhealthy foods through free toys or other incentives as of 2011.³⁵ Zoning to prohibit fast food outlets has been limited; our results mirror a cross-sectional survey of all US LHDs where 1% reported involvement in policy to limit fast food outlets²⁵ and an inventory found that only 77 US local jurisdictions had proposed or adopted such land use policies.³⁸ An analysis of media coverage of this strategy recommends considering local socio-economic conditions when framing policy debates while increasing LHD funding and staff is suggested to improve obesity prevention policy/plan development.^{26,38} A lack of scientific evidence supporting this strategy may prevent local jurisdictions from undertaking zoning approaches to limit unhealthy food sources.^{7,9} Additional factors hindering the adoption of policies that reduce access to healthy foods include lack of political and public support due to perceived infringement on individual choice, strong industry opposition, and concerns from small businesses about loss of revenue.^{39,40} Selecting and identifying these types of policy strategies during the community health improvement planning process may soften the ground for policy adoption by bolstering community support for such policies and generating shared commitment from key stakeholders early in the process.

Strategies that discourage the intake of specific dietary components such as trans fat, sugar, and sodium were notably low in our study. Our findings on trans fat bans is consistent with a 2014 survey of US municipalities with ≥ 1000 residents, which found one-third of the 63 municipalities with nutrition standards regulating food and beverages sales in government worksites/buildings limited trans-fat.⁴¹ We also determined few CHIPs contained a strategy related to sugar-sweetened beverage taxation. A 2016 survey of all US LHDs similarly found a low proportion were involved in fiscal policies to decrease consumption of unhealthy foods or beverages; this was not, however, limited to specific foods or beverages.²⁵ More specifically, eight local taxes on sugar-sweetened beverages have been identified in the US.³⁵ A policy inventory reported that 100 state and local health agencies voluntarily adopted sodium standards for packaged and restaurant foods by committing to the National Sodium Reduction Initiative, which helps frame our study findings that sodium reduction strategies are rarely included in CHIPs.³⁵ Local jurisdictions may have specifically avoided trans fat and sodium regulations because Federal regulations were pending or in place at the time of our survey.⁴² Case studies of sugar-sweetened beverage taxes, attempted in local jurisdictions ranging in size, offer important lessons about context that may be applicable to other policy strategies, including attention to framing political messages and the importance of the LHD in communicating evidence during the policymaking process.^{40,43}

Strong scientific evidence supports school-based food policies.²⁰ While only one-fifth of LHDs participating in this study reported including such policies in a CHIP, it was nevertheless the most commonly reported strategy. A 2013–2014 study found a majority of US school district wellness policies required school meals to follow federal nutrition guidelines (86%) and regulated vending and competitive foods and beverages (90%).⁴⁴ Thus, the proportion of LHDs with a CHIP including this strategy may have been low because many school districts have existing policies.

To our knowledge, no study has established a relationship between LHD population size served or Public Health Accreditation Board status with inclusion of healthy eating policy strategies in a CHIP. The lack of association observed for LHDs serving 50 000–99 999 residents was likely due to a lack of power. Two previous surveys offer differing views of the relationship between size and LHD involvement in healthy eating-related policies. In 2008, 6.7% of all US LHDs passed nutrition and physical activity policies, but no statistically significant difference was observed based on urbanization.²⁸ Whereas fewer small LHDs (<50 000 residents) reported involvement in food-based policy areas than medium LHDs (50 000–499 999), but this was not quantitatively tested.²⁵ Novel research on CHIPs found smaller LHDs (<100 000) were more likely to include a diverse range of partners in a CHIP compared to larger LHDs (\geq 100 000), which may help build capacity and resources.²³ Our study suggests, however, that size of population served remains an important factor and potentially helps identify LHDs requiring additional support to improve local food environments during the CHIP process. National accreditation requires the submission of a CHIP document that results from a data-driven collaborative process, includes evidence-based, practice-based, or promising strategies to meet community needs, and incorporates policy changes that address social determinants.²⁹ Though the accreditation process appears to be an important driver for selecting policy-based approaches to improve local food environments, smaller and rural LHDs consistently report time and resource constraints as barriers to accreditation.⁴⁵ To address such barriers, future research should investigate promising models such as the development of an accreditation-readiness roadmap or addressing cross-jurisdictional sharing of resources.^{45,46}

Limitations

This analysis has certain limitations. The cross-sectional study design restricted our analysis to descriptive statistics and measures of association rather than causation, but it fills a gap in the literature by establishing a baseline of how many local jurisdictions serving populations of <500 000 residents have selected recommended nutrition policies during their strategic health improvement planning process. We made efforts to prevent inaccurate reporting due to self-report by restricting eligibility criteria to LHD officials whom we believed would have sufficient knowledge to complete the survey accurately. Although we did not ask about every possible healthy eating policy strategy such as healthy food financing models and the evidence supporting the strategies we selected is variable, we purposefully incorporated an array of recommended strategies.^{8–20} Outcome misclassification could have occurred for multiple reasons. Policy strategies could have been adopted in an earlier version or outside the scope of a CHIP. The survey questions may have been unclear to survey respondents. For example, a policy related to school gardens could have been counted twice under zoning for community gardens and school policies. The survey questions lacked detailed definitions for the terms “unhealthy retail food outlet” or “community”. Unmeasured confounding may be present because federal sodium, trans fat, and menu labeling regulations were implemented or in process when we administered our survey. Our null results and wide confidence intervals may be an artifact of a small sample size and power issues. Selection bias may have occurred because of non-response and our decision to conduct a complete case analysis, but we applied sampling weights to overcome these challenges. Subsequent sensitivity analyses

found no difference between respondents and non-respondents and LHDs with complete data and missing data.

Strengths

This study has multiple strengths. To our knowledge, it is the first to describe the extent to which CHIPs contain healthy eating policy strategies and fills an important research gap. Our findings are generalizable to US LHDs serving less than 500 000 residents because we used a weighting methodology to produce national estimates.

Conclusion

While policies ranging from evidence-based to promising are recommended to improve local food environments^{8–12,15,16,20}, our findings suggest few such policy strategies have been included in CHIPs. The CHIP process is one way to help foster long-term sustainable collaborations necessary to address multi-factorial public health issues. Future research is warranted to investigate how smaller local jurisdictions and LHDs with fewer resources prioritize policy strategies to improve food environments.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Proportion of Local Health Departments with Healthy Eating Policy Strategies included in a Community Health Improvement Plan

Policy Strategy	% of sample (95% CI)	
	Unweighted (n=176)	Weighted (n= 2 390)
Any healthy eating policy strategy	32.4% (25.8–39.7%)	32.2% (24.9–40.4%)
Any policy strategy related to increasing availability/identification of healthy foods	20.5% (15.1–27.1%)	21.3% (15.2–29.0%)
Community gardens zoning or other ordinance/bylaw ^{5,8,9,11}	10.2% (6.5–15.7%)	11.4% (6.9–18.2%)
Farmers markets zoning or other ordinance/bylaw ^{5,8–10,15}	10.2% (6.5–15.7%)	10.8% (6.5–17.4%)
Doubling Supplemental Nutrition Assistance Program benefits on fresh produce ^{5,11}	8.0% (4.7–13.0%)	8.2% (4.6–14.2%)
Menu labeling at unhealthy retail food outlets ^{9,13,14}	5.7% (3.1–10.3%)	6.9% (3.5–13.0%)
Healthy food retail zoning or other ordinance/bylaw ^{5,11,12,15}	2.8% (1.2–6.7%)	2.8% (1.0–7.6%)
Urban agriculture zoning or other ordinance/bylaw ^{5,11}	2.3% (0.8–6.0%)	2.0% (0.6–6.3%)
Any policy strategy related to reducing access to unhealthy foods	21.0% (15.6–27.7%)	22.9% (16.6–30.8%)
Regulation of promotion or advertising of unhealthy food or beverages in schools, government buildings, or community ^{9,12,13}	15.3% (10.7–21.5%)	17.8% (12.2–25.4%)
Regulation of sale of unhealthy food or beverages in schools, government buildings, or community ^{11,12}	14.2% (9.7–20.2%)	15.1% (10.0–22.2%)
Sodium reduction at retail food outlets ^{14,17}	2.3% (0.8–6.0%)	3.5% (1.3–9.2%)
Trans fat ban at retail food outlets ^{14,18}	1.1% (0.3–4.5%)	1.6% (0.3–6.6%)
Fast food outlets zoning or other ordinance/bylaw ^{9,11,15,16}	1.1% (0.3–4.5%)	1.2% (0.3–5.6%)
Taxation of sugar-sweetened beverages ^{9,13,19}	0.6% (0.1–4.0%)	1.1% (0.1–7.2%)
Any policy strategy related to improving school food environment		
School district nutrition, procurement, and vending policies ²⁰	20.5% (15.1–27.1%)	20.8% (15.0–28.3%)

Table 2.

Local Health Department Characteristics Associated with Any Healthy Eating Policy Strategy in a Community Health Improvement Plan (unweighted n=176; weighted n=2 390)

Characteristics	Crude Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)
Size of population served		
100 000 – 499 999	6.52 (2.18–19.47)	3.66 (1.12–11.95)
50 000 – 99 999	3.97 (1.27–12.40)	2.50 (0.71–8.84)
25 000–49 999	6.01 (2.05–17.60)	5.00 (1.71–14.63)
<25 000	ref	ref
Structure of local health department		
County & City-county health department	2.07 (0.81–5.31)	1.35 (0.44–4.16)
Other health department	4.46 (1.13–17.65)	2.06 (0.42–10.00)
Municipal (city or town) health department	ref	ref
Public Health Accreditation Board accreditation status		
Accreditation achieved	4.24 (1.57–11.48)	3.22 (1.08–9.63)
Accreditation in progress or planned	5.29 (2.28–12.28)	4.46 (1.83–10.83)
Not accredited	ref	ref