Article

Built environment assessment: Multidisciplinary perspectives

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A B S T R A C T

Context: As obesity has become increasingly widespread, scientists seek better ways to assess and modify built and social environments to positively impact health. The applicable methods and concepts draw on multiple disciplines and require collaboration and cross-learning. This paper describes the results of an expert team's analysis of how key disciplinary perspectives contribute to environmental context-based assessment related to obesity, identifies gaps, and suggests opportunities to encourage effective advances in this arena.
Evidence acquisition: A team of experts representing diverse disciplines convened in 2013 to discuss the contributions of their respective disciplines to assessing built environments relevant to obesity prevention. The disciplines include urban planning, public health nutrition, exercise science, physical activity research, public health and epidemiology, behavioral and social sciences, and economics. Each expert identified key concepts and measures from their discipline, and applications to built environment assessment and action. A selective review of published literature and internet-based information was conducted in 2013 and 2014.
Evidence synthesis: The key points that are highlighted in this article were identified in 2014–2015 through discussion, debate and consensus-building among the team of experts. Results focus on the various disciplines' perspectives and tools, recommendations, progress and gaps.
Conclusions: There has been significant progress in collaboration across key disciplines that contribute to studies of built environments and obesity, but important gaps remain. Using lessons from interprofessional education and team science, along with appreciation of and attention to other disciplines' contributions, can promote more effective cross-disciplinary collaboration in obesity prevention.

1. Introduction

The built environment related to obesity can be thought of as the totality of places built or designed by humans, including buildings, grounds around buildings, layout of communities, transportation infrastructure, parks and trails (Anonymous, 2005; Sallis, Floyd Rodriguez, & Saelens, 2012), and features of locations where food is marketed, sold and served (Glanz, Sallis, Saelens, & Frank, 2005; Glanz, 2009). Built environments and the policies that shape them are increasingly considered key determinants of health behaviors related to obesity and other chronic diseases (Anonymous, 2001; Koplan, Liverman, & Krakk, 2005; Parker, Burns, & Sanchez, 2009). Thus, an improved understanding of built environments – and built environment measures – is critical to population health.

A variety of measures now exist that allow researchers and practitioners to plan and evaluate changes to the built

environment (Brownson, Hoehner, Day, Forsyth, & Sallis, 2009; McKinnon, Reedy, Morrissette, Lytle, & Yaroch, 2009; Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008). The measures establish the foundations for interventions to improve health by changing the built environment and for evaluating those interventions. Important advances in assessing the built environments related to eating and activity have drawn on multiple disciplines that have not traditionally worked together. These disciplines include nutrition, exercise science, public health, epidemiology, social and behavioral sciences (psychology, sociology, anthropology), urban planning, transportation, economics, and other disciplines (e.g. law, informatics/computer science, geography, policy studies). The research traditions, core concepts, metrics, and analytic methods from these different disciplines vary greatly from each other. The cross-disciplinary nature of these methodologies has created challenges to using a wide range of measurement strategies, because researchers, practitioners, and policymakers have tended to be rooted in single disciplines. Despite substantial progress in working across disciplines, silos and obstacles to collaboration remain.

The Built Environment Assessment Training (BEAT) Institute Think Tank was convened in 2013 to enable top scholars and practitioners to discuss the contributions of their respective disciplines to research and practice on assessing built environments that are relevant to obesity prevention. The 2-day invitation-only meeting, held in the summer of 2013 in Philadelphia, brought together 29 nationally recognized faculty, highly-cited authors in related fields, and exceptional alumni from the preceding five years' BEAT Institutes (Glanz, Sallis, & Saelens, 2015) [see Supplementary Appendix].

This article is based on discussions that began at that meeting and continued through early 2015. The purpose of this article is to highlight examples of key concepts that are defined and viewed differently through the lens of various disciplines, to describe selected successful collaborations across disciplinary lines, and to identify examples of and needs for better cross-disciplinary training and research. Although this article is not exhaustive and is a selective examination of published literature, it covers a number of key issues that the expert team identified. The article offers recommendations and highlights opportunities for successful collaborations.

2. Participants and methods for reviewing and synthesizing evidence

The expert team members were trained in two key "content-oriented" disciplines: nutrition and food sciences, and exercise science and physical activity research (Sallis, Carlson, Mignano, Lemes, & Wagner, 2013); and five other disciplines: urban planning, transportation, public health and epidemiology, behavioral and social sciences, and economics. Some have interdisciplinary backgrounds in additional relevant disciplines. Each expert reviewed evidence in her discipline; summarized key concepts, definitions and measures from that disciplinary tradition; and identified representative examples of built environment assessment related to obesity. Brief coverage of other disciplines, not explicitly represented by the team, was also compiled. A selective review of published literature and internet-based information on training programs was conducted in 2014 and 2015. The team also sought ideas for successful collaboration from the fields of inter-professional education, organizational development, and team science. The key points highlighted in this article were identified in 2014–2015 through discussion and consensus-building among the team of experts.

3. The foundation of built environment assessments and intervention across disciplines

This section describes the emphases of seven key disciplines and gives illustrative examples of concepts and tools used in each one. These descriptions are necessarily brief and not comprehensive. Table 1 summarizes highlights from each discipline, focusing on measures that are consistently associated with physical activity, diet, and obesity.

Table 1
Disciplines' emphasis and examples of built environment concepts and measures.

Discipline	Importance or emphasis	Examples of key concepts and measures/tools
Urban Planning	Focuses on the technical and social-political processes that shape land-use patterns and community design.	Use of geographic information systems (GIS) to extract measures of density and land-use mix from existing data sources. *Measures* such as walkability draw on urban planning concepts
Transportation	Planning and design of physical infrastructure of roads, sidewalks, bike paths, railroad tracks, bridges, etc.; understanding of daily travel choices	Use of GIS to extract measures of transportation systems. *Measures* of connectivity of street and pedestrian/bike systems.
Nutritional Science, Public Health Nutrition	Focus on how food choices are affected by neighborhood, store/restaurant and home food environments	Local/setting availability may influence what people eat. *Measures*: NEMS-S, NEMS-R
Exercise Science and Physical Activity (PA) Research	Attention to physical activity environments in neighborhoods and organizational settings where PA occurs	Self-report surveys, systematic observations, and secondary data analysis of walkability, bikeability, off-road walking/biking trails, parks and other physical activity settings. *Measures*: MAPS, SOPARC, SOPLAY
Epidemiology and Public Health	Study of the patterns, causes, and effects of health and disease conditions. Informs policy decisions and evidence-based practice. Often emphasizes health disparities	Contributes to study design, collection and statistical analysis of data, and interpretation and dissemination of results. May involve linking population-based behavioral or biological data to environment assessments
Behavioral and Social Sciences	Examines behavior and processes and social context, societal-level variables, and relationships within community. Emphasizes the importance of place to health.	Strong expertise in assessment, measurement development and psychometrics, experimental design, multi-level analysis and complex modeling. *Measures*: Wellness Child Care Assessment Tool, NEMS-P
Economics	Examines the importance of environmental factors including pricing, taxation and marketing on food consumption, PA behaviors and health-related outcomes. Often emphasizes health disparities.	Linkage of individual-level and contextual data sets with emphasis on fixed effects and longitudinal models. Focus on how enactment of policies affect the BE through changes such as food pricing, availability, and advertising. *Tools/measures*: Price elasticity of demand, BTG-COMP, secondary data analysis