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Socioeconomic Influences on Affordable Housing Residents: Problem Definition and Possible Solutions

Deborah J. Bowen and Lisa Quintiliani

Abstract

Socioeconomic status (SES) is a powerful social determinant of health. Often, affordable housing is an important step in promoting reliable economic and social health among individuals living in poverty. However, we argue that we must go further to improve the long-term health outcomes of these individuals and families. First, we use survey data and geographical analysis to identify the socioeconomic status of neighborhoods and residents of affordable housing in a major urban center. SES levels are certainly lower among affordable housing residents, and SES was significantly lower in public housing development neighborhoods than other neighborhoods. We offer solutions from our own and other research experiences that identify potential changes to affordable housing to promote and maximize health of residents. These data have implications for multilevel intervention.

Keywords: built environment, neighborhood, socioeconomic status, affordable housing

1. Introduction

Public housing residents have a much higher burden of chronic disease and disease risk than other urban dwellers, even when controlling for income [1]. One possible driver of these differences may be the environment in which public housing developments are located [2]. There is growing evidence that the physical surroundings and resources available to individuals can have an impact on the relationship between socioeconomic status (SES) and health outcomes [3–5].

Early research led to several large-scale interventions that provide alternatives to living in densely populated, very low SES neighborhoods and buildings [6]. The Moving to Opportunity study used a randomized design to demonstrate that health outcomes, including obesity, could be improved when moving from high- to low-poverty areas. Many of these interventions and changes required physical changes to public and affordable housing that take years to create and are expensive and labor intensive. In contrast, we believe that with simple changes, we can create affordable housing experiences that promote health, rather than reduce the likelihood of health promotion efforts. This chapter articulates those potential experiences and calls for research into them.

This chapter is divided into two main sections. First, we report health indicators and the socioeconomic status of residents and of neighborhoods within public housing developments in Boston, Massachusetts, and compare it with the SES levels in other Boston neighborhoods. This landscape is likely to be found in all major urban settings in the United States. Then, we propose methods of ameliorating the effects of SES on the health of affordable housing residents and discuss the literature to support these methods.

2. SES and affordable housing

2.1 Setting

This research was conducted as part of the US Centers for Disease Control and Prevention-funded Prevention Research Center at Boston University. Research at this center is focused on 69 public housing developments in Boston with almost 30,000 residents (>18,000 adults) in 13,937 units or apartments, with 68% of adult residents as female. On average, PHDs have greater than 300 units. The most common ethnic group in the PHDs is Hispanic (35%), followed by Black (32%) and White (21%). English (52%) and Spanish (33%) are the primary languages spoken in PHDs. Average annual household income is \$13,700, which is below the poverty line for a household with only one adult and one child.

2.2 Study 1: SES differences between housing residents and other urban dwellers

First, we analyzed data from an ongoing government-sponsored survey in order to compare the health of public housing residents with other Boston residents through this random-digit-dial survey. We used data from the Boston Behavioral Risk Factor Surveillance System collected in 2001 and 2003 to make crude and demographically adjusted comparisons between public housing residents and other Boston city residents on measures of health status, access and utilization, and health behaviors [1].

Public housing residents were more likely to report fair or poor overall health status, ever-diagnosed hypertension, current asthma, ever-diagnosed diabetes, obesity, disability, loss of six or more teeth, and feelings of depression for 15 days or more in the past month. Public housing residents were slightly more likely than others to be without health insurance or report financial barriers to medical care. Public housing residents reported more smoking and physical inactivity, less past-month binge drinking and past-year marijuana use, and similar levels of lifetime drug use.

This remarkably consistent evidence convinced our research group to focus our efforts on public housing residents in Boston and elsewhere. We focused specifically on obesity and smoking as two key behaviors that are amendable to change but that are double to triple the rates among public housing residents compared with other urban dwellers, given their role in promotion of chronic disease rates in the United States [7, 8]. Our smoking research has taken the form of development and resident-based smoking policies that restrict or limit smoking exposure among all residents of public housing [9]. We now promote smoke-free housing across the country and assist other public and affordable housing settings to go smoke-free [10]. The Boston Housing Authority initiated their smoke-free housing policy (not smoking in resident apartments) in 2012.

2.3 Study 2: analysis of neighborhoods surrounding public housing developments

Our focus on obesity was on understanding the risk factors for obesity in public and affordable housing and in testing new interventions to reduce obesity in those

settings. The second source of data was from the publically available 2007–2011 American Community Survey (ACS) summary file. The American Community Survey is an ongoing survey administered by the United States Census Bureau that collects a variety of demographic and economic data [11]. Block groups containing a family public housing development were considered public housing neighborhoods.

Several measures of SES were taken from the ACS, using the 2010 block group as the unit of analysis: median household income (in dollars); median value of owner-occupied housing (in dollars); percentage of households receiving interest, dividend, or net rental income; percentage of adults 25 years or older who completed high school; percentage of adults 25 years or older who completed college; percentage of employed persons 16 years or older in executive, managerial, or professional occupations; percentage of persons below the US poverty line, percentage white race, and percentage unemployed. To calculate area-level SES for each block group represented, we used the method of Diez-Roux [12], a combination of six census-based variables at the block group level. The Gini coefficient measures the inequality among values of a frequency distribution and is used here as a measure of income inequality [13].

Table 1 contains the socioeconomic levels of neighborhoods of Boston’s family public housing developments compared with neighborhoods in which there was not a family development. As seen in this table, there were consistent and significant differences in socioeconomic status variables between development neighborhoods and nondevelopment neighborhoods. This included the average Diez-Roux score for development and nondevelopment neighborhoods and for all of the specific variables included in the composite score, except for value of owner-occupied housing. The

	Public housing (N = 26)	Nonpublic housing (N = 609)	P-value
Characteristic	Mean (SD)	Mean (SD)	
Mean Diez-Roux composite score	−4.01 (4.48)	0.18 (4.50)	<0.0001
<i>SES indicators in composite score</i>			
Median household income (\$)	28,513 (22,066)	59,088 (32,179)	<0.0001
Median value of owner-occupied housing (\$)	372,308 (132,679)	395,254 (152,733)	0.0592
% households receiving interest, dividend, or net rental income	9.75 (12.19)	22.15 (14.31)	<0.0001
% adults 25 years or older who completed high school	71.62 (15.95)	84.09 (14.25)	<0.0001
% adults 25 years or older who completed college	25.01 (25.24)	39.45 (26.84)	0.007
% employed persons 16 years or older in executive, managerial, or professional occupations	30.07 (18.70)	41.76 (21.68)	0.007
<i>Additional area-level SES indicators</i>			
% persons below 100% of federal poverty level	42.49 (19.41)	19.97 (17.07)	<0.0001
% white race	37.16 (20.91)	56.80 (31.97)	0.002
% unemployed (imputed from Census 2010 tract level)	13.92 (6.59)	10.30 (7.93)	0.034
Gini index of income inequality (imputed from Census 2010 tract level)	0.498 (0.069)	0.461 (0.082)	0.033

Table 1.
Mean block group characteristics by public housing status (N = 635 2010 census block groups).

differences between development and nondevelopment neighborhoods were also found in percentage of persons living below the poverty line, percentage unemployed, and percentage white race. The average Gini index measure of income inequality was higher in development neighborhoods than nondevelopment neighborhoods.

Figure 1 is a map of Boston with family developments outlined in red and the block groups within Boston color-coded by the Diez-Roux composite measure of socioeconomic status. Many of the public housing development neighborhoods are in block groups color-coded in white or lighter colors, indicating a low composite score of socioeconomic status. Boston is a city with extensive public transportation

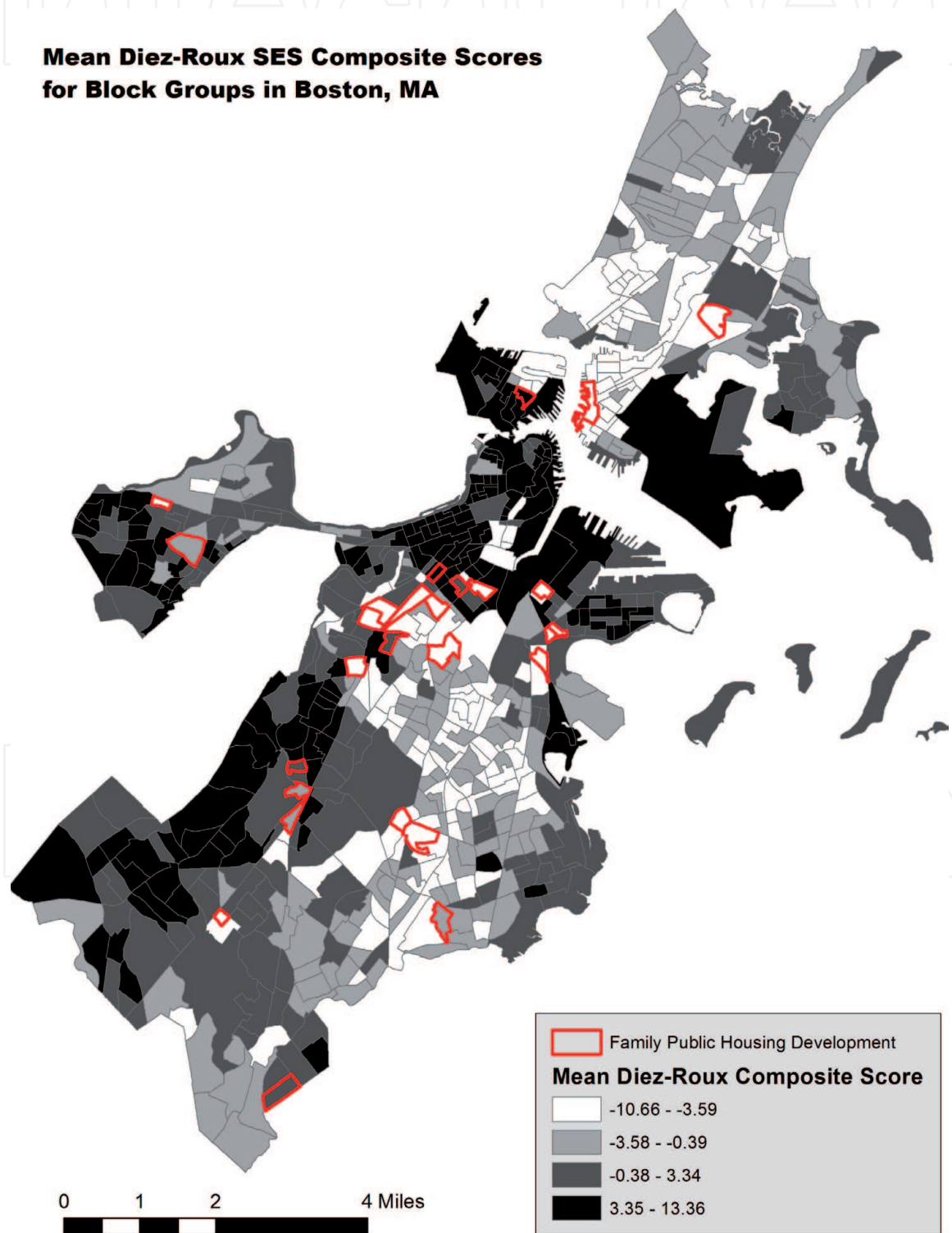


Figure 1. Map of Boston, MA, showing the socioeconomic status of public housing neighborhoods and nonpublic housing neighborhoods using an index calculated from 2007 to 2011 American Community Survey data.

where many children are bused to school from across town and workers can also readily access the transit system, so there is opportunity for movement across the city by public housing residents. Nevertheless, many people use services and have social interactions within a quarter mile of their home or work. Given that most residents of public housing are underemployed, resources built into the lived neighborhood become even more important.

We can hypothesize that these SES differences are likely associated with different amounts of opportunity for healthy eating and activity choices, both related to obesity. The fundamental distinctions in SES associated with differential access to healthy opportunities still exist [14, 15]. The concept of differential access within the practical confines of one's neighborhood frames what the next steps are for intervention to change an unhealthy, obesogenic environment.

2.4 Study 3: changing the environment of public housing

Given our thinking around the utility of simple changes within or in the immediate surrounding area of public housing developments, the third study was an initial test of an intervention to improve the environments of public housing developments to reduce obesity. The Healthy Families study [16, 17] was a group randomized weight reduction trial, in which five housing developments were randomized to receive all physical and social environment intervention activities and five to an assessment only control group. Intervention activities were promoted by resident advocates and targeted weight-related behaviors according to multiple levels: physical environment (e.g., walking groups, resource maps), social environment (e.g., health screenings, cooking demonstrations), consumer (mobile food bus), and information environment (social media). A cohort of 211 (intervention = 116; control = 95) randomly selected women and daughter pairs formed the evaluation cohort. Overall, most participants were Latino (63%), had affordable health insurance (79.1%), and have a high school education or less (64%). The 1-year follow-up assessment data indicated significant effects on moderate-level physical activity; these data were used, in part, to calculate power for the present study. Briefly, physical activity increased from 19.8 minutes per day to 30.5 minutes per day for intervention women, while control women reported stable walking levels. The proportion of sedentary intervention women decreased from 89 to 59%; again control women remained stable. These data indicate that a development-wide intervention can make a difference in the activity levels of affordable housing residents. The changes in outcomes were profound, in that a very large proportion of women changed from sedentary to nonsedentary in 1 year. This study showed that with relatively easy improvements in the environmental cues for healthy behaviors, public housing residents could make changes that in the short term can result in decreased obesity and decreased sedentary behaviors.

3. Future research and opportunities for affordable housing residents

One lesson from the previously cited Healthy Families intervention study is the idea that residents themselves, with help and guidance, can help other residents to improve their healthy behaviors and reduce obesity and smoking behaviors. We have conducted multiple projects to train and support residents to become lay health workers within public and affordable housing, skilled in behavior change techniques, motivational discussions with other residents, and environmental changes [18, 19]. In Healthy Families, for example, residents were trained and supported to work within their own and others' developments to help other residents

participate in walking groups [20] and choose more healthful food offerings. These lay health workers, called Healthy Living Advocates, participated in the design and implementation of all intervention activities within Healthy Families, and many are still active in their developments several years later.

Training HLAs in nutrition and physical activity changes skills on a large scale requires a curriculum that can be easily delivered and transported from setting to setting and delivered using easy to use accessible methods for affordable housing residents. eHealth technologies offer such a platform. Our survey data support the idea that recent use of the Internet and social media is high among public housing residents, with 65% and 59% reporting past-day use, respectively. Almost all residents in the sample used their cell phone for at least one phone call daily (97%) and 84% reported receiving or sending at least one text message per day [21].

Therefore, the use of eHealth technology may be used in several ways to facilitate the delivery of a curriculum by lay health workers: to provide training, help guide conversations with fellow residents, and provide a place to store notes about each contact for later retrieval by the lay health worker and the research team overseeing quality assurance. We have created an eHealth website that consists of web pages for use by lay health workers to counsel individuals in-person or over the telephone about diet and physical activity behaviors. The website assists the lay health worker by displaying on their computer screen [1] previously collected data about the resident receiving counseling (obtained via a survey assessment) and [2] suggested questions lay health advisor can ask the person about his/her lifestyle to identify relevant social contextual factors (e.g., family roles) that impact the diet and physical activity behaviors, followed by suggestions on how the lay health worker can work with the person to set behavior change goals (if the participant is motivated/ready). The website then directs behavior-specific goals which are then set with the participant and recorded in the website, and suggestions for how to meet the goals are discussed (e.g., enroll the help of a support person). All text is written in a motivational interviewing style and provides cues to the CHW to provide reflections (both simple and complex). The lay health advisor records notes within the website for their use during the next session and for the researcher's use in understanding what happened during the counseling session.

The website has undergone two rounds of usability testing with lay health advisors from public housing developments. Five lay health advisors reviewed an early version of the website and provided qualitative comments on its design and rated its usefulness and ease of use highly (mean = 6.8, on a 7-point scale). Second, we conducted another round of testing with three resident lay health advisors (two new individuals, one who had participated in round 2). Over 6 months, we conducted an iterative development plan in which we had eight one-on-one meetings to show them our plans, obtain their feedback, implement these changes, and then show them newly revised versions. They rated the CuesWeight system highly in terms of usefulness and ease of use (average of 1.7 on a scale of 1 [best] to 7 [worst]). Overall, these findings support the usefulness of an eHealth website to deliver a curriculum that can be easily delivered and transported from setting to setting and delivered using easy to use accessible methods for affordable housing residents.

4. Conclusions

Public and affordable housing residents need the help of research and public health practice teams. We have taken the approach of collaborating with the Partnership in Health and Housing to work with community members to develop and implement survey and intervention work. For academic institutions without an

existing partnership, researchers and public health practice teams can forge relationships with the tenant task forces that are present in many public and affordable housing communities.

With relatively simple changes, we can make potential differences in the health outcomes of public and affordable housing residents [22]. For example, using eHealth technologies as a platform for training and delivering lay health advisors in public housing developments is an opportunity to expand the reach of workers both within their developments and across developments nationally. Websites could be made open source so that lay health advisors could review and modify the content to fit their particular populations, housing contexts, and targeted health behaviors.

Changing policy to fund these types of programs and activities will improve the systems that support residents and help them improve their health. Funding positions of community health workers could be supported along with regular maintenance of the physical building to enable residents to improve their health outcomes and live happier, healthier lives.

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References

- [1] Digenis-Bury EC et al. Use of a population-based survey to describe the health of Boston public housing residents. *American Journal of Public Health*. 2008;**98**(1):85-91
- [2] Anderson LM et al. Providing affordable family housing and reducing residential segregation by income. A systematic review. *American Journal of Preventive Medicine*. 2003;**24**(3 Suppl):47-67
- [3] RE L, Mama SK, McAlexander KP, Adamus H, Medina AV. Neighborhood and PA: Neighborhood factors and physical activity in African American public housing residents. *Journal of Physical Activity & Health*. 2011;**8**(Suppl 1):S83-S90
- [4] Caspi CE et al. The relationship between diet and perceived and objective access to supermarkets among low-income housing residents. *Social Science & Medicine* (1982). 2012;**75**(7):1254-1262
- [5] Caspi CE et al. The social environment and walking behavior among low-income housing residents. *Social Science & Medicine*. 2013;**80**:76-84
- [6] U.S. Department of Housing and Urban Development. *Expanding Housing Choices for HUD-Assisted Families: First Biennial Report to Congress*. 1996. Available from: <http://www.huduser.org/portal/publications/affhsg/choices.html> [Accessed: August 14, 2010]
- [7] Field AE, Coakley EH, Must A, Spadano JL, Laird N, Dietz WH, et al. Impact of overweight on the risk of developing common chronic diseases during a 10-year period. *Archives of Internal Medicine*. 2001;**161**(13):1581-1586. DOI: 10.1001/archinte.161.13.1581
- [8] Whitlock G, Lewington S, Sherliker P, Clarke R, Emberson J, Halsey J, et al. Body-mass index and cause-specific mortality in 900 000 adults: Collaborative analyses of 57 prospective studies. *Lancet*. 2009;**373**(9669):1083-1096. DOI: 10.1016/S0140-6736(09)60318-4
- [9] Brooks DR, Burtner JL, Borrelli B, Heeren TC, Evans T, Davine JA, et al. Twelve-month outcomes of a group-randomized community health advocate-led smoking cessation intervention in public housing. *Nicotine & Tobacco Research*. 2018;**20**(12):1434-1441
- [10] Available from: www.BuildingSuccessSmokefree.org
- [11] United States Census Bureau, American FactFinder. American FactFinder. Available from: <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>; <http://www.census.gov/acs/www/> [Accessed: August 10, 2014]
- [12] Diez-Roux AV et al. Area characteristics and individual-level socioeconomic position indicators in three population-based epidemiologic studies. *Annals of Epidemiology*. 2001;**11**(6):395-405
- [13] Yen IH, Kaplan GA. Poverty area residence and changes in physical activity level: Evidence from the Alameda County Study. *American Journal of Public Health*. 1998;**88**(11):1709-1712
- [14] Larson NI, Story MT, Nelson MC. Neighborhood environments: Disparities in access to healthy foods in the U.S. *American Journal of Preventive Medicine*. 2009;**36**(1):74-81
- [15] Hilmers A, Hilmers DC, Dave J. Neighborhood disparities in access to healthy foods and their effects on environmental justice.

American Journal of Public Health.
2012;**102**(9):1644-1654

interventions on healthy eating.
Annual Review of Public Health.
2015;**36**:289-306

[16] Quintiliani LM, DeBiasse MA, Branco JM, Bhosrekar SG, Rorie JA, Bowen DJ. Enhancing physical and social environments to reduce obesity among public housing residents: Rationale, trial design, and baseline data for the healthy families study. *Contemporary Clinical Trials*. 2014;**39**(2):201-210

[17] Bowen DJ, Quintiliani L, Goodman R, Smith E. Changing the housing environment to reduce obesity in public housing residents: A cluster randomized trial. Vol. 18. *BMC Public Health*; 2018. Article number: 883

[18] Bowen D, Battaglia T, Murrell S, Bhosrekar S, Caron S, Smith E, et al. What do public housing residents say about their health? *Progress in Community Health Partnerships: Research, Education, and Action*. 2013;**7**(1):39-47

[19] Bowen DJ, Bhosrekar SG, Rorie J, Goodman R, Thomas G, Maxwell N, et al. Resident health advocates in public housing family developments. *Family & Community Health*. 2015;**38**(2):141-148

[20] Bowen DJ, Rus A, Beltrane C, Drayton M, Williams MJ, Goodman R. Walking groups: A simple, affordable intervention program for public housing developments. In: Brennan V, Kumanyika S, Zambrana, editors. *Obesity Interventions in Underserved Communities*. Baltimore: Johns Hopkins University Press; 2014

[21] Quintiliani LM, Reddy S, Goodman R, Bowen DJ. Information and communication technology use by female residents of public housing. *Mhealth*. 2016;**2**:39

[22] Bowen DJ, Barrington WE, Beresford SAA. Identifying the effects of environmental and policy change