HAPI

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Food Options, Health, and Place

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Photo by Ann Forsyth

The HEALTH AND PLACE INITIATIVE (HAPI) investigates how to create healthier cities in the future, with a specific emphasis on China. Bringing together experts from the Harvard Graduate School of Design (HGSD) and the Harvard School of Public Health (HSPH), it creates a forum for understanding the multiple issues that face cities in light of rapid urbanization and an aging population worldwide.

Health and Places Initiative
http://research.gsd.harvard.edu/hapi/
Harvard Graduate School of Design

The Research Briefs series summarizes recent research on links between human health and places at the neighborhood or district scale and provides background for a number of other forthcoming products—a set of health assessment tools, planning and urban design guidelines, urban design prototypes, and neighborhood cases. While the Research Briefs draw out implications for practice, it is these other tools that really provide specific, real-world guidance for how to create healthy places.

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Big Ideas

- Healthy (or unhealthy) eating is the result of many factors including personal preferences, social norms, the larger food system (supply and distribution), prices, seasons, transportation infrastructure, health education, and local availability. The built environment may matter more for healthy food procurement than for healthy eating behaviors.
- The connections between food, environments, planning, design, and health are complex. They include:
  - Food production—e.g. providing space for agriculture and food processing.
  - Food distribution and access—e.g. locations of shops, restaurants, and markets; transportation of people to purchase food.
  - Education and awareness-raising—much in the realm of public health but some in the realm of planning and design such as community garden programs and edible landscaping.
- While obesity has captured a great deal of attention, there are other health issues related to food including obtaining adequate nutrition.
- Findings regarding healthy food access are highly site- and culture-specific. As a whole, the reviewed literature lacks conclusive evidence to support widespread design recommendations. Most of the available literature is limited to high-income countries and urban areas, especially the United States. However, some of the research presents logical health and place associations (but not necessarily causations) that could be referenced for good practices.
- In the United States there is evidence that lower socio-economic areas and ethnic minority neighborhoods have less geographic access to healthy food. Evidence for other high-income countries is less clear. Problems with economic access to healthy food are of global concern.
- However, healthy food access does not necessarily translate to healthy food intake (and vice versa). Personal preferences, cultural background, transportation options, socio-economic status, education, seasonal availability, cost of fruits and vegetables, are among the variety of external factors that may affect dietary behavior and health outcomes.
- Planners and policy makers should focus on increasing access to high quality, diverse healthy food options in low-income areas, especially in the United States.
- Other good practices include reducing price disparities between healthy and non-healthy foods, advertising and marketing campaigns (promoting healthy food, limiting ads for unhealthy foods to children), and promoting urban agriculture.

What the Research Says

Health Issues

Rates of obesity are rising around the world, with serious health consequences.

Almost all countries across the world are seeing increases in overweight populations and obesity, especially in disadvantaged groups, such as low-income individuals (Finucane et al. 2011; Gortmaker et al. 2011, 848; Malik et al. 2013, 14; Swinburn et al. 2011, 804).

Obesity has some well-known serious health consequences, including type 2 diabetes, cardiovascular diseases, several cancers, disability, and premature death (Malik et al. 2011, 13; Swinburn et al. 2011, 805).

Obesity is a systems —not a local— issue.

The obesity epidemic is caused by increased supply, distribution, and marketing of easy, energy-dense food, and increasingly sedentary lifestyles (Gortmaker et al. 2011, 838; Malik et al. 2013, 13; Swinburn et al. 2011, 807). This is related to increasing global trade, economic growth, and rapid urbanization (Malik et al. 2013, 13).

Example: Gortmaker et al. analysized cost-effective policies to reduce obesity and concludes, “Even the most cost effective interventions will not be sufficient to

reverse the obesity epidemic individually. Solutions need to be multifaceted, with initiatives throughout governments and across several sectors" (Gortmaker et al. 2011, 842).

Environmental conditions and individual factors are important moderators of the rate of obesity (Wells and Rollings 2012).

Example: Swinburn et al. (2011) reviewed 120 articles to describe moderating environmental and individual conditions of obesity including: the built environment, transport systems, active recreation opportunities, cuisines and food culture, culture around body size, too little sleep, and possibly also epigenetic effects, passive overconsumption, and, somewhat, individual choice (but this gets quite complicated) (Swinburn et al. 2011, 807-808).

Example: Likewise, Gortmaker et al. describe the following moderating factors of obesity, "National wealth, governmental policy, cultural norms, the built environment, genetic and epigenetic mechanisms, biological bases for food preferences, and biological mechanisms that regulate motivation for physical activity all influence the growth of the epidemic" (Gortmaker et al. 2011, 838, citations removed).

While it is well known that unhealthy diet and over-consumption increases the risk of obesity, it is less known how much of a role the built environment has on healthy eating and obesity.

Finally, while obesity is a major health issue, there are other connections between health, place, and food including obtaining access to adequate nutrition and uncontaminated food.

Place Issues

In writing about food, environments, and health there is a major point of confusion. When people in public health and nutrition talk about the food environment, the **neighborhood** food environment—outside the home, workplace, or school but nearby—is a very small part of that picture. Rather, they typically focus on smaller and larger scales from what's on the plate (the platescape), to the food available in a home refrigerator or a school vending machine, to the larger media environment of advertising and the social environment providing support for eating habits (see Table 1 below). These scales of food environment, as well as the larger macro-level factors, are typically more important influences on what people eat than the neighborhood (Swinburn et al. 2011, 807).

Photo by Ann Forsyth

What's on your plate ultimately matters more than what's in your neighborhood. However, low-income groups in the United States may face fewer nearby healthy food options.

Table 1 below summarizes important places related to healthy eating as described in Story et al.'s (2008) review of 107 articles (focused on U.S., but potentially generalizable to other countries).

Table 1. Specific settings and places related to healthy eating.

Place	Issues
At home	• Household food availability and accessibility • Parental social support for healthy eating • Family meals • Household food security
Childcare	• Nutritional quality of food served likely needs to be improved • Federal and state guidelines important here (for licensing and regulation)
Schools (and after-school/summer school)	• Health of subsidized school meals for low income participants • Health of vending machines, a la carte offerings, school stores, fundraisers • Federal, state, and school policies and guidelines important here (nutritional standards)
Work Places	• Work site health-promotion programs (e.g. nutritional email messages) • Increasing availability and variety of healthful food options, target food placement • Reducing price of healthful food in cafeterias and vending machines • Point-of-purchase labeling, promotional materials
Neighborhoods	• Retail food stores: quality and availability of stores, and food within stores • Restaurants: foods may be more unhealthy and less nutritious, issues of portion size, possibly unavailable nutrition information • Disparities in food store access for low-income and minority groups (U.S.)

Source: Story et al. 2008, 255-264.

Vulnerable Groups

Low income or ethnic minority, especially in the United States.

Internationally, poorer populations are less able to afford healthy food choices. Whether the neighborhood environment compounds this factor seems to vary. Among higher income countries, in the U.S. but not elsewhere, lower income groups may have fewer nearby healthy food options. How important this is relative to factors like pricing is still up in the air.

Example: Black et al. (2014) conducted a international systematic review on neighborhood food environments. A total of 123 articles were reviewed (United States, U.K., Canada, Australia and New Zealand represented), and 10 review articles dealt specifically with community nutrition environments. The authors were able to conclude, "There is evidence for inequalities in food access in the U.S. but trends are less apparent in other developed countries" (Black et al. 2014, 229).

Children

Example: Engler-Stringer et al. (2014) conducted a systematic review of community and consumer food environments' relationship to children's diet (26 included articles). Articles included were international (Australia, Canada, Germany, China, U.K., U.S.), but most studies were done in the United States. The authors found, "moderate evidence of the relationship between community and consumer nutrition environments and dietary intake in children up to 18 years of age" (Engler-Stringer et al. 2014, 522).

Things for Certain (or semi-Certain)

In the United States low-income, ethnic minority and/or rural areas have less access to healthy foods (and vice versa).

This finding does not hold in other locations internationally—although most comparable research is from the U.K., Canada, New Zealand, and Australia, and many locations lack substantial research.

Example: Beaulac et al. (2009) conducted a systematic review of food deserts from 1966–2007 in the United States, Canada, United Kingdom, Australia and New Zealand. They concluded that, "Evidence is both abundant and robust enough for us to conclude that Americans living in low-income and minority areas tend to have poor access to healthy food. However, studies on the price of food were generally of low quality, and their findings were mixed" (Beaulac et al. 2009, 4). "Evidence on neighborhood food price from the United States was inconsistent...These observations suggest that people with limited food budgets may not be able to purchase healthy foods" (Beaulac et al. 2009, 4).

Example: Fleischhacker et al.'s (2011, 469) systematic review of fast food access studies in the U.S. (40 included studies) concluded that, "In our review, 16 out of 21 studies indicated fast food restaurants were more prevalent in low-income areas compared with middle- to higher-income areas."

See also Black et al.'s 2014 systematic review, described previously.

Things up in the Air

Proximity is not the only factor (or even necessarily the most important one) for healthy food options.

A number of non-environmental factors such as income, relative pricing of healthier options, personal preferences, cultural norms, marketing, nutrition information, and seasonal availability also affect options and choices (see figure 1 later in this brief). Furthermore, transportation options, daily travel patterns (e.g. to work and school), and even delivery services provide options for accessing a wider variety of food options beyond one's immediate residential neighborhood. Further, most food stores sell a range of healthier and less healthy items. Given the importance of such issues as pricing, personal preferences, and culture it may well be that people choose for those reasons, not mere proximity.

Example: Krukowski et al. (2013) surveyed (using their self-developed Food Store Selection Questionnaire) 100 primary household food shoppers in urban and rural Arkansas communities (93% female, 64% African American) to determine the most important factors that influence food store choice. They found, "Although proximity to home was a consideration for participants, there were clearly other key factors in their choice of food store" (Krukowski et al. 2013, 586). For example, meat, fruit and vegetable freshness and variety, store maintenance and cleanliness, and low prices were all top reasons for food store choice, in addition to store proximity (Krukowski et al. 2013, 586).

Example: Cannuscio et al. (2013) surveyed 514 residents (predominantly African-American) of Philadelphia, Pennsylvania about their food shopping destinations. The authors also audited 373 stores in the area using the validated Nutrition Environment Measures Survey in Stores to determine variety and healthfulness of foods available. The authors found that while corner and convenience stores were common (78.6% of food retail outlets), the vast majority of participants (94.5%) did their shopping at larger chain supermarkets, which were usually not close to home. Furthermore, supermarkets in disadvantaged areas had significantly fewer healthful foods than other supermarkets. Therefore Cannuscio et al. (2013) concluded, "These data suggest that, when possible, shoppers chose supermarkets that offered more variety and more healthful foods. Findings from this study also reinforce concern regarding unhealthy immediate food environments for disadvantaged residents, who disproportionately relied on nearby stores with more limited food items" (Cannuscio et al. 2013, 606).

Example: Drenowski et al. (2012) investigated whether supermarket price or geographic proximity was more closely related to obesity risk in King County, Washington (n=1682 participants, 8 supermarket stores identified as primary source by 88% of sample). They found "only 1 in 7 study respondents reported shopping at the nearest supermarket. The risk of obesity was not associated with street network distances between home and the nearest supermarket or the supermarket that SOS [Seattle Obesity Study] participants reported as their primary food source. The type of supermarket, by price, was found to be inversely and significantly associated with obesity rates, even after adjusting for individual-level sociodemographic and lifestyle variables, and proximity measures" (Drenowski et al. 2012, e74).

Healthier diets cost more.

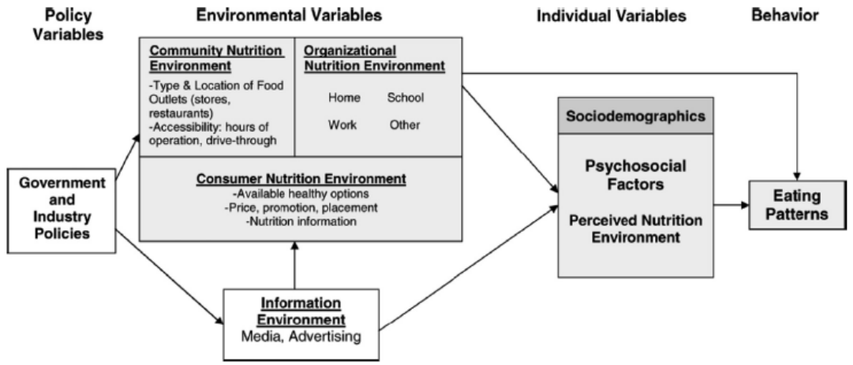
Example: Aggarwal et al. (2012) looked at the relationship between nutrient intakes, diet cost, and socio-economic status of individuals in King County, Washington (n=1,266). It was found that "Nutrients commonly associated with a lower risk of chronic diseases were associated with higher diet costs. By contrast, nutrients associated with higher disease risk were associated with lower diet costs. The cost variable may help somewhat explain why lower income groups fail to comply with dietary guidelines and have highest rates of diet related chronic disease" (Aggarwal et al. 2012, e37533).

Example: Drewnowski (2010) compared the cost versus nutritional value of foods using the USDA Food and Nutrient Database for Dietary Studies and the Center for Nutrition Policy and Promotion food prices database. It was found that, "Grains and fats food groups supplied the lowest-cost dietary category. The energy cost for vegetables was higher than that for any other food group except for fruit…The highest prices per serving were for meats, poultry, and fish, and the lowest prices per serving were for the fats category…These price differentials may help to explain why low-cost, energy-dense foods that are nutrient poor are associated with lower education and incomes" (Drewnowski 2010, 1181).

Photo by Ann Forsyth

Farmer's markets, especially if subsidized in low-income areas, can be a way to educate and promote both healthy food and local agriculture.

Figure 1. Model of nutrition environments.



Source: Black 2014, 230; Glanz et al. 2005, used with permission.

Research on which aspects of the food environmnent significantly influence eating habits or BMI are inconsistent.

There is vast literature on this topic, but five recent systematic reviews of the literature sort through the different findings. Some of the research demonstrates associations between healthy eating and neighborhood environments or community gardens, but it is inconclusive across the board.

Example: Black et al.'s (2014) systematic review of the international literature (123 included articles, United States, U.K., Canada, Australia and New Zealand represented) on neighborhood food environments. Out of 10 articles directly looking at product availability (in-store audit tools) and diet, six found at least one association between product availability and diet (Black et al. 2014, 237). Out of the 20 total research papers looking at consumer nutrition environment exposures and diet, "Almost a quarter (24%) of findings regarding the availability of healthy products revealed that better availability was associated with better dietary outcomes. Findings for price showed, in a fifth of the studies, that lower prices of healthy and less healthy foods increased consumption of these foods. However, almost half of the findings regarding price showed that higher prices of healthy foods were associated with better dietary outcomes" (Black et al. 2014, 237). They conclude, "The evidence also shows a trend for greater access and availability, to either healthy or less healthy foods, relating to diet as expected. However unexpectedly, the evidence for price shows a trend for higher prices of healthy foods being associated with better dietary outcomes" (Black et al. 2014, 239).

Example: Engler-Stringer et al.'s (2014) systematic review of 26 studies (Australia, Canada, China, Germany, U.K., U.S.) on the relationship between the food environment and dietary intake in children found "twenty-two of out of twenty-six studies showed at least one positive association between the food environment exposure and diet outcome. Four studies reported only null associations with dietary outcomes" (Engler-Stringer et al. 2014, 533).

Example: Fleischhacker et al.'s (2011) systematic review of fast food access (40 studies included, majority U.S., also U.K., Canada, New Zealand and Australia represented) found, "Six adult studies found higher body mass index was associated with living in areas with increased exposure to fast food; four studies, however, did not find associations" (Fleischhacker et al. 2011, e460).

Example: McCormack et al.'s (2010) systematic review (16 articles included) of nutritional implications of farmer's markets and community gardens in the United States found, "Six of the 16 studies reported that participation in a farmer's market program or community garden was associated with greater intake of fruits and vegetables. An additional three studies found an association with increased intake of vegetables but not fruit" (McCormack et al. 2010, 406, citations omitted). "It is important to note that no studies were found that assessed the effects of a farmer's market on nutrition-related outcomes without the use of monetary incentives (food vouchers and subsidies). Therefore, it is unknown if merely increasing access to fruits and vegetables via the presence of a farmer's market in a community is sufficient to affect diet" (McCormack et al. 2010, 407).

Example: Williams et al. (2014) conducted a systematic review (30 included articles) of retail food environment around schools on children's food purchases, consumption, and body weight. Most studies were done in North America (n=19), Europe, Asia, Australia, and one multi-country study were included. The authors found, "Very little evidence for an effect of the retail food environment surrounding schools on food purchases and consumption, but some evidence of an effect on body weight. Given the general lack of evidence for association with the mediating variables of food purchases and consumption, and the observational nature of the included studies, it is possible that the effect on body weight is a result of residual confounding. Most of the included studies did not consider individual children's journeys through the food environment, suggesting that predominant exposure measures may not account for what individual children actually experience" (Williams et al. 2014, 359).

Example: Giskes et al. (2011) wrote a systematic review of environmental factors, weight, and dietary intakes among adults (28 included studies, Australia, Japan, New Zealand, U.S.). Similar to Williams et al. above, they found a consistent relationship between weight/BMI and the food environment, but not dietary behaviors. Therefore, the authors conclude, "The environment may play an important role in the development of overweight/obesity, however the dietary mechanism that contribute to this remain unclear and the physical activity environment may also play an important role in weight gain, overweight and obesity" (Giskes et al. 2011, e95).

Implications

In these HAPI Research Briefs we aimed to find implications for planning and design at roughly the neighborhood level. These could include quantifiable standards, more qualitative but yet evidence-supported insights, and other good practices. Not every topic has a full complement of these implications.

Standards and Insights

Healthy food access and eating is a systems problem, not just a local problem. Most of the potential interventions to encourage healthy eating or discourage unhealthy eating are beyond the domains of urban planning and urban design.

Figure 1 shows a commonly used conceptual diagram of nutrition environments (Black 2014, 230; Glanz et al. 2005). However, planners and urban designers can help to shape the food environment of communities and encourage healthy eating through the type and location of food, elements of accessibility, and policies. While this contribution is important, the ability of planners to influence health food habits, and thereby health, is limited.

Other Good Practices

Healthy food systems goals should be included in comprehensive and sustainability plans.

Example: Hodgson's (2012) report "Planning for Food Access and Community-Based Food System" argues, "Comprehensive and sustainability plans are well suited to address complicated food access and community-based food systems issues and opportunities" (Hodgson 2012, 7). Other recommendations include developing a food policy council, partnering with key local government stakeholders in the planning process, develop a food systems planning staff position or food working group, partnering with local foundations, and balancing aspirational goals with measurable goals (Hodgson 2012, 9).

Ultimately, the goal of policy-makers and planners is to help repair the food system to have both a supply of healthier foods and demand for healthier foods.

Raja et al.'s (2008) report "A Planner's Guide to Community and Regional Food Planning: Transforming Food Environments, Facilitating Healthy Eating" describes ways community and regional food planning can encourage healthy eating. Their detailed recommendations have been incorporated into Table 1.

See also the Growing Food Connections website for a online tool and resource (geared toward the United States): http://growingfoodconnections.org/tools-resources/food-systems-reader/

Table 1 describes various planning and policy strategies recommended in the available literature on healthy food options. Environments can be both barriers to and supportive of healthy eating. While these strategies have typically not been proven to improve healthy eating, they may do so. In addition, they have other beneficial outcomes such as increased awareness of options and local economic development. However, cost-effectiveness, sustainability, and effectiveness are continuing challenges.

Photo by Ann Forsyth

Planners should remove policy or zoning barriers to urban farming in order to encourage local food and healthy eating.

Table 1: Good policy and planning practices to promote healthy food options.

Goal	Strategies
Efforts to influence individual behaviors[1]	• Health promotion programs, social marketing, education • Policies and laws to reduce costs of healthy foods and increase costs of unhealthy foods
Government policies to reverse obesity drivers[2]	• National and international policy changes, guidelines, and initiatives to improve diet and physical activity, monitor health outcomes, and increase awareness • National labeling, banning, taxation, subsidies, price adjustments, and nutritional labeling, to incentivize healthier choices and deter unhealthy choices • Government policies shifting agricultural policies to incorporate health outcomes • Encourage the advertisement of healthy foods • Restrict advertising of unhealthy foods to children, or self-regulation of marketing to children. • Nutritional education and improved standards in schools • Food industry policies to move product formulations toward healthier compositions
Plans and Designs[3]	• Protect and promote health and sustainable food security as over-riding priorities in food policy development • Stand-alone plans focusing on community food systems or their components • Inclusion of food system components in comprehensive and sustainability plans • Zoning with food and health in mind (sanitation, limiting unhealthy food vendors, permitting urban agriculture) • Food policy councils • Food charters
Promote healthy food access and quality[4]	• Facilitate the entry of supermarkets and other food stores into low-income areas • Encourage the development of local grocery cooperatives • Healthy foods sold in school and work canteens and cafeterias, school food policies • Where possible, encourage and facilitate quality and diversity of food and food stores, not just location • Transit routes facilitate access to supermarkets, farmer's markets, and other healthful food destinations • Medium to large grocery stores in urban areas (small parcel) • Fast-track grocery stores' development approval • Economic development incentives for grocery stores • Mixed-use neighborhood design includes small and midsize grocery stores • Corner stores carry healthy options
Promote urban/ local agriculture[5]	• Growth boundaries and greenbelts to protect against urban sprawl eliminating agricultural land near cities • Infrastructure and support for urban farmers at individual, community, and commercial levels to be included in food policy plans: e.g. regulation of vacant lot use • Strategies for self-sufficiency of cities and vertical farming, urban farms • Brownfield regulations should ensure food production isn't in areas of contaminated soil • Community gardens • Farmer's markets (especially accepting coupons for low-income people, e.g. food stamps, WIC) • Foster the development of more community food projects • Community supported agriculture (CSA) • Farm-to-school programs • Buy local campaigns • Edible landscapes

1. Beaulac et al. 2009; Gortmaker et al. 2011, 844; Malik et al. 2013, 19; Swinburn et al. 2011, 809
2. Beaulac et al. 2009; Gortmaker et al. 2011, 841, 844; Malik et al. 2013, 19; Swinburn et al. 2011, 810; Walker et al. 2010, 882
3. Gortmaker et al. 2011, 843; Hodgson 2012; Raja et al. 2008
4. Beaulac et al. 2009; Cannuscio et al. 2013; Krukowski et al. 2013; Raja et al. 2008; Walker et al. 2010
5. Beaulac et al. 2009; Mok et al. 2014; McCormack et al. 2010; Raja et al. 2008; Walter 2013

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