

Physical Activity and Food Environment Assessments

Implications for Practice



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There is growing interest in the use of physical activity and nutrition environmental measures by both researchers and practitioners. Built environment assessment methods and tools range from simple to complex and encompass perceived, observed, and geographic data collection. Even though challenges in tool selection and use may exist for non-researchers, there are opportunities to incorporate these measures into practice. The aims of this paper are to (1) describe examples of built environment assessment methods and tools in the practice context; (2) present case studies that outline successful approaches for the use of built environment assessment tools and data among practitioners; and (3) make recommendations for both research and practice. As part of the Built Environment Assessment Training Think Tank meeting in July 2013, experts who work with community partners gathered to provide input on conceptualizing recommendations for collecting and analyzing built environment data in practice and research. The methods were summarized in terms of perceived environment measures, observational measures, and geographic measures for physical activity and food environment assessment. Challenges are outlined and case study examples of successful use of assessments in practice are described. Built environment assessment tools and measures are important outside the research setting. There is a need for improved collaboration between research and practice in forming partnerships for developing tools, collecting and analyzing data, and using the results to work toward positive environmental changes.

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Introduction

An understanding of how the built environment influences individuals is important for designing effective policies and interventions to improve population-level behavior.¹ Evidence linking the built environment and health has been successfully translated into policy and practice, leading to initiatives that promote physical activity and increase healthy dietary choices.^{2,3}

In order to illuminate the complex associations between built environment and behavior,⁴ data collection needs to be valid, reliable, and cost-effective.⁵ Although assessments have improved over the last decade, current challenges to both research and practice include selecting the most parsimonious and appropriate measures, needing to continually adapt and refine them, ensuring their relevance for diverse populations, and integrating measures of the built environment into public health surveillance.⁶

One strategy to align policy interests, researcher expertise, and on-the-ground practice is to coordinate efforts to collect and utilize data.⁷ These data can be used in baseline assessments to provide general guidance on making changes to the built environment, monitor changes in the built environment and concomitant health behavior trends and outcomes,⁶ and develop advocacy and support for replication of evidence-based interventions, programs, and policies.^{7–9} Coordinating efforts can begin with raising awareness among practitioners on the importance of integrating built environment data into community design initiatives. Practitioners include a broad group of stakeholders such as public health staff, community

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development specialists, urban planners, transportation planners and engineers, those working in physical activity or nutrition advocacy, and others who have input in built environment decision making. Although there have been efforts to develop transdisciplinary communication and training about the built environment and health,^{10,11} collaboration across municipal departments does not always occur.¹² The aims of this paper are to (1) describe examples of built environment assessment methods and tools in the practice context; (2) present case studies that outline successful approaches for the use of physical activity and nutrition environment assessment tools and data among practitioners; and (3) make recommendations for both research and practice.

Methods

Methods for assessing physical activity and food environments can be broadly categorized as perceived environment measures, observational measures, and geographic measures, each with varying advantages for use in community practice (Table 1).

Measures

One way to gather perceptions of the built environment is through self-administered questionnaires or surveys. For physical activity, typical surveys include questions on the perceptions of the presence and condition of sidewalks, green space, bike lanes, and accessible recreational facilities. Tools may be short or highly detailed,¹³ and they may be tailored to subpopulations such as youth,¹⁴ older adults,¹⁵ or particular ethnic groups. In-person or telephone key informant interviews are a way to gain relevant perceptions from stakeholders. Stakeholders are those that have up-to-date information on aspects of the physical activity environment such as infrastructure and may include leaders in advocacy agencies, bicycle and pedestrian planners, and local policymakers.

Perceived environment measures are also used to assess food environments. Community food assessments (CFAs) refer to the process of examining the types of food resources in a community and the perceptions of community members of the available options. CFAs may include interviews with residents, local store-owners, and farmers as well as input from local health department leaders, city planners, and economic development agencies within or outside of government.^{16,17} In-depth interviews with food retailers have been used to understand the local food environment and the factors influencing food stocking and sales decisions.¹⁸

Table 1. Examples of Methods to Assess Physical Activity and Nutrition Built Environment

	Physical activity	Nutrition	Advantages	Disadvantages
Perceived measures				
Surveys	Presence or condition of sidewalks, bike lanes, green space, accessibility, facilities	Food availability Food affordability Foods offered	Can combine with other data for broad scope Relatively easy to administer Validated tools exist and can be tailored	Data entry and analysis can be a challenge
Community resources				
Interviews	City planners, policymakers, community leaders	City planners, policymakers, community leaders, store owners, retail managers, farmers, residents Can be specific to organizations (e.g., farmers markets, child care)	Provides local and relevant information Can be used to identify perceived barriers to improving environment	May be difficult to know which key people from whom to gather information Qualitative analysis may be time consuming
Observational measures				
Audit tools	Streets, schools, parks, buildings	Restaurants, retail food outlets, schools, vending, drinking water resources	Tools vary in complexity Validated measures exist Virtual tools being explored as option	Involves onsite visit May require training Data entry and scoring may be challenging
Geographical measures				
Geolocalized data	Population density, land use, street patterns, availability of recreational opportunities	Restaurants, retail food venue access, per capita access	Provides a broad scope of information Can be used with other types of measures	Data collected for other purposes (e.g., taxation) and may not be complete for all regions May require training and analytic skills to combine or interpret

Additionally, to gain insight into specific organization's nutritional environments, existing surveys can be tailored to specific organizational context. Examples include surveys for food service directors or administration at child care centers,¹⁹ hospitals,²⁰ and schools.²¹

Observational audit tools can be used to assess the built environment-related physical activity. These tools are typically tailored to particular settings such as streets, schools, or parks, and vary in complexity, ranging from simple to highly detailed.²² Observational audits often require substantial amounts of time for both training and onsite visits. To reduce labor-intensiveness, the feasibility of conducting virtual audits is being explored.^{23–25}

Observational audits of the nutrition environment (e.g., Nutrition Environment Measurement Survey [NEMS]) have been developed so that both researchers and community advocates can assess the food environment in restaurants, retail food stores, and vending machines.^{26,27} Audits may provide information on the location of food outlets, availability of healthful choices, and information, pricing, promotion, and placement of healthier food products.²⁸

Geographic Methods

Access to geospatial data for the built environment has increased over the past decade and has been used to measure the physical activity and food environment. This type of data is often collected for tax purposes, municipal and regional planning, or market research but can also facilitate measuring attributes such as population density, specific land uses or land use mix, street patterns, and availability of recreational opportunities (community centers, gyms, parks, and beaches) or food retail across a broad geographic scale.⁶ Although these measures have substantial appeal, there are practical limitations, given the availability and quality of data varying dramatically from place to place, with some locations having rich data²⁹ and others having very little.

Implications for Practice

Although numerous methods and tools to assess the built environment for physical activity and nutrition exist, their feasibility varies. Level of difficulty in implementing measures may be related to practitioner discipline or experience. For example, a person with a public health background may find NEMS relatively easy to use with minimal training,²⁸ but this measure may not be as easy to use for those working in planning and design professions. Conversely, geographic measures may require significant training and unique analytic abilities for public health professionals without these skills. Transdisciplinary collaboration is desired and often required. Observational audit tools as well as some perceived environment measures might be paper-based, requiring subsequent data entry. Data analysis can also be a challenge, and the amount of data produced by many built environment assessment tools can be daunting. Some tools provide standardized scoring protocols to achieve summary scores for areas, which may be what is

most useful for policy and practice,³⁰ but data analysis often requires skills that may fall outside of expertise areas of many practitioners.

Practitioners and researchers need measurement protocols that have been field tested and are efficient. It is also necessary to know whom to interview, which questions to ask, when and what to observe, and how to compile and analyze responses. Enhanced collaboration between researchers and practitioners can encourage resolution of these issues.

Data collection, management, and analysis are important practical aspects of built environment assessment. Additionally, the effective dissemination of findings through media, policy briefs, and reports is also needed for advocacy and community improvement.³¹ In spite of the complexity, built environment tools have been successfully adapted and implemented by practitioners in both physical activity and food environment assessments.

The following array of case studies was selected from many to highlight research-practitioner collaboration and identify aspects of how methodologic challenges were addressed in various practice settings.

Case Studies of Physical Activity Built Environment Assessment

Developing Technology to Make the System for Observing Play and Recreation in Communities More User-Friendly

The System for Observing Play and Recreation in Communities (SOPARC) is a validated tool that has been widely used to simultaneously assess physical activity and built environment characteristics (e.g., the presence, accessibility, and usability of facilities and activity areas) since 2004.^{32–34} The tool is particularly useful for practitioners because the physical activity outcome variables are presented in terms understood by planners and policymakers (e.g., number and proportion of people observed being sedentary, walking, or in vigorous activity) rather than in terms used by exercise physiologists (e.g., kcal/kg/min, METs). There have been substantial efforts to use technology to make this tool more accessible for practice. Video training tapes are available for free online through iTunes University (itunes.apple.com/us/itunes-u/soplay-soparc-3-assessment/id529513043?i=115757894), and the system has been used by researchers and practitioners on four continents.³⁵ Also, the RAND Corporation has made the SOPARC protocol available online (http://www.rand.org/health/surveys_tools/soparc/user-guide.html), with the site permitting anyone with an Internet connection to enter SOPARC data and retrieve a summary at no cost.

An international group led by researchers from Porto, Portugal, has developed an app for collecting SOPARC data using iPads (iSOPARC) (<http://ciafel.fade.up.pt/isoparc/>). The free app enhances the collection and management of standard data and includes functions for simultaneously including GPS and photographic data. This procedure enables practitioners to use validated tools and to receive upgrades and enhancements quickly. With online observer training being available and with data entry, management, and analysis being made easier, the tools become much more accessible and usable by all.

Building Capacity for Successful Funding

The B.E.A.T. Neighbourhood Assessment is a community-oriented tool created for use in communities by the British Columbia Recreation and Parks Association.³⁶ The tool was designed in collaboration with a community and researcher to help local government officials, community organizations, and individuals identify elements of a healthy built environment. It provides a summary score for a neighborhood (defined as 7 X 7 city blocks). Users are guided to walk the area and then score 50 items across ten domains: (1) density and land use; (2) pedestrian infrastructure; (3) bicycling infrastructure; (4) roads and parking; (5) trails and other modes; (6) transit; (7) safety; (8) aesthetics and character; (9) proximity to services; and (10) planning and engagement. For each item, users choose from three descriptions to describe the area. The tool provides a summary with the overall score (0–50, “needs work”; 51–100, “room for improvement”; 101–150, “getting active”) and a score for each domain. Particular features of this tool ease the burden of both implementation and analysis. First, it has explanations and embedded pictures that provide clarification and education. Second, it guides users to create a spider plot with the scores for each domain, resulting in a visual depiction of the strengths and weaknesses of the community. Third, there is a set of follow-up questions at the end to guide actions and avenues for using the assessment results.

This tool has been widely distributed and promoted through health, transportation, and planning realms, mainly through professional organizations. In 2011, use of the tool was endorsed by a community infrastructure granting program offered by the British Columbia Ministry of Community Sport and Cultural Development for small- and medium-sized communities (B Bedford and J Ingram, personal communication). This particular tool was selected because it was deemed to be rigorous, easily accessible, and would serve as a resource to guide smaller communities to identifying specific actions that might make the biggest impact. The tool was promoted

to help communities identify customized solutions related to active transportation and health, and data from assessments provided a strong rationale for funding and prioritization of projects.

Raising Awareness and Community Engagement with a Walkability Checklist

In celebration of WHO's World Health Day in 2012, research teams in Vancouver, Canada, hosted a neighborhood tour event (Walk in My Shoes) to raise awareness about the interaction among older adult health, mobility, and the physical environment and to address the question *Does your neighborhood work for older adults?* A key motivation for the event was to facilitate interaction among older adults, service providers, community groups, and city planners and engineers.^{37,38} This event preceded a major investment in a Greenway development. The event was both active and interactive—the half-day session included presentations, a walking tour, and a debriefing group discussion. The walking tour had three options of various lengths to encourage participation of older adults across a range of mobility, and each route included at least one mini-park (green public spaces the size of one to two lots). On or during the walking tour, older adults were asked to complete a checklist among items across seven domains of walkability: (1) mini-parks; (2) street crossing and way finding; (3) sidewalks; (4) traffic; (5) personal safety; (6) pleasant and supportive routes; and (7) social connectedness. The checklist was based on existing tools but was tailored by the research team and city partners to focus on issues pertinent to planning activities and issues along the Greenway (e.g., mini-parks, homeless individuals) and the concerns of the older adult population (e.g., washrooms, cyclists on sidewalks).

Each item had *yes/no* response options and participants were asked to provide a summary rating for each domain, which was aggregated to an overall neighborhood score. The research team compiled a final report for the city planners and stakeholders based on checklist results. A valuable outcome of the event was the conversation between the participants and city planners that led to the changes in the built environment, with the checklist serving to ground the relevant discussions. This event emphasized the need to engage various age groups in the design and appraisal of their neighborhood and how it meets their needs and expectations. Also, the walking tour attracted substantial media attention, which served to raise the profile of the need to plan for the aging demographic and listen to the voices of older adults in planning healthy communities.

Case Studies of Food Built Environment Assessment

Reading Health System Community Food Assessment

The Reading Community Foods Needs Assessment was conducted in Fall 2013 and included a high-level analysis of demographic information, evaluation of existing food retail locations, and plans for identifying potential healthy food infrastructure. Key community partners were interviewed to discuss how to increase healthy food access in the county. A sample of residents was surveyed to better understand their challenges in finding healthy, affordable, and culturally acceptable foods in their neighborhoods. In addition, a random sample of 21 stores across four ZIP codes was obtained in order to obtain a snapshot of fresh food offerings in the community using a tool derived from the Neighborhood Food Access Survey³⁹; nineteen of the locations were classified as corner stores with very few fresh produce options. Data indicated that overall produce quality was poor and was typically displayed poorly, such as in cardboard boxes on the ground. Further, the study found that 72% of visited stores had fewer than five varieties of produce available and 25% had none at all. Results from residents' surveys revealed that the primary perceived barriers to accessing healthy food included cost, quality, and the distance to stores. Residents indicated they would like to see more emergency food distribution locations (i.e., food pantries) nearby. Nearly half reported shopping at a supermarket just once per month and 60% reported they relied on a local corner store for food. A report was used to plan for improving the food environment in this region.

Healthful Nutrition of Foods in Stores on Navajo Nation

Until recently, the Navajo Nation had limited information on the availability, pricing, and promotion of healthful foods offered at food retail venues on or near the Navajo Nation. A collaboration involving the Navajo Department of Health (NDOH), CDC's Division of Nutrition, Physical Activity, and Obesity, and other tribal and academic partners was formed to perform a baseline assessment of the food environment (i.e., food and beverage availability, pricing, and promotion) in grocery and convenience stores (including trading posts) on and around Navajo Nation. In July 2013, four CDC staff members joined 15 staff and volunteers from the NDOH to assess 83 grocery and convenience stores across the entire Navajo Nation and in five adjacent border towns. The Nutrition Environment Measurement Survey in Stores (NEMS-S)²⁶ was adapted for local use by including

foods popular among the Navajo people, traditional Navajo foods, and foods allowed as part of the Navajo Nation Special Supplemental Nutrition Program for Women, Infants, and Children. Further, surveys of 22 store managers from a subsample of the original sample of stores on the Navajo Nation were conducted to assess supports and barriers to offering healthier foods in stores.

This collaborative assessment revealed that in both Navajo grocery and convenience stores, many healthier option items were more expensive than less-healthy foods. It was also noted that fewer than one in three stores promoted/identified locally grown items or encouraged healthy eating. These findings were shared with local stakeholders and are currently part of ongoing discussions about possible approaches to address needed improvements in the Nation stores.

National Park Service Healthy Foods Evaluation

The National Park Service (NPS), a bureau within the Department of the Interior, manages 401 national park units, employs 22,000 staff members, has 221,000 volunteers, and has more than 280 million visitors annually.⁴⁰ In addition, NPS has initiatives that help support local rivers, trails, and other open spaces. In April 2011, as part of the newly launched Healthy Parks Healthy People U.S. initiative, NPS Director Jon Jarvis announced a service-wide Healthy and Sustainable Foods Strategy to "ensure access to healthy, sustainable, and high-quality food at reasonable prices." Partnering with CDC, the NPS Healthy Foods Evaluation was a unique collaboration designed to provide baseline data that informed NPS food policy and environment changes for all levels of parks.

CDC scientists adapted observational tools including NEMS to evaluate access, availability, pricing, and promotion of nutrition offerings²⁶ and developed tools to evaluate access to free drinking water access in national parks. During May 2011, these standardized tools and protocols were piloted in 11 national parks. More than 40 volunteers collected data in national park units across the U.S. Five evaluation modules with detailed protocols were used to collect data from multiple places within parks. Overall, 47 national park units in 33 states, including all NPS regions, were surveyed, totaling 79 restaurants, 55 snack shops, 30 stores, 83 beverage and 17 food vending machines, and 352 free drinking water access points. Results of CDC–NPS Healthy Foods Evaluation provided data to help support the 2013 NPS Healthy and Sustainable Food Program, which includes policies that require healthier food and beverage availability at national sites through concessioner contracts. This policy will impact the food system by having food

Table 2. Recommendations for Researchers and Practitioners to Enhance Built Environment Assessment

Recommendations for researchers	Recommendations for practitioners
<ul style="list-style-type: none"> ● Develop tools that are easy for practitioners to use. Lengthy tools and those requiring extensive training, significant time in the field, and detailed analysis are not practical. Consider both the types of questions and data collection methods. 	<ul style="list-style-type: none"> ● Collaborate with researchers. Many researchers are part of local community efforts or coalitions to improve food and physical activity opportunities. Through these groups, network and engage them in discussions about what is needed. Many researchers are affiliated with universities that have staff, students, and relevant resources to assist in assessments.
<ul style="list-style-type: none"> ● Provide training programs information, videos, or toolkits. Supplement tools with additional information that will facilitate implementation and analysis. 	<ul style="list-style-type: none"> ● Find training opportunities. There are online trainings or self-guided learning modules for some built environment measurement tools. National and local advocacy groups often promote and provide links to them. Sign up for news alerts to increase awareness of these resources.
<ul style="list-style-type: none"> ● Include input from practitioners during initial development of the tools. Make the tools more appropriate and adaptable by gaining input from those likely to use them. 	<ul style="list-style-type: none"> ● Be a liaison with the community. Successful local changes come from within communities. Engage with community members to develop an awareness of the connection between the environment and health behaviors and facilitate success in both assessment and policy change.
<ul style="list-style-type: none"> ● Consider diversity. Communities vary across income, population density, region, race/ethnicity, and it is crucial for assessment tools to address the needs and conditions of different populations. Pilot-test in diverse settings to ensure adaptability. 	<ul style="list-style-type: none"> ● Disseminate key findings effectively. Use local newspapers, video outlets, press releases, town meetings, policy briefs, info graphics, and social media to share both the process of assessing the built environment and the key findings. The way information is presented can increase data use for advocacy and support.
<ul style="list-style-type: none"> ● Facilitate partnerships among public health organizations and other relevant groups. Work with local leadership to understand what evidence is most needed in the field and help coordinate efforts for research. 	
<ul style="list-style-type: none"> ● Make tools, training, and analysis materials available and accessible. Support open access to instruments via websites. Promote these sites to increase awareness within the practice community. 	

suppliers and distributors procure healthier items such as whole grain products and more fruits and vegetables for an estimated 23.5 million meals at NPS sites.

Discussion

Assessment of the physical activity and nutrition environment can be an important step in demonstrating community assets and improving community health. The case studies described here provide examples of success beyond the research setting, but more work is needed to incorporate assessments into broader practice settings. An environmental assessment requires work at the local level to create an important nexus of shared experience of stakeholders, including both researchers and practitioners. Early and continued collaboration among these stakeholders is needed for standardizing measures, developing adapted or simplified tools and training protocols, and advancing the field of environmental assessment. The recommendations that are summarized in Table 2 build on the mutual interests of researchers and practitioners and were developed as a result of the Built Environment Assessment Training

Think Tank meeting. With enhanced collaboration, the likelihood for subsequent policy and practice changes within communities will increase.

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