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On: 23 January 2012, At: 06:57

Publisher: Routledge

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Community Development

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rcod20>

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Available online: 23 Jan 2012

To cite this article: James Jennings (2012): Measuring neighborhood distress: a tool for place-based urban revitalization strategies, *Community Development*, DOI:10.1080/15575330.2011.645047

To link to this article: <http://dx.doi.org/10.1080/15575330.2011.645047>



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Measuring neighborhood distress: a tool for place-based urban revitalization strategies

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The United States federal administration's recent Promise Neighborhood and Choice Neighborhood initiatives are part of increasing calls for place-based strategies in the delivery of education and human services in inner cities. Within this new policy context, measures of community-level inequality emerge as a key tool for identifying places which manifest relatively high levels of social and economic distress and where this condition places acute pressures on local service-delivery nonprofits. Measuring and spatially showing levels of neighborhood social and economic distress can enhance our understandings of the needs associated with low-income communities and facilitate civic engagement in the development of neighborhood-based responses. A "neighborhood distress score" can be generated and used to target services into urban areas but can also encourage greater resident civic participation. This score is based on the variables identified in the literature and input from community and civic leaders in Boston, MA.

Keywords: place-based revitalization; neighborhood distress; spatial inequality

Introduction

Place-based strategies for improving urban living conditions are gaining increasing attention as reflected in the national administration's recent Promise Neighborhood and Choice Neighborhood initiatives. Based on the availability of funding announcement in the *Federal Register*, the components of place-based strategies aimed at the "transformation of communities" include identification of places with the greatest social and economic needs; developing strategies that benefit the entire neighborhood; building partnerships among neighborhood organizations and provision of "continuum of services" throughout the lives of residents; linking activities to improve the quality of schooling and raising academic achievement within a neighborhood context; and residential governance and decision-making about planned activities and implementation (*Federal Register*, 2011). These components differentiate place-based strategies from others which focus on providing mobility opportunities for residents in distressed neighborhoods, or identify individuals with specific needs for need-specific services (Melendez & Stoll, 2000).

Broadly, place-based strategies seek to strengthen neighborhoods and community-based organizations. Ironically, this idea emerges at a time when a number of

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local service-delivery nonprofits in Black and Latino communities in Boston are closing or in eminent collapse. The Barr Foundation, the largest foundation in Massachusetts and one with a strong social justice mission, retained the author in 2008 to help provide an overview of the social and demographic characteristics of neighborhoods in Boston. This was considered a first step in highlighting contextual conditions impacting the work of neighborhood organizations. After meetings with foundation representatives and community and civic leaders such as City Year's Hubie Jones, Marilyn Anderson Chase, Assistant Secretary for Children, Youth, and Families in the Massachusetts Executive Office of Health and Human Services, and others, the idea of documenting spatial inequality emerged as an important need. While other research reports and papers have documented inequality among individuals and families across the city, a systematic look at the distribution of inequality on the basis of community or neighborhood indicators was lacking. The systematic measure of neighborhood distress at the census tract level, and development of spatial visualizations of distress levels, can help to identify residential areas requiring greater targeted attention.

The use of community indicators is one way of showing varying levels of needs in a city composed of neighborhoods. A range of community indicators can be indexed in order to differentiate areas. Along with this, the use of Geographic Information Systems (GIS) can assist with showing how different levels of needs are reflected spatially. Measuring and spatially showing neighborhood distress is an effective mechanism for identifying places characterized by social and economic inequality, and where such conditions impose greater demands on service-delivery nonprofits. In order to show areas of the city that reflect relatively higher needs in addressing a range of problems, and to facilitate the design of several place-based neighborhood initiatives emerging in Boston, the author constructed a neighborhood distress score for each census tract in this city. The model described here can be used in other cities focusing on the design of place-based strategies to identify and respond to the needs in low-income communities.

Measuring neighborhood distress

Neighborhood distress is defined as situation reflecting concentrated social and economic conditions which point toward lower living standards for residents, and where such conditions can raise organizational demands on local and small and service-delivery nonprofits. Community indicators can help to assess the needs of the city's most vulnerable populations and the places in which they live. This is one reason "Communities around the U.S. are significantly increasing their use of community indicators to assess their well being and to measure their progress toward shared visions and goals" (Dluhy & Swartz, 2006). Indicating the level of neighborhood distress or spatial inequality through GIS can be used to identify areas requiring targeting in terms of public services and interventions, but also to engage community groups in planning and implementing place-based initiatives.

The construction of a neighborhood distress score illustrates how a range of social and economic variables are distributed throughout a city's neighborhoods and communities. As observed by Lobao, Hooks, and Tickamyer, the "where" dimension of inequality, or how inequality is manifested in places, is as significant as the study of inequality itself: "Inequality – the study of who gets what and why – has been at the heart of sociology since its inception. However, this simple formula

fails to acknowledge that ‘where’ is also a fundamental component of resource distribution” (2007). The “where” of inequality in Boston shows the sub-neighborhood areas that should be targeted for focused intervention.

There are several earlier studies and initiatives that have used similar approaches as a tool for assessing local inequality. One study reporting the measures of distress for purposes of comparison across the country was published by the United States Government Accounting Office in 1998, “Community Development: Identification of Economically Distressed Areas.” It utilized poverty and unemployment variables to compare the state of social and economic distress at the census tract level across counties in the United States. In another study, the city government of Tucson, AZ, developed a list of measures to determine the comparative inequality reflected in different parts of the city (City of Tucson, Arizona, 2002). However, the report states:

Our review of the literature did not reveal any National standards or thresholds upon which neighborhoods might be judged or weighed. We did not find theory or practice, attractive to us, which might tell leaders when an area needed assistance. These decisions are innately political in that they involve the distribution of public monies and goods Given these facts, staff decided that all one could do was measure the City’s “neighborhoods” against the average condition of the City as a whole. (City of Tucson, Arizona, 2002)

Other studies discuss a range of social, economic, and political factors that could comprise measures for determining and comparing the quality of life in urban neighborhoods (Coulton, 2008; James, 1990; Montiel, Nathan, & Wright, 2004; Phillips, 2005; Rogers, 2008; Schulz, Williams, Israel, & Lempert, 2002). The National Neighborhood Indicators Project based at the Urban Institute in Washington, DC, was an initiative aimed at helping “local institutions develop a comprehensive and technically sound set of indicators of neighborhood conditions, so that community residents, public officials, and civic leaders can better plan appropriate strategies to improve their communities” (Sawicki & Flynn, 1996, p. 165). A report issued by this organization emphasized that the development of indicators should be based on the participatory processes involving both residents and experts and that the indicators could be useful for citizen action and public policymaking (Stoeker, 2006).

The Office of Policy Development and Research at HUD commissioned a research report to review various approaches utilized in designing a community needs index (Eggers & Econometrica, Inc., 2007). The indicators included variables associated with poverty, family structure, housing, schooling, and unemployment. The indicators above were selected on the basis of literature reviews and interviews with researchers and representatives of various government agencies.

Neighborhood distress scores and Boston neighborhoods

For Boston, the author selected some of the variables described in the literature cited above, as well as review of earlier research reports and papers documenting inequality in Boston. He also solicited informal input from a wide range of key informants and advocates and elected officials, about the factors that tend to place greater pressures on the work of neighborhood-based nonprofits and organizations. Input was also gathered through participation in community meetings and events over a 10-month period as part of the work for the Barr Foundation (Jennings,

2009a, 2009b). The selection of variables reflected Eggers' concern that measures based on the ground-level experiences should be encouraged (Eggers & Econometrica, Inc., 2007).

The neighborhood distress score is an index based on housing, education, employment, poverty and income, and public safety variables. In addition to using data from the US Bureau of Census and the Bureau of Labor Statistics, population estimates and projections at the census tract level for 2006 and 2011 were provided by two proprietary and highly respected demographic companies, Claritas, Inc. and Applied Geographic Solutions; the latter compiled crime data based on the Federal Bureau of Investigation (FBI)'s Uniform Crime Index. The source for foreclosure data includes ForeclosuresMass and the Warren Group. GIS software programs, *MapInfo* and *Pcensus*, were used to produce standardized scores. Using what is referred to as a site score methodology, the variables are all measured and ranked in each of Boston's census tracts in order to produce a measure for comparing how the variables are bunched up in these places.

The following variables (based on 2006 estimates unless indicated otherwise) were used to construct a distress score for Boston:

- # foreclosure petitions (2007)
- per capita income (inverse ratio)
- average household size
- # of children 17 years and under
- % labor force non-participation
- % families in poverty
- % female-headed households
- % foreign born (2000)
- % persons 5 years + who do not speak English at home
- % of persons 25 years + without a high school diploma
- # homicides (2006, 2007, 2008) and
- FBI crime index (1999–2003).

Health data or school achievement data were not utilized for construction of the neighborhood distress scores. Health data and related information are critical in describing the degree of well-being, or lack thereof of individuals and families. Due, in part, to the need to protect confidentiality, a wide range of health data is not collected or reported in ways that it can be geo-coded at the census tract or block level. School achievement data were not used, because under the city's busing and racial balance policies children and youth can be assigned to schools outside of their immediate neighborhoods.

Each variable was assigned a weight of 1 in order to generate a rank ordering of census tracts based on all the variables. The assigned weight of 1 is justified in that the purpose of the distress score was not to measure how specific variables affect individuals and families, as noted above, but rather to ascertain the distribution of concentrations of the variables. Census tracts with higher distress scores mean that these factors are more prevalent or concentrated in that particular area than census tracts with lower distress scores. Census tracts are used as the unit of analysis for measuring neighborhood distress due to wide social and economic variability within Boston's neighborhoods. By using census tracts, the index captures social and economic variability within neighborhoods that in the aggregate or at the zip code

level might be hidden or not apparent (Krieger, Chen, Waterman, Soobader, Subramanian, Carson, 2003). Some earlier studies of inequality have relied on zip codes, or neighborhood boundaries that do not capture significant differences within these boundaries.

The use of census tracts versus aggregated neighborhood-level or zip code-level data highlights differences within neighborhoods. One of the city's poorest neighborhoods, for example, Roxbury, registers a poverty rate of all persons at 31% based on the data reported by the American Community Survey (2005–2009). Yet there is a wide range of variability in this rate in the 23 census tracts which compose the Roxbury neighborhood. A few tracts report rates in the range of 10% or so, and others are as high as 50% or more. This variability can also be hidden at the zip code level. There are three zip codes composing Roxbury, and all reflect a wide range of poverty rates when census tracts are considered.

In order to avoid an arbitrary determination of population distributions via colorized theme assignments for the maps, a method known as “natural break” was used to thematically differentiate the various neighborhood distress scores across census tracts in the city. This allows the reader to visualize spatial concentrations based on a mathematical formula versus arbitrary assignments of color. According to the user guide for *MapInfo Professional Version 9.5*, the GIS software program used for this purpose, “. . . Natural Break creates ranges according to an algorithm that uses the average of each range to distribute the data more evenly across the ranges. It distributes the values so that the average of each range is as close as possible to each of the range values in that range. This ensures that the ranges are well-represented by their averages, and that data values within each of the ranges are fairly close together” (p. 340). The natural break algorithm is based on a procedure described in an earlier article on choroplethic maps (Jenks & Caspall, 1971).

Figure 1 shows the index that was generated for each census tract. In effect, the map shows the degree of concentration for the variables identified by census tracts. Those census tracts with higher scores mean that the factors associated with social and economic distress are more “bunched up” in those places.

The census tracts with the highest distress scores (≥ 70) are actually located in Boston's predominantly Black and Latino neighborhoods as shown in Figure 1: Roxbury, South Dorchester, and Mattapan. Even within these three neighborhoods, however, there is variability in the levels and distribution of neighborhood distress scores. This is illustrated in Figure 2 showing the distribution and concentration of Black residents and Figure 3 showing the Latino population's distribution and concentrations.

The Asian-descent population is more dispersed than that of Blacks and Latinos. But, pockets of Asian-American residents are still found in the areas with higher neighborhood distress scores, as shown in Figure 4.

These maps help to illustrate that race and ethnicity are associated with spatial inequality in Boston. And even where most Blacks and Latinos tend to reside, we find varying levels of spatial inequality at least measured by the neighborhood distress scores. The maps discourage a view that social and economic distress is simply a problem for individuals or families, as the unit of analysis. As warned by Robinson (2005) regarding this matter in the field of public health, “. . . two critical errors are often committed: (a) race is viewed as an individual characteristic and (b) the analytic methods used in its assessment fail to consider the contextual nature of race, which in turn undermines the ability to discern the root causes of racial

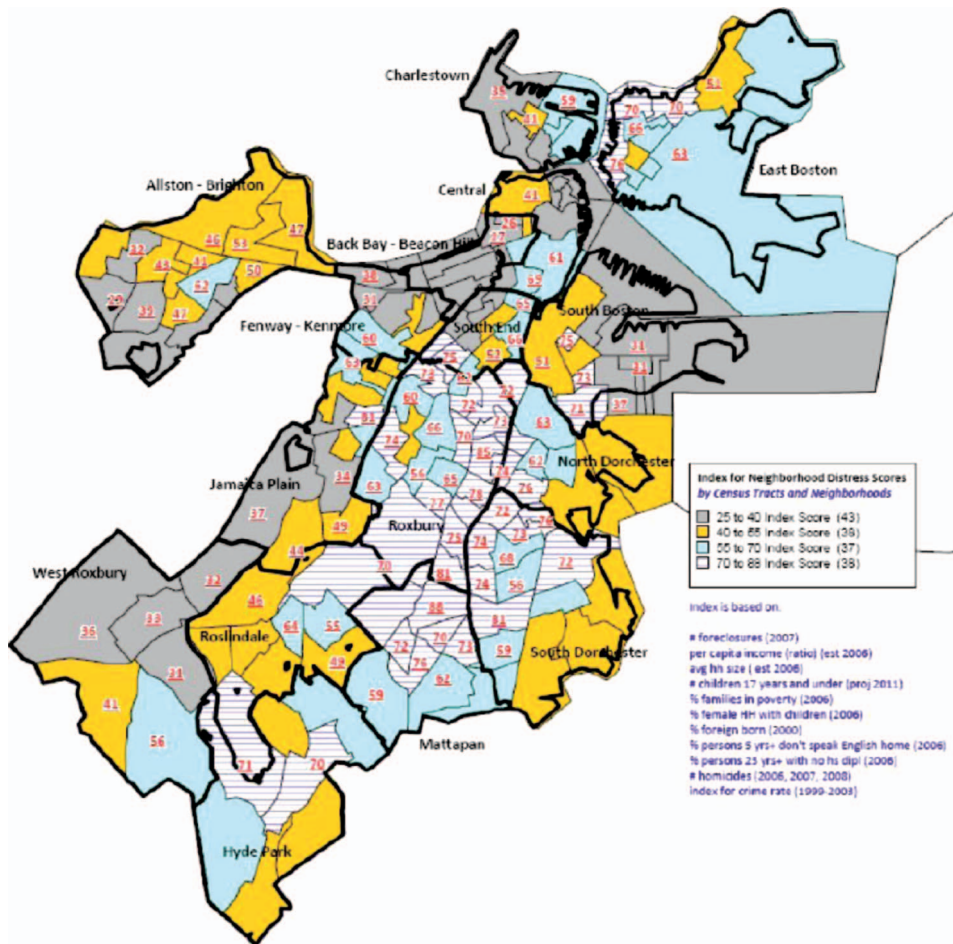


Figure 1. Neighborhood distress scores by Boston's census tracts.

disparities” (p. 338). Robinson (2005) adds: “. . . epidemiologic methods of defining and measuring variables such as race/ethnicity and socioeconomic status must be overlaid with more focused assessment and analysis of relevant characteristics that may exist within at-risk populations” (p. 344). Along this line of thought, the current study shows that both individual characteristics and the use of neighborhood distress scores can help to show the location of inequality. This, in turn, can raise questions and issues which go beyond the experiences of individuals or families.

Advantages and limitations

What has been described in some literature as PP-GIS, or public participation – GIS, indicates that the use of GIS can be a very powerful tool to engage civic audiences. In a review of the impact of GIS on a group of nonprofits, Bishop (2010) cites a range of literature that point to the possibility of greater civic engagement on the part of residents. This kind of impact could be useful in building an understanding of indicators to measure the effects of a range of problems or challenges facing residents in low-income urban areas. Further, it can encourage program benchmarks that are

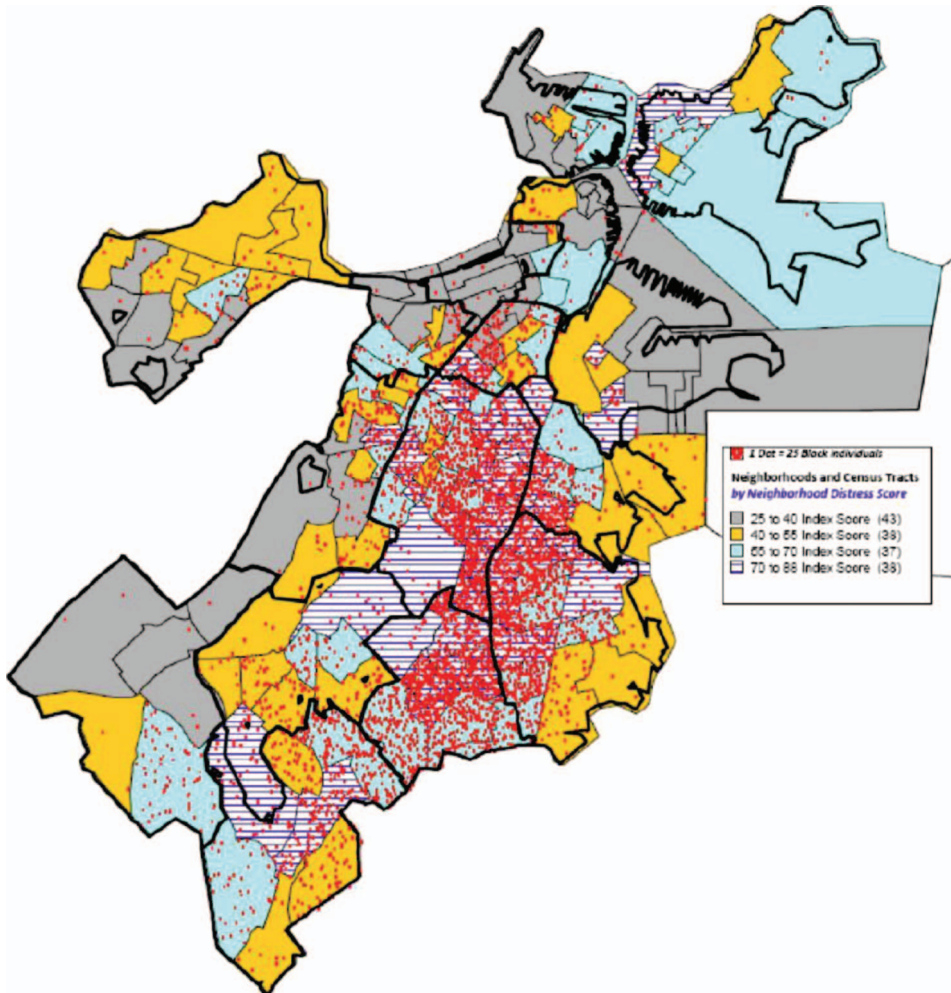


Figure 2. Distribution and concentration of Boston's black population.

locally determined. Schlossberg and Shuford (2005) observe that “the spatial visualization and analysis capacities inherent in GIS present a unique opportunity for enhanced citizen involvement in public policy and planning issues.”

Bishop identified several dimensions in which GIS can be utilized by local government officials and nonprofits: “Grant applications; Avoid duplication; Find commonalities with other organizations; Improve internal communication; Inform decision making; Meet client need; Adjust staff; Develop partnerships; Promote collaborations; Facilitate communication; Analysis with GIS; Share database” (Bishop, 2010). Presentation of spatial inequality can be a lens for community-based organization decision-making and for enhancing civic discourse and participation among residents in areas reflecting living conditions such as higher poverty rates compared to the overall city rate; higher unemployment levels; higher housing vulnerability; higher number of homicides; and other problems. As a planning tool, community indicators at sub-neighborhood levels can be used to frame civic discourse around social and economic inequalities. This would be particularly

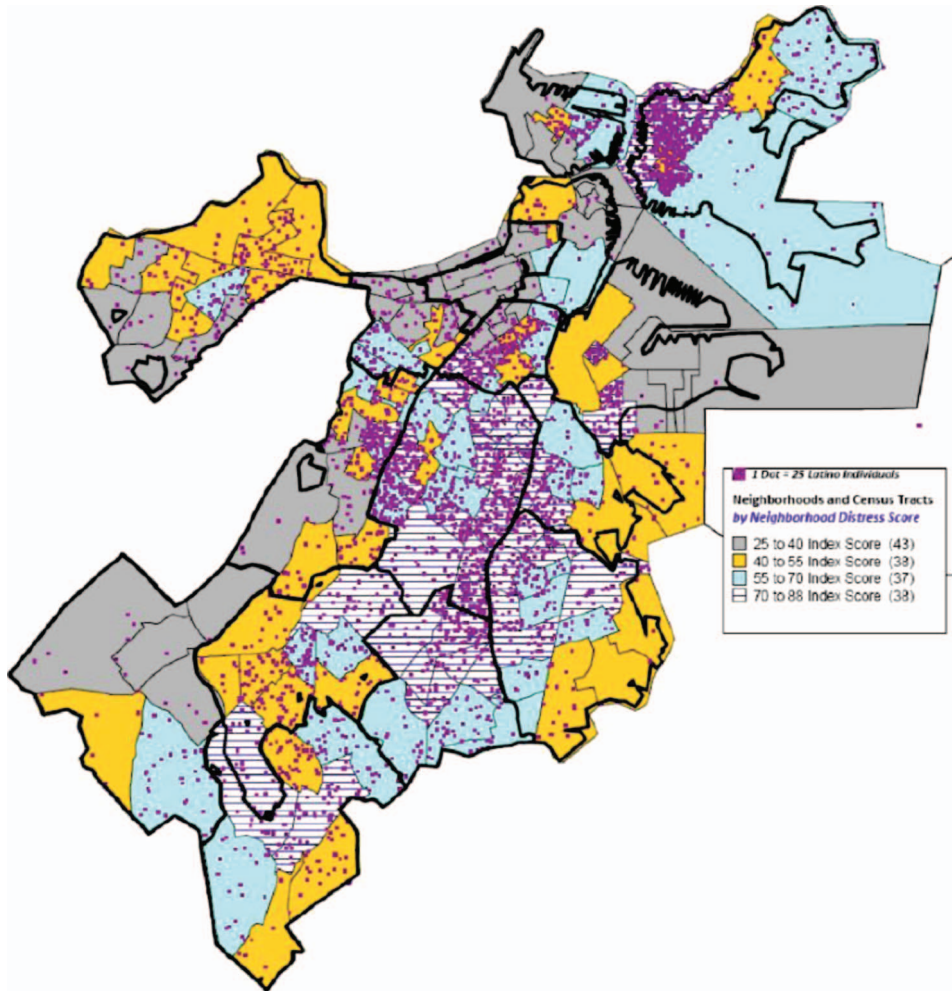


Figure 3. Distribution and concentration of Boston's Latino/a population.

helpful to community health organizations serving vulnerable populations where public feedback represents a tool for improving the delivery and quality of services (Jennings, 2009a, 2009b).

There are some limitations in using distress scores and GIS for showing spatial inequality. It should be cautioned, for instance, that in some ways GIS "has emerged as an elitist, anti-democratic technology by virtue of its technological complexity and cost"; nevertheless, utilization of GIS to highlight spatial inequality can also increase and enhance civic participation (Ghose, 2001, pp. 141–163). GIS programs can be costly both in terms of software and training, representing a serious obstacle for its wide utilization.

There are potential problems associated with community indicators to show spatial inequality. As noted by Krieger et al. (2003), "Despite the well-known existence of socioeconomic inequalities in childhood health within the United States, efforts to monitor trends in these disparities are hampered by two problems: The first

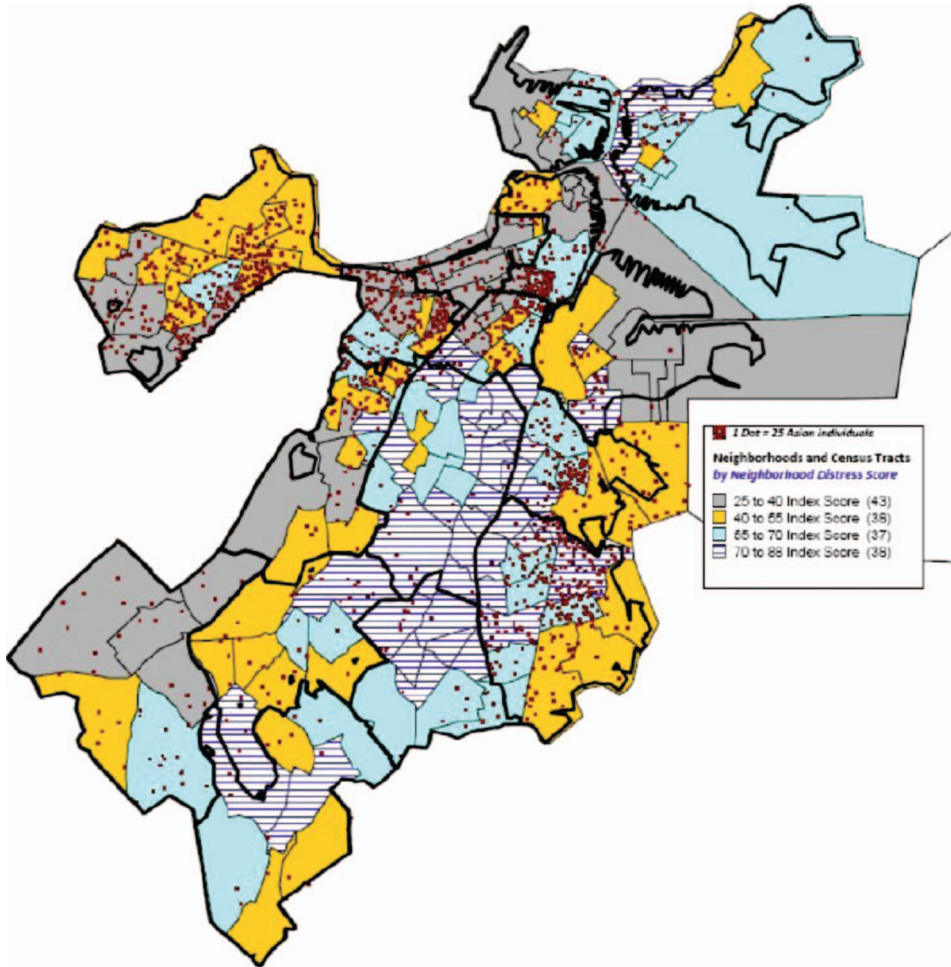


Figure 4. Distribution and concentration of Boston's Asian-descent population.

is the scant data available on socioeconomic position in US public health surveillance systems ... and no socioeconomic data are included in public health data systems ...” (p. 186). And, “... without adequate socioeconomic data, US public health monitoring systems are compromised in their ability to track disparities and trends in childhood health” (p. 186). A second problem according to these researchers is lack of consensus regarding the appropriateness of the types of data and its geographical level; that is, do indicators improve based on the utilization of block groups, or census tracts, or zip codes?

Another potential problem with the use of community indicators for assessing neighborhood distress and spatial inequality is that it could still encourage presumptions of pathology or behavioral defects among residents in places with high levels of poverty and economic depression. Along this line, some social scientists see “neighborhood disorder” rather than neighborhood distress and link the former with behavioral issues rather than historical and contemporary decision-making in policy and political arenas (Fiss, 2003; Ross & Mirowsky, 1999).

According to Wacquant (1997), this is one pernicious premise found in some urban literature which must be challenged as ahistorical and inaccurate. It is, therefore, important that discussions about neighborhood distress and spatial inequality may not be confined to the research or policy community, but readily available to residents, as well. Residents must have opportunities to help interpret and consider the implications of neighborhood distress scores in terms of a range of institutional practices.

Conclusion

Neighborhood distress scores, as illustrated in the maps above, are being utilized for grassroots planning initiatives in Boston. According to the leadership of one organization, the Dudley Street Neighborhood Initiative (DSNI), these illustrations and related discussions of spatial inequality helped the organization obtain a major US Department of Education planning grant to consider how education reform can be placed more effectively within a place-based framework in low-income neighborhoods. DSNI was one of the 20 recipients in the nation to obtain this planning award. Uphams Corner Community Health Center, a health center in a very impoverished part of the city, used these maps and distress scores to pursue a health grant from Health Resources and Services Administration in Washington, DC.

The maps and approach described here are currently being utilized by public agencies, as well. According to Mary Ann Crayton, Executive Director of Community Engagement for the Boston Public School system, this information has been used to “synthesize background information on neighborhood geography . . . access to this statistical data also assists BPS in structuring inter-departmental collaborations with city agencies working on place-based solutions” (email correspondence, September 27, 2011). And, the Chief of Staff for the Boston Housing Authority, Trinh Nguyen, noted that they have used this kind of information and presentation “to align the same needs of other residents with similar distress scores with BHA’s residents, to strengthen partnerships to address the needs of public housing residents” (email correspondence, September 25, 2011).

Of course, measuring distress and sharing findings with communities is not a panacea for improving the quality of public policies (Shaw-Ridley & Ridley, 2010). In fact, such indicators can be “more effective as tools for community engagement and education than as a means for directly influencing public policy” (Gahin and Paterson, 2001, p. 358). Nevertheless, measuring distress spatially can “. . . yield information about past trends and current conditions and can reveal target areas for the community to focus on for policy and budgeting” (p. 353). Variables associated with inequality can simply be presented statistically and focus on individuals and families as the unit of analysis, but spatial demonstrations of indexed community indicators can be reader friendly and empowering by facilitating the sharing of information and encouraging civic discussion about inequality among residents and others.

The construction of neighborhood distress scores can help to identify places requiring targeted attention in terms of resources; it could also have the effect of informing neighborhood groups in understanding how to become more effective in proposing solutions to neighborhood-based problems. It can empower residents to ask questions about the location and distribution of quality basic services that might not be considered without actually seeing how inequality is played out spatially. It

has the possibility of moving residents and neighborhood activists who live in impoverished areas from simply being perceived as victims versus potential change agents at the local level. This is a key for place-based urban revitalization strategies.

Identification and visualization of neighborhood distress levels can help to raise policy-related and program-related questions such as how are resources being distributed to reach areas – versus only targeting individuals or families. Robinson (2005) explains that using community as the unit of analysis holds advantages in the area of understanding health disparities:

A Model based on community rather than traditional reductionist approaches may begin to affect those more intractable disparities that remain, particularly those heavily influenced by poverty and racism. Interventions that reach deeper into at-risk populations and use a comprehensive strategic plan to focus scarce resources where they can do the most good will facilitate empowerment and intersectoral planning to address problems that are embedded in social structure and the legacy of social injustice. (p. 345)

Measuring neighborhood distress should be part of place-based strategies in urban areas for similar reasons. In Boston, this kind of tool was utilized to identify patterns of spatial inequality. It is a tool that is being utilized to facilitate designing strategies aimed at rectifying the inequality between various parts of the city. Further, and more importantly, it is an approach for empowering residents in low-income and distressed areas to understand how inequality affects the places and city where they live, and to question the location of inequality.

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