INTERVENTION TABLE 10

Neighborhood Availability of Food Stores and Restaurants

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
United States						
Sturm, Datar (2005); Sturm, Datar (2008) United States	Availability of affordable food in grocery stores, convenience stores, full-service restaurants and fast-food restaurants ***OTHER INTERVENTION COMPONENT:*** *Multi-component:* 1. Pricing of fruits, vegetables, and meats *Complex:* Not reported	***DESIGN:*** Retrospective cross-sectional (no intervention – used Early Childhood Longitudinal Study, Kindergarten Class [ECLS-K] data from different points in time and compared to food pricing) ***DURATION:*** > 24 months ***SAMPLE SIZE:*** The sample consisted of 6,918 children from the Early Childhood Longitudinal Study, Kindergarten Class (ECLS-K); attended schools in 724 different zip codes, located in 59 metropolitan areas and 37 states ***PRIMARY OUTCOME:*** Overweight/obesity (body mass index [BMI]) ***MEASURES:*** 1. BMI (child's height/weight) 2. Interviews (parental characteristics, sociodemographics [SES], lifestyles) 3. U.S. Census Bureau's 1999 Zip Code Business Patterns (classify food outlets and per capita # of grocery stores, convenience stores, full-service restaurants, fast-food restaurants, and ratio of grocery stores to convenience stores and of full-service restaurants to fast-food restaurants in the resident's zip code) 4. American Chamber of Commerce Researchers Association (ACCRA) food price data (food price indices for meat, fruit & vegetables, dairy, and fast-food). ***DATA COLLECTION:*** Data were collected through interviews by the ECLS-K team on children over a 5 year time period, beginning in Kindergarten through 5th grade. The ECLS-K team measured students' height/ weight and collected data on parental background characteristics, SES, and lifestyles. Census Bureau data on food outlets merged with individual level data on home and school zip codes. ACCRA food price data were merged with individual level data from the ECLS-K by Metropolitan Statistical Area (MSA). ***LIMITATIONS:*** Sample size was not sufficient for detailed stratified analyses by population subgroups; the authors did not observe actual consumption of fruits and vegetables (F&V); food prices might reflect cultural differences in consumption (i.e. demand) rather than supply alone; many limitations of ACCRA data could have biased results: no data available for neighborhood definitions within a city, possible sampling errors along with non-coverage of certain areas, different areas covered in different time-periods and authors couldn't exploit price variation over time	5-10 year olds Nationally representative sample 59.3% White, 12.8% Black, 18.4% Hispanic, 5.8% Asian, 3.7% other (sample) ***ELIGIBILITY:*** Kindergarten -5th grade children with BMI data; the largest and smallest changes (1%) in BMI over time were omitted ***EXPOSURE/ PARTICIPATION:*** Not reported	***LEAD AGENCY:*** Research Team ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not reported ***FUNDING:*** United States Department of Agriculture Economic Research Service grant and Robert Wood Johnson Foundation Healthy Eating Research ***STRATEGIES:*** Not reported	***OVERWEIGHT/OBESITY:*** 1. Increasing F&V prices by 1 standard deviation would significantly raise BMI by 0.11 BMI units (95% CI: 0.05 - 0.18, p<.001) by 3rd grade. About half of the effect occurred in the first year between kindergarten and 1st grade (0.054 units; 95% CI 0.01 - 0.10, p=.016). 2. Increasing meat prices would lower BMI over 3 years, but this was not statistically significant (-0.025 units, p=0.414). 3. No robust effects were found between differential changes in BMI and any of the following: per capita measures of food outlets, relative shares of fast-food restaurants compared with full-service restaurants, or convenience stores compared with grocery stores. 4. At the lower end of the price distribution, children living in a city with low F&V prices would gain 0.28 BMI units less than the average, while at the upper end of the price distribution, children living in a city with high prices would gain 0.21 units more than the average (the average is already 0.55 units higher than should have been according to growth charts). 5. Point estimates suggest that the protective effect (i.e., lower weight gain) of lower vegetable and fruit prices is 1.5 times larger for children in poverty than for other children (not statistically significant, given sample size). *5 year update (4,557 of 6,918 children):* 6. Increasing F&V prices by 1 standard deviation would raise BMI by 0.20 BMI units by 5th grade (up from 0.11 BMI units by 3rd grade) (p<0.001).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Jago, Baranowski (2007) Texas	Neighborhood access to food stores and fast-food restaurants ***OTHER INTERVENTION COMPONENT:*** *Multi-component:* Not reported *Complex:* 1. Fruit and vegetable home availability	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 204 Boy Scouts (aged 10-14) recruited from 36 Boy Scout Troops within the greater Houston area ***PRIMARY OUTCOME:*** Nutrition ***MEASURES:*** 1. Body mass index (height & weight) 2. Cullen Food Frequency Questionnaire (fruit and vegetable consumption) 3. GEMS scale (fruit and vegetable home availability) 4. Domel scale for self-efficacy 5. ArcGIS to assess density of food outlets within 1 mile radius of participant residences 6. Revised Manifest Anxiety Scale (social desirability) ***DATA COLLECTION:*** Participants reported fruit, juice, and vegetable consumption using the Cullen Food Frequency Questionnaire. Participants' home addresses were geocoded using ArcGIS Version 9.0; the ArcView buffer tool was used to create a boundary with a one-mile radius around each participant's residence. City Council public health records were used to identify the number of food establishments within each participant's buffer zone; grocery stores and restaurants were grouped according to the North American Industry Classification System 2002 codes. ***LIMITATIONS:*** The food frequency questionnaire relies on participants' perception of frequency and portion size; the relatively high levels (overestimation) of fruit and vegetable intake reported are probably a by-product of the assessment; participants were predominantly Euro-American and from a single "sun-belt" city, limiting generalizability; participants were predominately middle class which limits the ability to detect differences in association by socio-economic status which could be important in light of previous work that has shown considerable economic and ethnic differences in access to grocery stores	Male 10-14 year olds 70.2% Euro-American; 29.8% Other racial/ethnic populations ***ELIGIBILITY:*** Participants were a sub-sample from a baseline assessment of a physical activity intervention. The addresses of participants that met minimum 2-day accelerometer inclusion criteria in the initial study were included. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Baylor College of Medicine researchers ***THEORY/ FRAMEWORK:*** Social Cognitive Theory ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** Robert Wood Johnson Foundation Active Living Research Program; American Cancer Society ***STRATEGIES:*** Not applicable	***NUTRITION:*** 1. Distance to the nearest small food store (convenience store and drug store) was positively associated with fruit and juice consumption (β=0.001, 95%CI 0.00, 0.00; z=3.07, p=0.002), while distance to nearest fast food restaurant was negatively associated with fruit and juice consumption (β=-0.000, 95%CI -0.001, - 0.000; z=-2.76, p=0.006). 2. Both fruit and juice home availability (β=0.269, 95% CI 0.18, 0.35; z= 6.37, p<0.001) and fruit and juice preferences (β=0.061, 95% CI 0.02, 0.10; z= 2.8, p=0.005) were associated with fruit and juice consumption. 3. The association between distance to the nearest small food store and fruit and juice consumption was attenuated (z=3.07 to 2.63, but still significant) after preferences were added to the model, suggesting that fruit and juice preferences function as a mediator. 4. Distance to the nearest small food store was positively associated with low-fat vegetable consumption (β=0.001, 95%CI 0.00, 0.001), z=2.74, p=0.006). Reduction in the strength of association between distance to the nearest small food store and low fat vegetables consumption before and after the addition of low fat vegetables preferences (z reduced from 2.74 to 1.87) suggested a mediation effect. 5. Preferences (β= 0.067, 95% CI 0.02, 0.09; z= 3.04, p=0.002) and home availability (β= 0.182, 95% CI 0.10, 0.26; z= 4.58, p<0.001) of low-fat vegetables were positively associated with consumption. 6. Distance to the nearest small food store [β=0.003, 95%CI (0.00, 0.00), z=3.69, p<0.001], home availability [β=0.169, 95%CI (0.08, 0.26), z=3.79, p<0.001], and preferences [β=0.174, 95%CI (0.07, 0.27), z=3.31, p=0.001] were associated with consumption of high fat vegetables while distance to the nearest fast food restaurant was negatively associated [β=-0.001, 95%CI (-0.00, -0.00), z=-3.21, p=0.001].

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Rundle, Neckerman (2009) New York	Neighborhood availability of food outlets ***OTHER INTERVENTION COMPONENT:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 13,102 adults ***PRIMARY OUTCOME:*** Overweight/obesity ***MEASURES:*** 1. Height and weight (body mass index [BMI]) 2. Questionnaire (sociodemographic characteristics) 3. Neighborhood measures (a subject's neighborhood was defined as a half-mile network buffer around their residential address; includes sociodemographic and built environment measures using data from 2000 US Census) 4. Food environment measures derived from 2001 Dunn & Bradstreet data (business name, geocoded location, SIC codes). ***DATA COLLECTION:*** BMI and individual-level data were collected during the baseline enrollment of the New York Cancer Project. Neighborhood measures and food environment measures were calculated by the research team. Food outlets were grouped into 3 categories based on their SIC codes: 1. BMI-healthy (supermarkets, fruit and vegetable [F&V] markets), 2. BMI-intermediate (non fast-food restaurants, medium sized grocery stores), and 3. BMI-unhealthy (fast-food, convenience stores, pizzerias, bakeries, candy stores). The density per square kilometer of establishments falling within each of the 3 food outlet categories was calculated for each subjects' unique network buffer zone. Subjects were then categorized into increasing quintiles for each of the 3 food outlet categories with the first quintile being the least dense and the 5th being the densest. To control for effects of neighborhood composition on BMI, the models were adjusted for proportion of residents below federal poverty line and proportion of Black and Hispanic residents. The authors assessed the possible confounding effects of measures of neighborhood walkability, including population density, density of bus/subway stops, % of commuters using public transit, land-use mix, and proportion of land zoned to permit commercial development. ***LIMITATIONS:*** Individuals may self-select into neighborhoods that support their preferred lifestyle; Dunn & Bradstreet data used for food outlet info may have been incomplete; potential misclassification of food outlets into the 3 BMI- categories; the time period of the survey, food environment measures and land-use/zoning data do not match perfectly; data were observational and cross-sectional and no causality can be inferred	Adults Urban 12% Asian, 14% Black (African American), 5% Black (Caribbean), 47% Caucasian, 20% Hispanic, 2% Other (evaluation sample) ***ELIGIBILITY:*** Participants in the New York Cancer Project with baseline enrollment data, BMI<70 and complete data for objectively measured height/ weight and questionnaire measures of age, race, ethnicity, sex, income, and education were included. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Researcher from Columbia University ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** National Institute of Environmental Health Sciences ***STRATEGIES:*** Not applicable	***OVERWEIGHT/OBESITY:*** 1. The adjusted mean BMI in the 5th quintile of healthy food outlets (mean BMI: 27.26) was 0.80 units (95% CI 0.27-1.32, p<0.01) lower than in the 1st quintile of healthy food outlets (mean BMI: 28.06). 2. The prevalence ratio for obesity comparing the 5th quintile of healthy food density with the lowest 2 quintiles combined was 0.87 (95% CI 0.78-0.97). These associations remained after control for 2 neighborhood walkability measures, population density and land use mix. The prevalence ratio for obesity for the 4th versus 1st quartile of population density was 0.84 (95% CI 0.73-0.96) and for land use mix was 0.91 (95% CI 0.86-0.97). 3. Increasing density of BMI-unhealthy and BMI-intermediate food categories was not associated with BMI. ***OTHER:*** 4. 99% of subjects lived within a half-mile of at least one BMI-unhealthy food outlet, while only 82% lived within a half-mile of a BMI-healthy food outlet. 5. Outlet density was highest in high-walkable areas of the city and affluent and predominantly white neighborhoods, and lowest in low-walkable and poor and predominantly black or Latino neighborhoods.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Morland, Wing (2002) North Carolina, Maryland, Minnesota, and Mississippi	Availability of food stores and food service outlets ***OTHER INTERVENTION COMPONENT:*** *Multi-component*: Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 10,623 Atherosclerosis Risk in Communities (ARIC) study participants; 2,392 Black Americans living in 110 of the 208 census tracts (Maryland= 8, Mississippi= 48, Minnesota= 7, North Carolina= 47) and 8,231 White Americans living in 151 of the 208 census tracts (Maryland= 28, Minnesota= 54, North Carolina= 69) ***PRIMARY OUTCOME:*** Nutrition ***MEASURES:*** 1. ARIC study data (dietary intake, demographics) 2. 1990 Census tracts (used to approximate neighborhood areas) 3. Names and addresses of food resources (food stores and food service places) located in the communities was obtained in 1999 from the local health departments and the state departments of agriculture ***DATA COLLECTION:*** The neighborhood locations were geocoded by either the exact address (75% of locations) or the zip code. The food resources were assigned industry codes based on the 1997 North America Industry Classification System (NAICS). Food outlets that were smaller than grocery stores/supermarkets or restaurants were investigated as covariates, since they have a negligible contribution to people's local food environments. From 1993 through 1995 ARIC participants were given semi-quantitative questionnaires to determine food intake. A weighted scale was used to assess daily servings of fruit and vegetables. To assess dietary intake of cholesterol (in milligrams) and the percentage of calories from fats, the authors used a method developed by Willett et al. that is based on data from the US Dept. of Agriculture that defines healthy diets for individuals. ***LIMITATIONS:*** Misclassification of addresses with respect to neighborhood and residential characteristics possible; use of the number and type of stores as a proxy for the availability of healthy foods (assumes supermarkets offer the widest selection at the lowest prices); assumed proportion of the types of food stores and restaurants remained constant between 1993 and 1999; associations observed between the local food environment and dietary intake may be due to the specific geographic areas studied; other factors influencing people's dietary choices related to the food environment were not controlled for in this study	Adults 22.5% Black Americans 77.5% White Americans ***ELIGIBILITY:*** Participant in the ARIC study ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Researchers at the University of North Carolina Chapel Hill and Columbia University ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** University of North Carolina's School of Medicine Women's Health Research Grant, the National Institute of Environmental Health Sciences grant, and the National Heart, Lung, and Blood Institute ***STRATEGIES:*** Not applicable	***NUTRITION:*** 1. Black Americans reported increased intake of fruit and vegetable (F&V) when there was one supermarket in their census tract (adjusted RR =1.30; 95%CI=0.93, 1.81), and a larger increase when there were two or more supermarkets (RR=2.18; 95% CI=1.57, 3.03), corresponding to an average increase of 32% for each additional supermarket (linear RR=1.32; 95% CI=1.08, 1.60). After adjustment for the other types of food stores & food service places, the linear association increased (adjusted RR=1.41; 95% CI=1.13, 1.76). Adding education and income to the model did not change these associations. 2. The proportion of meeting dietary recommendations for total fat was higher among Black Americans living in a census tract with at least one supermarket (adjusted RR=1.22; 95% CI=1.03, 1.44) 3. The presence of at least one supermarket was also associated with an increase in reported intake of recommended levels of saturated fat for Black Americans (adjusted RR=1.30; CI=1.07, 1.56). 4. Compared with Black respondents living in areas without full-service restaurants, those living in neighborhoods with at least one full-service restaurant reported a 26% increase in meeting the recommended diet for saturated fat (adjusted RR=1.21; 95% CI=1.01, 1.46). 5. Compared to Black Americans, White Americans estimates of the association between the local food environment and reported intake of recommended foods and nutrients revealed associations that were weaker and linear associations were not observed. 6. There was an 11% increase among Whites in meeting dietary requirements for F&V if at least one supermarket was present (adjusted RR=1.08; 95% CI=0.89, 1.30) and a 10% increase in meeting requirements for saturated fat (adjusted RR=1.09; 95% CI=0.99, 1.20). 7. The presence of fast-food restaurants among White Americans was associated with a 12% increase in meeting F&V requirements (adjusted RR=1.12; 95% CI=0.91, 1.37).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Morland, Evenson (2009) Mississippi, North Carolina	Neighborhood availability of food stores ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 1295 adults from 102 census tracts from Forsyth County, NC and the city of Jackson, MS ***PRIMARY OUTCOME:*** Overweight/obesity ***MEASURES:*** 1. Random digit dial telephone surveys (height, weight, age, gender, race/ethnicity, education, employment) 2. 2000 US Census tracts (proxies for neighborhood borders) 3. Business addresses of places where people could obtain food (chain supermarkets, independently owned grocery stores, convenience stores, convenience stores attached to gas stations and specialty food stores, full service restaurants, franchised fast food restaurants, limited service places, limited service places that primarily sell one type of food and bars/taverns) ***DATA COLLECTION:*** Demographic items and height and weight were collected from the random digit dial telephone surveys. Height and weight were used to calculate body mass index [BMI] scores with obesity defined at >30 kg/m^2. Business addresses of places people could obtain food were collected and geocoded to the census tracts along with the residential addresses of participants. Network distances were calculated between residential addresses and the nearest supermarket and franchised fast food restaurant. The number of each of the 11 types of food stores/ service places was calculated for each census tract. ***LIMITATIONS:*** Response rates were low and selection bias may have occurred as respondents tended to be highly educated; the study relied on residential home phones and therefore the sample may be different from individuals who have no land line or only have cell phones; the food environment data were collected 3 years after the individual level data were collected; data were self-reported and limited to 2 geographical areas	Adults 61.5% White and 38.5% African American 64.7% women (evaluation sample) ***ELIGIBILITY:*** Non-English speakers were excluded. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** The research team ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** American Heart Association ***STRATEGIES:*** Not applicable	***OVERWEIGHT/OBESITY:*** 1. The prevalence of obesity was lowered by 0.78 in areas that had at least one supermarket (adjusted prevalence ratio [PR] =0.78, 95% CI 0.63-0.95). 2. Areas with at least one limited service restaurant (adjusted PR=0.73, 95% CI 0.56-0.95) or at least one specialty food store (adjusted PR=0.66, 95% CI 0.51-0.84), were also associated with a lower prevalence of obesity. 3. A higher prevalence of obesity was observed in areas with at least one independent owned grocery store (adjusted PR=1.31, 95% CI 1.05-1.62), at least one convenience store with a gas station (adjusted PR=1.19, 95% CI 0.97-1.46) or more than one franchised fast food restaurant (adjusted PR=1.30, 95% CI 1.00-1.69). 4. Each mile closer to a supermarket was associated with a 6% higher prevalence of obesity (adjusted PR=1.03, 95% CI 0.91-1.17) and each mile closer to a fast food restaurant was associated with a lower prevalence of obesity (adjusted PR=0.88, 95% CI 0.75-1.02).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Wang, Cubbin (2007) California	Changes in neighborhood food store environment, food behavior and body mass index (BMI), 1981-1990 ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 5779 adults from 4 California communities that participated in the Stanford Health Disease Prevention Program (SHDPP) surveys (1981-1990) ***PRIMARY OUTCOME:*** Overweight/obesity and nutrition ***MEASURES:*** 1. Height and weight (using standardized protocols – body mass index [BMI]) 2. Interviewer administered questionnaire (socioeconomic status, eating habits, frequency of consumption of selected foods) 3. Neighborhood food store data obtained from the California State Board of Equalization and supplemented with store listings from phone directories. 4. Geographic information systems [GIS] (food store addresses and densities, census tracts/block groups) ***DATA COLLECTION:*** Survey and clinical data were collected during a 2 hour exam by nurses and other research staff from the SHDPP. Retail food store data were obtained for the years SHDPP surveys were conducted. Geocoded locations were verified with city planners to ensure correspondence with actual neighborhood boundaries. The number of food stores of each type was counted in the neighborhood and a surrounding 0.5 mile buffer zone. The geographic store density was calculated by dividing the number of stores by the area of the neighborhood. The North American Industry Classification System and the Food Marketing Institute definitions of retail food stores were adapted to create 11 food store categories. The researchers analyzed changes in the food store environment during the same time period the SHDPP examined changes in eating habits and BMI for residents of Monterey, Salinas, Modesto and San Luis Obispo. ***LIMITATIONS:*** The SHDPP food behavior assessment did not include fruits and vegetables; fast food items were not asked about specifically; the assessment of consumption of selected foods did not seek information on portion size; store data was archival and categorization of the stores was based on name recognition which could result in categorization error	Adults 83% non-Hispanic White, 17% racial/ ethnic populations 25.5% lower-income (evaluation sample) ***ELIGIBILITY:*** Participants had to be 25-74 years old, reside in 1 of 4 California cities, and speak English or Spanish. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** The research team ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** American Heart Association; the National Institute of Environmental Health Sciences; the National Heart, Lung and Blood Institute ***STRATEGIES:*** Not applicable	***ENVIRONMENT CHANGE:*** 1. In terms of store density, stores selling sweets (% change= 152.1, p<0.001), pizza stores (% change= 85.2, p<0.001), small grocery stores (% change= 60.3, p<0.001), convenience stores (% change= 17.6, p<0.001) and fast food restaurants (% change= 53.7, p<0.001) showed large increases from 1981 to 1990. *During the same time period (1981-1990)* ***OVERWEIGHT/OBESITY:*** 2. Mean BMI increased by 1.5% in men (p=0.05) and 3.2% in women (p=0.01) from 1981-1990. The % of men and women who were obese increased rapidly, from 14.1% to 17.5% in men (p=0.09) and from 16.3% to 20.9% in women (p=0.03). ***NUTRITION:*** 3. There were notable increases among both men and women in the % consuming what are generally considered "healthy" foods. The percentage reporting consumption of poultry/fish, cooked dried beans and reduced-fat milk increased by 12-26% in men and 13-20% in women) from 1981-1990. 4. There were significant decreases in the % reporting consumption of fried foods (men= 20% decrease, p<0.001; women= 32% decrease, p<0.001) and cured meats (men= 23% decrease, p<0.001; women= 16% decrease, p<0.02). 5. The consumption of other less healthy foods increased: sweets by 35% in men (p<0.001) and 15% in women (p=0.04), and TV dinners and other pre-prepared foods by 4-5% among both men (p=0.22) and women (p=0.03).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Vernez Moudon, Lee (2007) Washington	Access to grocery stores and restaurants ***OTHER INTERVENTION COMPONENTS:*** *Multi-component:* 1. Complete sidewalks and route directness 2. Land-use mix, density, and distance to commercial facilities *Complex:* 1. Perceptions of social supports	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 608 adults from 4 parts of urbanized areas (88 non-contiguous square miles) within the Urban Growth Boundary of King County, Washington. (105 sub-sample personal characteristics) ***PRIMARY OUTCOME:*** Walking behavior ***MEASURES:*** 1. Geographic Information System (GIS) data (parcel level data: urban and non-suburban environment, buffer and proximity measures) 2. Survey (walking behavior, attitude, perceptions [visual quality, social supports for walking, street amenities], demographics, household characteristics, the environment) 3. Behavioral Risk Factor Surveillance System (BRFSS) (total walking) 4. National Health Interview Survey (NHIS) (total walking) 5. International Physical Activity Questionnaire-Long (IPAQ) (total walking) 6. King County tax assessor (environmental factors [data ca. 2001]) 7. King County park and Metro data (street connectivity, land-use mix, residential density, distance to locations, presence of sidewalks, bike lanes, and trails [data ca. 2001]) 8. Puget Sound Regional Council (trails, sidewalks, street connectivity) ***DATA COLLECTION:*** With the exception of questions about walking behavior, attitude, and perception, the survey used validated questions from the Behavioral Risk Factor Surveillance System (BRFSS), the National Health Interview Survey (NHIS), and the International Physical Activity Questionnaire-Long (IPAQ). Three categories for weekly walking minutes were developed; "nonwalker," "moderate walker" (<149 minutes per week), and "sufficient walker" (>150 minutes per week). Measures were taken using both airline (straight line) and network (actual street line) distances. Clustered destination areas were labeled Neighborhood Centers or NCs. ***LIMITATIONS:*** Objective measures were not used; the study was cross-sectional; response rate was low	Adults, General population, Urban and Suburban environment ***ELIGIBILITY:*** Participants had to be 18 years or older, having little or no difficulty in walking a quarter of a mile, living at the same address as listed in the database, speaking English, and being able to communicate via telephone. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Researchers were from the University of Washington, Texas A&M University, Centers for Disease Control and Prevention, and the Seattle Pacific University. ***THEORY/ FRAMEWORK:*** The previously developed Behavioral Model of Environment provided conceptual framework for selecting attributes for the environment. The BME used 3 spatial constructs to model the walking environment: (1) points of origin/ destination, (2) route, and (3) area around origin/destination. ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** The survey was pilot-tested on a random sample of 50 respondents drawn from the same sample frame and administered in the summer and early fall of 2002. ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** This study was supported by a cooperative between CDC and the University of Washington Health Promotion Research Center. ***STRATEGIES:*** Not applicable	***PHYSICAL ACTIVITY:*** 1. Survey variables strongly associated with walking sufficiently to enhance health included using transit, perceiving social support for walking, walking outside of the neighborhood, and having a dog ($p<0.01$). 2. Having too many grocery stores near home was negatively associated with walking in one airline model (airline model [walking sufficiently relative to not walking] OR= 0.667, 95%CI= 0.454-0.980, $p<0.05$). 3. Walking was negatively associated with distance to NC5 (office and mixed-use; airline model, odds of walking sufficiently relative to not walking OR=1.274, 95%CI=1.041-1.559, $p<0.05$) and distance to (office only network model; odds of walking sufficiently relative to not walking, OR=1.581, 95%CI=1.146-2.180; network model odds of walking sufficiently relative to walking moderately; OR=1.235, 95%CI=1.020-1.495, $p<0.05$) as well as the size of the closest NC8 (office, airline model, odds of walking sufficiently relative to walking moderately; OR= 0.779, CI= 0.0.655-0.927, $p<0.05$; odds of walking sufficiently relative to walking moderately, OR=0.801, 95%CI=0.712-0.901, $p<0.05$) to home. 4. Living closer to a grocery store/market (Airline model Odds of walking moderately relative to not walking; OR=0.375, 95%CI= 0.189-.743, $p<0.01$) (Airline model Odds of walking sufficiently relative to not walking OR=0.443, 95% CI=0.219-0.896, $p<0.05$)], an eating/ drinking place (Airline model Odds of sufficient walking relative to walking moderately OR=0.688, 95%CI=0.493-0.959, $p<0.05$), a bank (Network model Odds of walking moderately relative to not walking OR=0.775, 95% CI=0.620-0.968)), and a NC2 ([grocery, restaurant, retail] Network model Odds of walking sufficiently relative to not walking OR=0.640, 95%CI= 0.441-0.928, $p<0.05$) were correlated with increased walking. 5. Living in an area with more complete sidewalks along major streets (airline (sufficient relative to walking) OR=1.090, 95%CI=1.008-1.179, $p<0.05$) was significant in the airline but not in the network models and was positively associated with the likelihood of walking sufficiently ($p<0.05$). 6. Two route directness (airline/network ratio) variables, showed moderately significant (all $p<0.05$) associations with walking to the closest grocery store/market (network; walking sufficiently relative to not walking, (OR= 1.025, 95%CI= 1.004-1.047) and to the school (OR= 0.987, 95%CI= 0.974-1.00). *(continued next page)*

(Continued from previous study)						
						7. The density of the respondent's parcel was also strongly associated with walking sufficiently (airline sufficient not walking, OR=1.959, 95%CI=1.148-3.346) (network sufficient relative to not walking, OR=2.021, 95%CI=1.239-3.294) (network sufficient to moderate, OR=1.457, 95%CI=1.118-1.899) (p<0.01 for all) and significantly correlated with both the network and airline models. ***OTHER:*** 8. Perceived social support for walking in the neighborhood had the strongest association with increased odds of walking. Odds of walking moderately to not walking, (OR= 1.622, 95%CI=1.216-2.165, p<0.01) and odds of walking sufficiently relative to not walking, (OR=1.855, 95% CI=1.366-2.520, p<0.01).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
International						
Timperio, Ball (2007) Australia	Availability of a variety of types of food outlets near the home ***OTHER INTERVENTION COMPONENT:*** *Multi-component:* Not reported *Complex:* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 801 children; 340 5-6 year-olds & 461 10-12 year olds from Melbourne & Geelong ***PRIMARY OUTCOME:*** Nutrition ***MEASURES:*** 1. Parent survey (child's sociodemographics and eating behaviors; fruit and vegetable intake items were adapted from the National Nutrition Survey). 2. Food outlet locations & participant addresses were geocoded using GIS and 3 measures of availability were created: shortest distance to nearest outlets, existence of ≥1 outlet and number of outlets within 800 meters. ***DATA COLLECTION:*** Data from the parent self-administered survey were collected from November 2002 - December 2003. Researchers located and measured 5 types of food outlets relative to participant addresses in 2004-05 (greengrocers, supermarkets, convenience stores, fast food outlets, and restaurants, cafés and takeaway stores) from food premise registers maintained by the local government, electronic databases, and online and printed dining guides. This information was geocoded along with participant addresses. ***LIMITATIONS:*** Study limited by cross-sectional design; inability to verify types of food sold in food stores & potential misclassification of stores within each category; it is possible that families did not shop in the stores close to home, instead purchasing fruits and vegetables [F&V] in areas convenient to work or school or en route to common destinations; researchers were unable to determine the amount of F&V consumed since only frequency & not portion was assessed; results may be biased toward families with high levels of maternal education; 3,695 children were invited to participate, 1560 participated in larger study, data on residential address and F&V consumption available for 801 children	5-12 year olds ***ELIGIBILITY:*** Not reported ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Researchers from Deakin University in Australia ***THEORY/ FRAMEWORK:*** Not reported ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** Data collection & evaluation was funded by Victorian Health Promotion Foundation. Data collection related to locations of food stores was funded by the State of Victoria Department of Human Services & in part by the Australian Research Council. ***STRATEGIES:*** Not applicable	***NUTRITION:*** 1. Children with at least one fast food outlet within 800 meters (m) of home were 38% less likely to consume fruit ≥ 2 times/day (OR=0.62, 95%CI: 0.40, 0.95; p<0.05) and those with at least one convenience store within 800 m of home were 25% less likely to consume vegetables ≥ 3 times/day (OR=0.75, 95%CI: 0.57,0.99; p<0.05) than were children who did not have these types of stores close to home. 2. Each additional fast food outlet close to home was associated with 18% lower odds of consuming fruit at least 2 times/day (OR=0.82, 95%CI: 0.67,0.99; p<0.05). 3. Each additional convenience store within 800 m of home was associated with 16% lower odds of consuming fruit at least 2 times/day (OR=0.84, 95%CI: 0.73, 0.98; p<0.05), and vegetables at least 3 times/day (OR=0.84, 95% CI: 0.74, 0.95; p<0.01). 4. The likelihood of consuming vegetables at least 3 times/day increased as the distance to the closest supermarket and fast food store increased (OR 1.27, 95% CI: 1.07,1.51; p<.001 and OR 1.19, 95% CI: 1.06,1.35; p < .001, respectively). 5. There were no significant associations with access to greengrocers. ***OTHER:*** 6. Few children had a greengrocer or fast food outlet close to home and one in four had a supermarket within 800m. Of the 5 types of food stores (greengrocer, supermarket, convenience store, fast food outlet, restaurant/café/ takeaway), the closest to home were convenience stores and restaurants, cafés or takeaways and the farthest was a greengrocer. 7. More than a quarter (29.8%) did not have any of the five types of food stores within 800m of home.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Hume, Salmon (2005) Australia	Access to food stores and restaurants ***OTHER INTERVENTION COMPONENTS:*** *Multi-component* 1. Presence of parks and green spaces 2. Access to diverse locations in the neighborhood *Complex* Not reported	***DESIGN:*** Cross-sectional study ***DURATION:*** Not applicable ***SAMPLE SIZE:*** 147 children from three Victorian metropolitan government funded coeducational primary schools of more than 500 students enrolled. ***PRIMARY OUTCOME:*** Low and moderate intensity physical activity and sedentary behavior ***MEASURES:*** 1. Mapping through use of drawings (perceptions of importance in home and neighborhood [places and things]) 2. Photograph mapping (perceptions of importance [places and things in the home and neighborhood environment]) 3. Accelerometers (duration of physical activity) 4. Qualitative assessments (features drawn and photographed were analyzed for common themes, 6 themes identified [family home, opportunities for physical activity and sedentary pursuits; food items and locations; green space and outside areas; the school; opportunities for social interaction]) 5. 1998 SEIFA index from the Australian Bureau of Statistics (socioeconomic status and disadvantage) ***DATA COLLECTION:*** The map drawing lessons were 1 week apart, with the home map completed in the first week and the neighborhood map completed the following week. The word "home" and boundaries of the home were specified to children to create a standard of understanding. The word 'environment' was explained as 'our surroundings, the places and things that are around us'. A subsample of children (n = 44) were given disposable cameras and asked to take about 8 photos. One week after camera distribution, film was collected and processed. Photographs were developed and returned to each child to provide a brief written explanation for each of their photos. The children wore the accelerometers approximately 6 weeks prior to completing the maps and taking the photographs for 8 consecutive days. Only children with more than 10,000 steps per day were included. Day 1 and 8 were not included in data report because of fittings and collection. Children wore the accelerometers during March/April of 2002. All children received individualized feedback about their physical activity participation in the form of a brief report and were given compensation (e.g. sports drink bottle, balls, Frisbees) for participating in the study. ***LIMITATIONS:*** Data was based on child perception; study design was cross-sectional; the sample was homogenous, as only 3 schools were used, making generalizations difficult; the sample was small which limited statistical power	10.1 ± 0.4 years old (evaluation sample) ***ELIGIBILITY:*** Schools were eligible for participation if; they were government funded coeducational primary schools, they had more than 500 students enrolled, and facilities were adequate for fundamental motor skill lessons and physical education. ***EXPOSURE/ PARTICIPATION:*** Not applicable	***LEAD AGENCY:*** Researchers were from Deakin University in Australia ***THEORY/ FRAMEWORK:*** Ecological Systems Theory ***EVIDENCE-BASED:*** Not reported ***REPLICATION/ ADAPTATION:*** Not applicable ***ADOPTION:*** Not applicable ***IMPLEMENTATION:*** Not applicable ***FORMATIVE EVALUATION:*** Not reported ***PROCESS EVALUATION:*** Not reported	***RESOURCES:*** Not applicable ***FUNDING:*** The Victorian Health Promotion Foundation ***STRATEGIES:*** Not applicable	***PHYSICAL ACTIVITY:*** 1. Food locations drawn within the neighborhood showed a significant positive association with moderate intensity activity [F (1, 48) =4.16, p=0.05, r^2=0.08). 2. There were no associations between perceived environmental variables and low or moderate intensity activity among boys. 3. Among girls, physical activity opportunities in the neighborhood were positively associated with low intensity activity [F (1, 51) =5.29, p=0.03, r^2=0.09]. 4. Sedentary and vigorous intensity activity was not associated with any environmental variables among girls. 5. Opportunities for sedentary behaviors drawn at home showed a significant positive association with vigorous activity [F (1, 60) =4.06, p=0.05, r^2=0.06] and an inverse association with time spent being sedentary [F (1, 60) =3.65, p=0.06, r^2=0.06].

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