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Racial Residential Segregation and the Distribution of Health-Related Organizations in Urban Neighborhoods

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ABSTRACT

Recent research has considered the role of racial/ethnic residential segregation as it relates to health and health care outcomes in the United States. In this article, I employ key theories of segregation and urban inequality to explain the spatial distribution of health-related organizations. Using data from the 2010 County Business Patterns and the U.S. Census in a series of spatial regression models, I examine the distribution of a variety of health-related organizations across the United States. I find that the concentration and clustering of racial/ethnic minorities (blacks and, to a lesser extent, Latinos and Asians) in urban neighborhoods is inversely associated with the number of health-related organizations, including food resources, physical fitness facilities, health care resources, civic associations, and social service organizations. The spatial distribution of health-related organizations could help to explain broader links between racial/ethnic minority segregation and health.

KEYWORDS: residential segregation; organizations; race/ethnicity; health; health care.

As a system of stratification and racial subordination, racial/ethnic segregation favors numerous social problems (Massey and Denton 1993). In particular, several studies show that racial/ethnic minority segregation can be devastating to health and functioning across the life course (Williams and Collins 2001). For example, research suggests that various indicators of racial/ethnic segregation are associated with higher rates of mortality (Polednak 1997; Williams and Collins 2001), infant mortality and low birth weight (Ellen, Cutler, and Dickens 2000; Hearst, Oakes, and Johnson 2008), overall poor health (Anderson and Fullerton 2014; Subramanian, Acevedo-Garcia, and Osypuk 2005), nutrition and obesity (Chang 2006), and access to health care (Anderson and Fullerton 2012, 2014). Although various theoretical mechanisms have been proposed to explain the health consequences of racial/ethnic segregation, such as socioeconomic concerns, stress, and access to resources, few studies have formally tested any of them (Williams and Collins 2001).

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In this study, I examine the association between race/ethnic segregation and health-related organizations. This work builds on previous research in two principal ways. First, it takes the initial step in establishing health-related organizations as a viable mechanism of the broader association between race/ethnic segregation and health. Second, it pushes the literature beyond narrow black and white distinctions to include other urban minority groups. With these considerations in mind, the overarching research question that this study addresses is the following: How are health-related organizations distributed across urban space in the United States? More specifically, are racial/ethnic minority neighborhoods less likely to have many and diverse health-related organizations compared to (non-Hispanic) white neighborhoods? What other contextual factors are related to the distribution of such resources? Here, I address these questions by examining how the distribution of health-related organizations differs by the racial/ethnic composition of such neighborhoods and how this may relate to other theoretically important factors according to theories of urban neighborhood inequality. Generally, I expect that minority neighborhoods will be less likely to have such establishments, which may provide a mechanistic link between our understanding of segregation and health outcomes. In the pages that follow, I consider current theories of urban inequality and racial/ethnic segregation and how they may be related to the distribution of organizations. Next, I review the current literature on the distribution of health-related organizations in space and how this relates to race and segregation. Finally, I describe the present study and its central findings.

THEORIES OF SEGREGATION, URBAN INEQUALITY, AND ORGANIZATIONS

Community Organizations and Urban Inequality

In general, scant attention has been paid to the role of organizations in creating and promoting community well-being. Michael McQuarrie and Nicole P. Marwell (2009), in a review of organizational research in the urban sociology literature, argue that urban sociology treats organizations as derivative of the urban context rather than productive. They refer to this as the "missing organizational dimension" and assert that organizations contribute to the urban environment and its consequences, and are not simply the result of the urban environment. From this perspective, it is not just the people that make up a neighborhood, but the people, the organizations, and the interplay between the two. Some scholars have addressed this missing dimension and provide evidence that organizations are productive of the urban environment and the accompanying inequalities (Allard and Small 2013; McQuarrie and Marwell 2009).

Scholars in this tradition argue that organizations form essential components of urban life and community well-being. In particular, organizations represent the key sites in the community through which individuals can access material resources or information through a variety of means, such as employment opportunities, retail, as well as through nonprofit and government social service agencies that directly allocate goods or provide services and activities (Galaskiewicz, Mayorova, and Duckles 2013; Marwell and Gullickson 2013; Small and McDermott 2006). Furthermore, organizations may also provide less tangible support as well, as these represent the locations where individuals can meet and form connections. Thus, they also provide the space for the formation of social networks and social capital, which may also contribute to community vitality (Allard and Small 2013; Galaskiewicz et al. 2012; Oldenburg 1989; Small 2009). In this sense, they serve as "producers" of the neighborhood though both these physical and social means. Yet, in this line of research, little attention has been given to the role of segregation or to health-related organizations more specifically. Despite the general lack of attention to organizations, urban sociological theory carries a rich tradition of explaining and interpreting urban inequality due to segregation. These theories can be extended to the case of organizations in urban space and imply different theoretical mechanisms for why segregated areas may lack important community resources.

Wilson's Geographic Concentration of Poverty Theory and Deinstitutionalization

In 1987, William Julius Wilson brought renewed attention to the plight of the urban poor in his pivotal work, *The Truly Disadvantaged*. Using the case of Chicago, he outlines a theory of urban

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inequality in an attempt to understand the growth of black urban "underclass" communities that was occurring throughout this time period. Although these problems occur principally in black urban neighborhoods, he argues that important demographic and structural changes prompted the growth of poverty and its accompanying problems in these neighborhoods (Wilson 1987, 1996). As a result of these various mechanisms, Wilson argues that poverty and its consequences thus become concentrated in urban black communities.

In this work, Wilson was one of the first to articulate a theory of inequality that accounts for the role of organizations in communities—what he terms deinstitutionalization. He posits that one of the main consequences of concentration effects is organizational flight. As poverty mounts in the inner city, this condition drives away organizations that support community vitality. Essentially, these areas become organizational deserts, where basic community institutions no longer exist. This condition becomes cyclical as the lack of institutions perpetuates joblessness, poverty, and its effects. In sum, Wilson provides a class-based perspective, where segregation compounds poverty and social problems into one space, which in turn leads to organizational flight. From this perspective then, I draw the following hypothesis:

H1: As poverty increases across urban neighborhoods, the density of neighborhood organizations and service providers will decrease, net of racial/ethnic composition.

Racial Segregation and Place Stratification

Several scholars have critiqued Wilson's theoretical approach to urban inequality. Most notably, many have criticized Wilson for downplaying the significance of race in these processes. Of course his theory does not ignore the role of race and racial segregation, but many have argued that his theory places too strong of an emphasis on class and poverty, and that it ignores the central role of segregation as an institutionalized form of racism in producing such neighborhood conditions. Chief among these critics is Douglas S. Massey and colleagues (Massey and Denton 1993; Massey and Fischer 2000). They argue that segregation as a structural form of racism serves as an "institutional apparatus that supports other racially discriminatory processes and binds them together into a coherent and uniquely effective system of racial subordination" (Massey and Denton 1993:8). John Logan and colleagues have termed this the "place stratification" perspective and many scholars have employed this theoretical orientation in their empirical work (Alba and Logan 1993; Charles 2003; Krivo et al. 1998; Logan 1978; Massey, Gross, and Shibuya 1994; Small and McDermott 2006).

As it relates to the distribution of organizations in space, we can apply Massey and colleagues' main argument that central to these processes is the role of racial/ethnic minority status. Organizations may leave or avoid these neighborhoods due to the compounded social problems, but also due to the racially discriminatory processes embedded in segregation. For example, organizational flight may occur because of negative associations with black neighborhoods. This discrimination may then be "rational," drawing on the idea of statistical discrimination, in associating such neighborhoods with higher crime rates or other problems associated with crime. Similarly, for long-standing fixed community organizations, such as parks or major hospitals, minority residents may have been historically relegated to areas of the city that lack these key resources. Or, relatedly, they may have been relegated to areas with inferior or lower quality versions of such resources. Thus, this perspective provides a more race-based approach to the problem, and it implies that the lack of organizations stems principally through the pathway of discrimination. The best empirical example of a study examining organizations more specifically is Mario L. Small and Monica McDermott's (2006) piece on the distribution of retail establishments across the United States. They find that the percent of black residents in an area is negatively associated with a variety of neighborhood retail resources, while poverty is actually positively associated with many of such resources,

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finding support for Massey and colleagues' side of this debate that emphasizes race over class dynamics (Small and McDermott 2006). In sum, from this perspective, I produce the following hypothesis:

H2: As the concentration and clustering of racial/ethnic minorities across urban neighborhoods increases, the number of neighborhood organizations and service providers will decrease, regardless of the poverty status of such areas.

Immigrant Enclaves and Spatial Assimilation

While these two perspectives provide a theoretical rationale for how racial/ethnic segregation may be related to having fewer organizations, an alternative perspective emphasizes the dynamics of immigration and argues that high minority areas may actually have more establishments. Moving beyond the case of black segregation, others argue that high concentrations of minorities alone do not necessarily produce such effects. In an examination of immigrant ethnic enclaves, some scholars argue that these communities, although they consist of poor minority groups, do not experience the same neighborhood problems (Logan, Alba, and Zhang 2002). Immigrant enclave theory asserts that immigrant entrepreneurship provides flourishing and organizationally dense communities (Aldrich and Waldinger 1990; Logan, Alba, and Zhang 2002; Portes and Bach 1985). Though these neighborhoods would seemingly present with similar circumstances as those discussed above, the immigrant experience, the different motivations for migration, and the distinct role of the immigrant in U.S. society leads to these more vibrant immigrant communities through entrepreneurship (Logan, Alba, and Zhang 2002; Portes and Bach 1985).

Similar to the enclaving perspective is the spatial assimilation model of residential patterning. This understanding of residential segregation sees segregation largely as the result of differences in socioeconomic status (Charles 2003). In this way, segregation is a stepping stone to mobility and potentially provides access to organizations, a social support network, job opportunities, and an ethnic economy (Logan, Alba, and Zhang 2002). The effects of poverty and low socioeconomic status are simply the result of a not-yet-realized upward trajectory, and we should not expect to observe differences in organizational provision after accounting for these factors. From these two perspectives then, I formulate the following hypothesis:

H3: As the concentration of immigrants across urban areas, such as Latinos or Asians, increases, the density of neighborhood organizations and service providers will also increase.

However, some scholarship contests this third theoretical tradition, and suggests that the Latino and Asian cases are less clear, and that we may observe patterns similar to the black case. This critique argues that this tradition operates from the erroneous assumption that such groups are principally constituted of immigrants. Immigration is driving the immense growth in this population, but as of 2010, only about 36 percent of all Latinos in the United States are foreign born, and about 66 percent of Asians are foreign born (Migration Policy Institute). While the immigrant enclave may be a robust organizational environment, as some research shows, it is unclear what the long-term spatial trajectory of these groups are as they become acculturated to the U.S. social system, one that often excludes racial minorities. Some literature provides evidence that Latinos and Asians are able to move to more integrated areas of the city with increasing socioeconomic status (SES) and financial capital in support of the spatial assimilation perspective (Iceland and Scopilliti 2008; Massey and Fischer 1999; Waters and Jimenez 2005). However, some have also noted segmented trajectories in terms of residential space (Alba, Logan, and Stults 2000; Brown 2007; Massey 2009; Ortiz and Telles 2012). Thus, spatial assimilation and upward mobility is not a taken-for-granted assumption for groups that remain marginalized and in a lower socioeconomic status condition.

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In terms of organizational resources then, taking into account these perspectives, an alternative hypothesis is as follows:

H4: As the concentration and clustering of Latino and Asian residents across urban areas increases, the density of neighborhood organizations and service providers will decrease, net of immigration.

In summary, following from the first two theoretical perspectives, I expect to find that minority neighborhoods will have a lower density of both quantity and quality of health-related organizations, and I attempt to adjudicate between these competing theories that emphasize the processes of class versus race respectively. Further, taking into consideration spatial assimilation theory, I account for how this process may differ in immigrant versus non-immigrant communities. First, I review the existing literature on such types of organizations.

LITERATURE ON HEALTH-RELATED ORGANIZATIONS

Patterns in the Distribution of Health-Related Resources

Recent scholarship, mainly in the field of public health, has seen an explosion of interest in the relationship between neighborhood patterns and how this relates to health outcomes and healthy environments. Specifically, much of this literature has examined the distribution of food resources in urban communities. Over the last couple of decades, over 50 studies have been conducted that examine the distribution of food resources by neighborhood sociodemographic characteristics, or the so-called "food deserts" literature (Beaulac, Kristjansson, and Cummins 2009; Walker, Keane, and Burke 2010). These studies have employed a variety of different methods and have examined several ways of conceptualizing access to food resources (Beaulac, Kristjansson, and Cummins 2009). In general, this literature demonstrates that poor and minority (largely conceptualized as black) neighborhoods in the United States have less access to a variety of food resources (Algert, Agrawal, and Lewis 2006; Alwitt and Donley 1997; Bower et al. 2014; Horowitz et al. 2004; Moore and Diez Roux 2006; Morland, Wing, and Roux 2002; Powell et al. 2007; Schuetz, Kolko, and Meltzer 2012; Smiley et al. 2010).

In addition to food desert studies, some literature has examined the distribution of parks and recreational facilities and found similar disparities for poor and minority communities. In general, these studies show that low-income, low-education, high racial/ethnic minority communities are much less likely to have a number of park and recreational resources compared to their high-income, high-education, and white community counterparts (Estabrooks, Lee, and Gyurcsik 2003; Moore et al. 2008; Popkin, Duffey, and Gordon-Larsen 2005; Wilson et al. 2004). Moreover, some of the studies in both of these bodies of work have also emphasized differences in quality of resources between such communities, noting that even where present, such areas tend to lack quality resources and facilities (Algert, Agrawal, and Lewis 2006; Powell et al. 2007; Vaughan et al. 2013).

Beyond the attention to food and recreational resources found largely in the public health literature, sociological studies have also demonstrated strong disparities in the spatial distribution of other community resources. These include an examination of retail establishments and service providers, nonprofit social services, employment opportunities, and mental health and substance abuse centers to name a few (Allard 2009; Allard, Rosen, and Tolman 2003; Allard, Tolman, and Rosen 2003; Galaskiewicz et al. 2013; Kissane 2010; Marwell and Gullickson 2013; Small 2009; Small and McDermott 2006; Small and Stark 2005). Although these studies have not typically been couched in terms of health specifically, they inform the present study and demonstrate important inequities in the distribution of a number of resources across various layers of social disadvantage.

Moreover, recent research has shown that the unequal spatial distribution of organizations has consequences for residents of resource deprived areas. For example, some research demonstrates that the availability of health food stores in neighborhoods affects food choices, including diet quality and

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fruit and vegetable consumption (Blitstein, Snider, and Evans 2012; Jetter and Cassady 2006; Laraia et al. 2004; Morland et al. 2002). These patterns in food choices have also been linked to BMI and rates of obesity in such communities, which are important indicators of a variety of health problems (Bader et al. 2013; Gibson 2011; Inagami et al. 2006; Morland, Diez Roux, and Wing 2006; Ohri-Vachaspati et al. 2013; Zick et al. 2009). Similar results have been found for the case of recreational facilities as well, with the lack of such facilities related to higher BMI and lower rates of physical activity (Black et al. 2010; Gordon-Larsen et al. 2006). Thus, a careful examination of the neighborhood characteristics that lead to healthier lifestyles and greater physical activity is important for addressing health disparities.

Limitations of the Current Research

Despite the abundance of research in this field, there are several important gaps in this literature that this study seeks to fill. First and foremost, as most of this literature is situated within public health, there is little attention to how the social and demographic variables used in such studies are measured, particularly how racial residential segregation is conceptualized. The vast majority of the studies mentioned above measure minority neighborhood status using an ethnic density score, or the proportion of minority residents in some area (census tract, zip code, etc.). However, residential segregation should account for clustering in space, in addition to group size. Further, this measure obscures differences in the relative size of minority populations across metropolitan areas and regions. For example, a census tract with a 20 percent black population in Salt Lake City, Utah, would be a disproportionately black area, but the same percentage in Detroit, Michigan, would likely be considered a white neighborhood. This is especially problematic in that certain regions simply have larger numbers of racial/ethnic minority groups, such as the U.S.-Mexico border for Latinos, for example. Using an ethnic density score in this case then just becomes a comparison of certain regions to the rest of the United States rather than of segregation within the local context. Thus, how we measure these central variables is important to understanding such distributions.

Similarly, much of this literature is focused heavily on the distribution of only a few health resources, such as food and recreation. Even health care organizations are notably missing from this literature. However, if we apply a more sociological lens to how organizations may impact health, several other types of organizations may be important for the social support or community building that they provide. Research in sociology and social epidemiology alike has shown for many decades that a variety of social support and social network factors may influence health (Link and Phelan 1995; Smith and Christakis 2008; Umberson, Crosnoe, and Reczek 2010). Thus, we might think of social service organizations, civic society, and the nonprofit sector, or even religious institutions as important community resources related to health as these are all types of community resources that can either provide direct aid to an individual or can serve as an important site for bringing people together and building communities (Marwell and Gullickson 2013; Oldenburg 1989; Putnam 2000). In Figure 1, I include a typology of how we can expand our thinking about what constitutes a health-related resource. These include both proximal (those organizations that have a clear and direct bearing on health) and distal (those that have less of a direct relationship to health and work by improving socioeconomic status, social support, etc.), as well as those that may theoretically impact both physical and mental/emotional health. These categories in the typology are not meant to be mutually exclusive, though, as many of these different types can provide both physical and mental health benefits. It simply serves as a way to structure our thinking about what may constitute a health-related resource in a more inclusive fashion than is often employed in this literature. As such, this study takes a broad view of what could be considered a health-related organization, and includes any type of organization that may impact health directly or health behaviors.

In this article, I address these various limitations by employing a measure of racial/ethnic segregation that is geographically defined and able to account for the distribution of minority groups, and is

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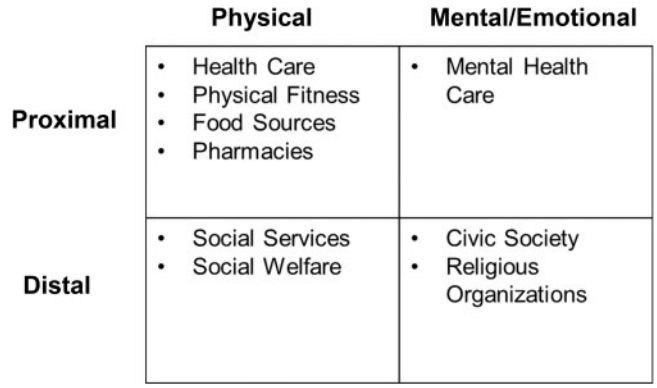

Figure 1. Typology of Health-Related Organizations

situated within the context of the metropolitan area. I also examine a variety of health-related community organizations. Finally, all data are examined in a geographic information system (GIS), using spatial econometric models that account for the spatial relationships between the units of analysis. In this manner, I present a considerable advance in our understanding of the ways in which racial residential segregation may be linked to health outcomes through a study of health-related organizations in urban space.

DATA AND METHODS

Data

In order to address these concerns, I examine the distribution of health-related organizations across the United States by combining several data sources with data at the zip code level, including the U.S. County Business Patterns and several U.S. Census related data sources. First, for data on organizations, I use the 2010 County Business Patterns (CBP) data, which is a U.S. Census product and provides a count of known business establishments with paid employees collected through Internal Revenue Service (IRS) administrative records. The data are available for several geographic units and all North American Industry Classification System (NAICS) codes. For the purposes of this study, I use the zip code level of analysis, which is the smallest unit of analysis available. While nearly all industry classifications are available in the data, I examine only those that are generalist organizations, which theoretically pertain to health in a positive manner according to the above typology (measures discussed in detail below).

In order to understand how the distribution of these organizations is related to segregation, I merge these data with two other U.S. Census products: the 2010 U.S. decennial Census for demographic data and the 2008-2012 American Community Survey (ACS) for socioeconomic data. The ACS data spans multiple years as the data are only released in this form at a small unit of analysis like the zip code. The ACS comes from a sample survey, and they combine five years of data collection in this fashion in order to have a representative sample at this small geographical unit.

While I study these patterns at the level of the zip code unit of analysis, not all U.S. zip codes are included in order to limit the study area to urbanized areas. Rural dynamics entail a different set of theoretical considerations and are therefore outside of the scope of this study. I exclude any zip codes that do not belong to a metropolitan statistical area, as defined by the U.S. Office of Management and Budget (OMB). Further, I exclude any zip code that does not have at least 200 residents so as to bracket out non-residential areas, and any zip code that does not have a population density of at least .15 persons per square kilometer. I also exclude Alaska and Hawaii as non-contiguous portions of the United States Using these three exclusion criteria, the final sample size of included zip codes is 8,644 (down from 33,120 in the full sample).

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Dependent Variables

Using the County Business Patterns data, I examine four main sets of dependent variables, which pertain to four categories of health-related organizations from the typology above: proximal/physical, proximal/mental, distal/physical, and distal/mental. Each of these dependent variables is selected based on the NAICS code and reflects a count of the type of establishment in a zip code per 10,000 people. As these reflect per capita measures, each of the dependent variables was checked for outliers and the aforementioned zip code inclusion criteria on population size and density were used to exclude outliers that are simply a function of low population sizes. First, for proximal/physical resources, I examine several food-related resources, including *grocery stores* (445110), *community food services* (624210), and *full-service restaurants* (722110). Next, I analyze the distribution of *physical fitness facilities*, which includes any generalist NAICS code that directly involves physical fitness activities, including fitness and recreational sports centers (713940) and nature parks (712190). I also include a dependent variable for *pharmacies* (446110). Next, I examine counts of physicians' offices by type, including *medical physicians* (621111) and *dentists* (621210). Finally, I account for medical facilities, including *general hospitals* (622110), *urgent care centers* (621493), and a combined category for all *medical facilities*, including the two above and all other non-specialty outpatient facilities (621491 and 621498). For proximal/mental resources, I include *mental health professionals* (621112 and 621330). For distal/physical resources, I include individual and family *social services* (624110, 624120, and 624190), and for distal/mental resources I include *religious organizations* (813110) and *civic associations* (813410). As these last categories may be less clear, some examples of what constitutes a social service agency include welfare agencies, community centers, or self-help organizations, and examples of civic associations include fraternal organizations, hobby clubs, scouting, and social clubs.

I include all of these variables individually as the dependent variables in a series of models, and I also include a second subset of these variables and analyze them by size, as the previous literature indicates that this may be an important distinction (Moore and Diez Roux 2006; Powell et al. 2007; Small and McDermott 2006). The CBP data include a code for the number of employees that an establishment has, which can be used a proxy for the size of the establishment. I do not include all types of establishments as some vary little by size. Those included are grocery stores, hospitals, all medical facilities, physician's offices, and pharmacies. In order to capture this, I divided each of these dependent variables into three groupings—by small (1-19 employees), medium (20-99 employees), and large establishments (100 or more employees), which is the strategy employed in other research using these data (Small and McDermott 2006).

Independent Variables

In order to examine the association of these health resources with racial/ethnic segregation, my main independent variables in this analysis are segregation measures that are derived from measures for percent black, percent Latino (of any race), and percent Asian, which come from the 2010 U.S. Census and are measured at the zip code level. Specifically, in order to measure segregation, as opposed to just ethnic density, I calculated a clustering measure of these percentages based on physical adjacency (using a k-2 nearest neighbor spatial weight matrix). It is a geographic method that accounts for two main pieces of information: the proportion of a given group within a zip code (the extent of concentration) and the extent to which physically adjacent zip codes also have high quantities of the same group (or the extent of clustering). The formula for the clustering statistic for the zip code i is as follows:

$$C_i = x_i \sum_{j=1,\ j\neq i}^{n} w_{ij}x_j$$

where x_i is the variable for feature i, x_j is the variable for feature j, and w_{ij} is the spatial weight between features i and j. Essentially, it is the product of the variable for percent race/ethnicity and the

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spatial weight of that same variable based on physical proximity. To interpret this measure, high values for these clustering calculations reflect a zip code where a high proportion of residents from the group in question are highly clustered in space with zip codes that also have a high proportion of residents from the same group. Further, of note, this measure does not reflect a macro-level calculation for how groups are distributed across a particular space (similar to the way metropolitan-level segregation scores like the index of dissimilarity are calculated), rather it provides a measure for how to code which smaller units within a segregated area are clustered in space with predominately one group. An important feature is that is takes into account the immediate local environment for calculation, which in this sense makes it a way to code for segregation using the relative contextual environment, as opposed to the general patterns of racial/ethnic minority proportions across the United States as discussed above. Thus, from this measure, I include three scores: *clustering measure for percent black* (non-Latino), *for percent Latino* (of any race), and *for percent Asian*.[1] These were the only variables that were measured by accounting clustering in space. Though there is inevitably clustering across the other independent variables included, I only give this treatment here as clustering is an important definitional component for understanding and measuring residential segregation across urban space.

Furthermore, I account for a variety of other factors that could be related to the effect of the clustering measure of the percent of racial/ethnic minorities in an area. First, I include a variable for the *percent foreign born* of any racial/ethnic group (or immigration). Next, I include a number of socioeconomic variables, including *percent in poverty* (below federal poverty line), *percent with a college degree or higher*, and *percent unemployed*. Finally, I include several demographic control variables, including *percent aged 65 and above*, and *percent of vacant housing units*. I checked for multicollinearity using the variance inflation factor and it was not found to be a problem for the included independent variables. All independent variables are treated as continuous, and are group-mean centered around the means for the metropolitan area in order to account for the clustering by metropolitan areas, which is a technique used by Robert Sampson, Jeffrey Morenoff, and Felton Earls (1999) in other spatial analysis that has a multi-level element.[2] Descriptive statistics for all variables used can be found in Table 1.

METHODS

For all outcomes, I estimate a series of spatial regression models that account for spatial autocorrelation for each of the organizations dependent variables. Typical ordinary least squares regression models assume that the observations are independent; however, in this case, since my observations are spatial, they are, by their nature, not independent of one another, and it is likely that places that are spatially adjacent will influence one another in distinct ways, including social patterns. This is referred to as spatial autocorrelation, and it should be accounted for in order to meet the assumptions of regression methods (Anselin, Florax, and Rey 2004). To account for this, I estimate a series of spatial autocorrelation or so-called SAC models that include terms for both spatial autocorrelation in the

1 These groups do not cover the scope of racial and ethnic minority categories across the United States. Notably, I exclude Native Americans and Pacific Islanders. However, each of these groups make up a small percent of the U.S. population and is highly concentrated in only certain regions of the United States, making a nationwide analysis difficult. Thus, I limit my analysis to blacks, Latinos, and Asians.

2 I also ran all of these models in a series of multilevel hierarchical linear regression models that also accounted for a variety of metropolitan-level variables, including MSA-level segregation and poverty. However, the interclass correlation coefficients for all of the dependent variables were all quite low (with the highest at just above 3 percent and most below 1 percent), indicating that little of the variation in the distribution of health-related organizations is at the metropolitan level of analysis. Further, for most of the outcomes, both MSA-level segregation and poverty were not significant, implying that these variables fail to capture the little MSA-level variation that does exist (results available upon request). Thus, all of the models presented here are only at the zip code level of analysis, but use this group-mean centering technique to account for the fact that they are clustered by metropolitan areas.

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Table 1. Descriptive Statistics for Variables Used in Statistical Models of Organizational Densities

Variables	*Mean*	*SD*	*Range*	*Description*
Dependent				
Grocery stores	2.18	3.06	0 to 63.29	Grocery stores per 10,000 people
Community food banks	.15	.78	0 to 34.36	Community food banks per 10,000 people
Full-service restaurants	9.96	24.63	0 to 1141.55	Full service restaurants per 10,000 people
Physical fitness	1.84	3.88	0 to 147.78	Physical fitness areas per 10,000 people
Pharmacies	1.50	2.64	0 to 121.70	Pharmacies per 10,000 people
Hospitals	.18	1.54	0 to 72.20	General hospitals per 10,000 people
Urgent care facilities	.22	.78	0 to 31.85	Urgent care facilities per 10,000 people
All medical facilities	.80	2.44	0 to 72.20	All medical facilities per 10,000 people
Physician's offices	9.11	28.81	0 to 1865.39	Physician's offices per 10,000 people
Dentist's offices	5.34	15.63	0 to 896.74	Dentist's offices per 10,000 people
Mental health professionals	1.45	8.57	0 to 608.53	Mental health professionals per 10,000 people
Religious organizations	6.33	8.88	0 to 166.67	Religious organizations per 10,000 people
Civic associations	1.48	5.88	0 to 202.84	Civic associations per 10,000 people
Social services	2.64	8.03	0 to 344.83	Social service organizations per 10,000 people
Independent				
Percent black clustering	442.08	1129.79	0 to 9082.58	Clustering measure of percent black
Percent Latino clustering	477.17	1159.11	0 to 9554.16	Clustering measure of percent Latino
Percent Asian clustering	67.61	225.67	0 to 3599.23	Clustering measure of percent Asian
Percent foreign born	13.41	12.15	0 to 77.50	Percent born outside of the United States
Percent in poverty	14.35	12.09	0 to 100	Percent below federal poverty line
Percent college educated	32.84	18.98	0 to 100	Percent with a college degree or higher
Percent unemployed	6.02	3.01	0 to 50.50	Percent unemployed
Percent aged 65 and older	12.94	6.68	0 to 93.50	Percent aged 65 and older
Percent vacant housing	9.44	8.08	0 to 100	Percent of vacant homes

Note: $N = 8{,}644$.

dependent variables and spatial error, which are both present in my data. Specifically, I estimate SAC models using a two-stage weighted least squares method with a k-2 nearest neighbor spatial weight matrix.[3] I also use Kelejian-Prucha robust standard errors to account for significant heteroskedasticity present in the models (Kelejian and Prucha 2010).

I analyze these results in three sets. First, I analyze the models that include only the variables for racial/ethnic segregation and immigration in order to examine the gross effects of these variables. Next, I examine the fully adjusted models with all independent variables included. Finally, I present the models adjusted for all independent variables but divided by the size of the establishment. The results for the full set of dependent variables with only the race/ethnicity related variables can be found in Table 2, the fully adjusted models in Table 3, and the subset of dependent variables by establishment size can be found in Table 4.

3 The k-2 nearest neighbor weight matrix was determined to be the weight matrix that best maximizes global Moran's I for my dependent variables and main independent variables. This weight matrix codes zip codes as neighbors if they are the two neighboring zip codes that are physically most proximate to the geographic centroid of the zip code.

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Table 2. Coefficients from Spatially Weighted Two-Stage Ordinary Least Squares Models of Organizational Densities

Variables	*Grocery Stores*	*Community Food Banks*[a]	*Full-Service Restaurants*	*Physical Fitness*	*Pharmacies*	*Hospitals*	*Urgent Care Facilities*
Independent							
Percent black clustering.	.212***	.035***	−1.150***	−.304***	−.014	−.065*	−.037***
	(.04)	(.01)	(.16)	(.03)	(.02)	(.03)	(.01)
Percent Latino clustering	.087	.001	−1.775***	−.325***	−.060	−.027	−.069***
	(.05)	(.02)	(.54)	(.08)	(.03)	(.02)	(.02)
Percent Asian clustering	−.063	−.054	5.377	1.005	.152	.070	−.163**
	(.35)	(.06)	(4.76)	(1.19)	(.25)	(.10)	(.05)
Percent foreign born	.046***	.004	.102	−.019	.013*	−.008	.007**
	(.01)	(.00)	(.09)	(.02)	(.01)	(.01)	(.00)
Constant	2.104***	.148***	12.928***	2.007***	.997***	.149	.212***
	(.27)	(.01)	(1.69)	(.20)	(.29)	(.13)	(.05)
Rho	.029		−.313*	−.098	.317	−.711	.050
	(.12)		(.15)	(.10)	(.18)	(.55)	(.18)
Lambda	.243*	.011	.403***	.227**	−.347	.396**	−.081
	(.10)	(.01)	(.08)	(.08)	(.19)	(.13)	(.16)
Pseudo R^2	.037	.003	.017	.001	.069	.000	.009
Spatial pseudo R^2	.026		.007	.015	.004	.001	.008

Variables	*All Medical Facilities*	*Physician's Offices*	*Dentist's Offices*	*Mental Health Professionals*	*Religious Organizations*	*Civic Associations*	*Social Services*
Independent							
Percent black clustering	−.048	−.843***	−.858***	−.227***	.320**	.050	.455***
	(.05)	(.19)	(.08)	(.04)	(.12)	(.06)	(.10)
Percent Latino clustering	−.038	−1.921**	−1.168**	−.459**	−.154	−.178	−.169
	(.05)	(.66)	(.40)	(.14)	(.11)	(.11)	(.24)
Percent Asian clustering	.241	−1.520	4.214	.081	1.553	.586	2.057
	(.47)	(1.66)	(3.35)	(.76)	(.88)	(.90)	(3.06)
Percent foreign born	−.002	.126	.061	.023	−.063***	.019	.032
	(.02)	(.09)	(.07)	(.02)	(.02)	(.02)	(.04)
Constant	.947	7.372*	5.658***	1.145***	6.547***	2.152***	2.936***
	(.63)	(2.94)	(.82)	(.23)	(.94)	(.45)	(.55)
Rho	−.284	.176	−.070	.144	−.038	−.494	−.141
	(.72)	(.30)	(.14)	(.14)	(.15)	(.28)	(.20)
Lambda	.221**	−.178	.167	.038	.310**	.479***	.371**
	(.08)	(.22)	(.13)	(.15)	(.11)	(.07)	(.13)
Pseudo R^2	.003	.025	.000	.233	.001	.068	.027
Spatial pseudo R^2	.000	.005	.011	.004	.005	.001	.007

Notes: Coefficients and standard errors for percent black, percent Latino, and percent Asian clustering measures are multiplied by 1,000 for the ease of presentation. Standard errors in parentheses. $N = 8{,}644$.

[a]Model for this outcome is presented as a spatial error model (instead of a spatial error and spatial lag model) due to model convergence issues and as the spatial lag effects are not significant.

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

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Table 3. Coefficients from Spatially Weighted Two-Stage Ordinary Least Squares Models of Organizational Densities

Variables	*Grocery Stores*	*Community Food Banks*	*Full-Service Restaurants*	*Physical Fitness*	*Pharmacies*	*Urgent Care Facilities*	*Hospitals*
Independent							
Percent black clustering	.018	.000	−1.430***	−.094*	−.060*	.006	−.007
	(.03)	(.01)	(.29)	(.04)	(.03)	(.03)	(.01)
Percent Latino clustering	.016	−.008	−.097	.040	.011	−.019	−.024*
	(.04)	(.01)	(.27)	(.03)	(.03)	(.02)	(.01)
Percent Asian clustering	−.041	−.020	3.621	.581	.166	.002	−.141***
	(.22)	(.05)	(2.86)	(.76)	(.27)	(.07)	(.04)
Percent foreign born	.033***	.001	.055	−.010	.014**	−.006	.006***
	(.01)	(.00)	(.05)	(.01)	(.01)	(.00)	(.00)
Percent in poverty	.030***	.008***	.181***	.013	.019**	.023**	.005***
	(.01)	(.00)	(.05)	(.01)	(.01)	(.01)	(.00)
Percent college educated	.002	.000	.214***	.032***	.013***	.004	.004**
	(.00)	(.00)	(.04)	(.01)	(.00)	(.00)	(.00)
Percent unemployed	−.025	−.014	−.172	−.033	−.022	−.040*	−.012*
	(.03)	(.01)	(.27)	(.03)	(.02)	(.02)	(.01)
Percent aged 65 and older	.020	−.001	.007	.021	.028*	.015	.013*
	(.01)	(.00)	(.09)	(.02)	(.01)	(.01)	(.01)
Percent vacant housing	.043***	.006***	.756***	.043*	.043	−.010	−.002
	(.01)	(.00)	(.15)	(.02)	(.03)	(.01)	(.00)
Constant	1.391***	.097***	7.570***	.934***	1.043***	.193***	.141***
	(.15)	(.02)	(.74)	(.15)	(.14)	(.04)	(.03)
Rho	.351***	.319**	.227***	.311**	.286***	−.068	.353**
	(.06)	(.11)	(.06)	(.10)	(.08)	(.15)	(.11)
Lambda	−.217**	−.281***	−.193**	−.355**	−.221*	−.029	−.279***
	(.07)	(.08)	(.07)	(.12)	(.10)	(.15)	(.07)
Pseudo R^2	.105	.007	.098	.059	.098	.018	.011
Spatial pseudo R^2	.065	.024	.096	.065	.049	.020	.032

Variables	*All Medical Facilities*	*Physician's Offices*	*Dentist's Offices*	*Mental Health Professionals*	*Religious Organizations*	*Civic Associations*	*Social Services*
Independent							
Percent black clustering	−.031	−.095	−.176	−.081	−.135	−.272***	−.075**
	(.03)	(.27)	(.12)	(.06)	(.11)	(.06)	(.07)
Percent Latino clustering	−.024	−.232	−.101	−.076	−.178*	−.077	−.020
	(.03)	(.30)	(.20)	(.07)	(.08)	(.05)	(.09)
Percent Asian clustering	.041	−1.566	2.078	−.239	.570**	.527	1.258
	(.30)	(1.36)	(2.14)	(.57)	(.61)	(.52)	(1.79)
Percent foreign born	.003	.132***	.055	.026	−.060***	−.003	.001
	(.01)	(.03)	(.04)	(.02)	(.01)	(.01)	(.02)
Percent in poverty	.047***	.226***	.047	.018	.078***	.052***	.107***
	(.01)	(.04)	(.03)	(.02)	(.02)	(.01)	(.02)
Percent college educated	.012***	.160*	.086***	.045***	.000	.025***	.051***
	(.00)	(.08)	(.02)	(.01)	(.01)	(.01)	(.01)

(*continued*)

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Table 3. Coefficients from Spatially Weighted Two-Stage Ordinary Least Squares Models of Organizational Densities (continued)

Variables	*All Medical Facilities*	*Physician's Offices*	*Dentist's Offices*	*Mental Health Professionals*	*Religious Organizations*	*Civic Associations*	*Social Services*
Percent unemployed	−.057*	−.253*	−.191*	−.111*	−.010	.039	−.032
	(.02)	(.13)	(.10)	(.05)	(.12)	(.06)	(.08)
Percent aged 65 and older	.047*	.843	.165**	.011	.118***	−.010	.000
	(.02)	(.51)	(.06)	(.05)	(.03)	(.02)	(.02)
Percent vacant housing	−.008	−.017	.090	.112	.083*	.109**	.127**
	(.01)	(.18)	(.06)	(.11)	(.04)	(.04)	(.04)
Constant	.620***	4.860**	3.190***	.864***	4.528***	.937***	.566***
	(.09)	(1.55)	(.90)	(.17)	(.54)	(.13)	(.26)
Rho	.210*	.441**	.379**	.341**	.281***	.327***	.364***
	(.10)	(.17)	(.16)	(.11)	(.08)	(.07)	(.08)
Lambda	−.100	−.322**	−.356**	−.223	−.110	−.235**	−.292***
	(.09)	(.12)	(.11)	(.16)	(.09)	(.08)	(.09)
Pseudo R^2	.038	.058	.041	.256	.098	.101	.102
Spatial pseudo R^2	.048	.061	.041	.048	.032	.056	.081

Notes: Coefficients and standard errors for percent black, percent Latino, and percent Asian clustering measures are multiplied by 1,000 for the ease of presentation. Standard errors in parentheses. $N = 8{,}644$.
*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

RESULTS

First, I examine the results from Table 2, which include only the racial/ethnic segregation and immigration variables. Notably, the variable for the clustering measure by percent black is significant for all but 3 of the 14 outcomes. In most cases, this coefficient is negative, indicating that a higher concentration and clustering of blacks in urban space is related to a decrease in having a higher density of health-related neighborhood establishments.[4] In particular, there are notably high and negative coefficients for the dependent variables for restaurants, physician's offices, and dentist's offices. Specifically, in the case of full-service restaurants, a 1,000-point increase in black clustering (out of an observed range of 0 to 9082.58 and a theoretical range of 0 to 10,000) is associated with a decrease of 1.15 (or over one establishment) in the number of full-service restaurants per 10,000 people in a zip code. However, for four outcomes (grocery stores, community food banks, religious organizations, and social services) this value is actually positive, indicating that a higher concentration and clustering of blacks is related to having a greater density of these three resources. These results, though, do not account for the socioeconomic variables or the size of the establishment.

Further, the results for Latinos and Asians also demonstrate a number of important patterns. Latino areas in particular are less likely to have a variety of health-related organizations in their neighborhoods (net of immigration), including full-service restaurants, physical fitness facilities, urgent care facilities, physician's offices, dentist's offices, and mental health professionals. These cover a wide variety of types of establishments, but demonstrate important disparities in health care resources in particular. Again, here the effects are strongest for restaurants, physician's offices, and dentist's offices. Specifically, the coefficient for physician's offices is quite large where every 1,000-point increase in the Latino clustering measure (with an observed range of 0 to 9554.16 and a theoretical range of 0 to

4 Please note that in all cases, these are cross-sectional associations and not causal relationships between variables.

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Table 4. Coefficients from Spatially Weighted Two-Stage Ordinary Least Squares Models of Organizational Densities by Size

Variables	*Grocery Stores*	*Pharmacies*	*Hospitals*	*All Medical Facilities*	*Physician's Offices*
Small establishments					
Percent black clustering	.481	−.215	−.006	−.204	−.884
	(.30)	(.16)	(.01)	(.17)	(2.27)
Percent Latino clustering	.179	.073	−.015*	.172	−1.901
	(.33)	(.21)	(.01)	(.20)	(2.48)
Percent Asian clustering	.638	−.626	−.044	1.128	−12.137
	(2.26)	(.75)	(.04)	(2.96)	(11.53)
Percent foreign born	.028***	105.111***	2.973	.003	.114***
	(.01)	(28.23)	(2.12)	(.00)	(.03)
Percent in poverty	.029***	19.518***	−3.664	.011***	.183***
	(.01)	(4.74)	(2.97)	(.00)	(.04)
Medium establishments					
Percent black clustering	−.371*	−.361*	−.002	−.116*	−.070
	(.18)	(.17)	(.00)	(.06)	(.38)
Percent Latino clustering	.012	.032	−.003	−.246**	−.366
	(.12)	(.14)	(.01)	(.10)	(.54)
Percent Asian clustering	−.416	2.111	−.003	−1.090***	−2.992
	(.61)	(2.52)	(.02)	(.33)	(2.34)
Percent foreign born	.005*	31.356	.320	.005**	.017*
	(.00)	(32.68)	(.48)	(.00)	(.01)
Percent in poverty	.001	1.027	.408	.009***	.039***
	(.00)	(32.34)	(.58)	(.00)	(.01)
Large establishments					
Percent black clustering	−.118**	−.002	−.166	−.117	.028
	(.04)	(.01)	(.16)	(.12)	(.04)
Percent Latino clustering	−.047	−.005	−.145	−.127	−.120
	(.06)	(.01)	(.12)	(.12)	(.07)
Percent Asian clustering	−.822***	−.070*	.286	.276	−.625*
	(.24)	(.03)	(.30)	(.27)	(.25)
Percent foreign born	.002*	2.788*	−46.751	−.004	.003*
	(.00)	(1.25)	(35.08)	(.00)	(.00)
Percent in poverty	−.002*	.195	76.473	.011	.006***
	(.00)	(.62)	(68.15)	(.01)	(.00)

Notes: Models also contain a constant, rho, lambda, and the other control independent variables. Coefficients and standard errors for the percent black, percent Latino, and percent Asian clustering measures and all variables under hospitals and pharmacies are multiplied by 10,000 for the ease of presentation. Standard errors in parentheses. $N = 8{,}644$.
$^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$ (two-tailed tests)

10,000), is associated with a decrease in the number of physician's offices by 1.921 (or almost two establishments) per 10,000 people in a zip code. For the variable for clustering by percent Asian (net of immigration), only one of the coefficients is significant and negative: urgent care facilities. While the magnitude of this effect is greater than for the other two groups, it is not a substantively great effect compared to some of the other coefficients across models. In no case is the coefficient for these two groups significant and positive. Thus, the gross effects of racial/ethnic minority concentration and clustering demonstrate a number of disparities for a wide variety of health-related resources.

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Next, I examine the results from the fully adjusted models (see Table 3). These results demonstrate several important patterns on the distribution of health-related resources by the clustering measure after adjusting for a variety of socioeconomic factors. Most notably, the percent black clustering measure again reveals numerous disparities in the distribution of such resources. Specifically, a higher score on the clustering measure by percent black is related to a decrease in having 5 of the 14 community resources. These include full-service restaurants, physical fitness facilities, pharmacies, civic associations, and social service organizations. Furthermore, compared to the unadjusted results, none of the coefficients is significant and positive. The variable drops to non-significance for grocery stores, community food banks, and religious organizations, and becomes significant and negative for social services. In these cases, it appears that when accounting for the socioeconomic dynamics of such areas, in addition to race, we observe a different set of patterns. In some cases, the magnitude of the effect is actually bolstered with the inclusion of these variables, especially in the case of full-service restaurants, pharmacies, and civic associations. However, after accounting for SES, the rather strong (for certain types) and significant results for the distribution of health care organizations drop to non-significance in the case of black segregation.

We also observe several notable patterns for Latino and Asian areas. First, for Latinos, the clustering measure by percent Latino yields significant results for only 2 of the 14 dependent variables. These include urgent care facilities and religious organizations. These are substantially fewer types of resources when compared to the unadjusted models, indicating that much of the observed disparities from above are accounted for by the socioeconomic set of variables. Further, the size of the still significant coefficient for urgent care facilities is reduced considerably compared to the unadjusted models. Similarly, the variable for the index based on percent Asian also demonstrates one primary disparity, urgent care facilities, as was the case in the unadjusted results with only a small reduction in the size of the coefficient. In sum, for both of these often overlooked groups in this literature, we observe a few disparities in the distribution of health-related resources, particularly health care resources, with a higher concentration and clustering of these two groups.

Furthermore, beyond the results for the three racial/ethnic categories, there are also a few important trends in the control variables. Most notably, the variable for percent in poverty, net of all other variables, is significant and positive in all models with the exception of three resources, indicating that higher poverty rates in a zip code leads to an increase in the organizational density. The magnitude of these effects in some cases is also quite substantial, especially in the case of physician's offices and full-service restaurants. For example, a 10 percent increase in poverty is related to an increase of 2.26 (or over two establishments) in the number of physician's offices per 10,000 people in a zip code. Additionally, the variable for percent foreign born produces some notable results in several of the models. For 4 of the 14 dependent variables (grocery stores, pharmacies, urgent care facilities, and physician's offices), the coefficient for percent foreign born is significant and positive, indicating that a higher immigrant population in a zip code is associated with a higher density of such establishments per 10,000 people. In the case of zip codes again, this is a substantively large effect as well. In only one case is the variable significant and negative (religious organizations).

As noted above, I also ran a series of models with the dependent variables divided by the size of the establishment as measured by the number of employees (see Table 4). As expected from previous research, I find some important differences when accounting for size compared to the full results, especially in the case of grocery stores. For this outcome, the race/ethnicity clustering measure variables are not significant for small sized establishments (and were not significant in the full models), but are significant and negative in the case of medium and large establishments for the variables by percent black and large establishments by percent Asian. This indicates that a high concentration and clustering of blacks and Asians in urban neighborhoods is related to a decrease in the predicted density of large (over 100 employees) grocery stores. Furthermore, the size results reveal several more important disparities. In particular, a greater concentration and clustering of all three groups is related to a lower density of medium-sized medical facilities. And, there is also a significant and negative

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pattern for Latino clustering and small hospitals, and for Asian clustering and large physician's offices. Thus, the results by size indicate several additional negative patterns by racial/ethnic clustering.

Relatedly, in these two models, percent in poverty is also significant and negative for large grocers (which is positive for small establishments of the same types). In the full models, percent in poverty is significant and positive across many types of establishments, but it appears that at least in the case of grocery stores, this is accounted for by size. However, this measure is still significant and positive across several other dependent variables regardless of size.

DISCUSSION AND CONCLUSIONS

The goal of this study is to examine the relationship between racial residential segregation and the distribution of a number of health-related resources in light of theories of urban inequality. This study provides several important contributions to the literature on the link between segregation and health outcomes, and how it relates to theories of racial/ethnic segregation. First, the results across a variety of types of resources are consistently patterned by segregation. This is especially true for black areas, where I find a consistent disparity in the organizational density of resources across both the number and type of resources, especially when accounting for socioeconomic factors as well. However, taking the literature beyond black and white racial/ethnic segregation, I also find some disparities in other resources for both Asian and Latino segregation patterns, though these tend to be clustered in certain resources. For example, high Latino neighborhoods are less likely to have certain health care resources, although this is less so after accounting for socioeconomic variables. Access to health care is one of the most pressing Latino health disparities, and as such, this unequal distribution of resources in Latino neighborhoods may help account for this disparity (Aguirre-Molina, Molina, and Zambrana 2001). Overall, the results for racial/ethnic segregation are much more consistent and in the expected direction when compared to poverty and other socioeconomic characteristics. These findings provide support for the place stratification theoretical perspective, and Hypotheses 2 and 4, which emphasize the dynamics of racial stratification beyond simply poverty and economic inequality (Charles 2003; Massey and Denton 1993). Other studies on urban organizational resources have found similar patterns with regards to the theory (Small and McDermott 2006), however here I apply it to a wide variety of health-related resources in particular. Although not tested here, I suggest that these patterns could help account for the link between racial residential segregation and adverse health outcomes.

With regard to the other theoretical perspectives discussed above, I find that poverty is frequently positively associated with having a higher density of establishments in a zip code. This result runs counter to the expectations and theorizing about urban inequality and Hypothesis 1. However, the result is similar to the findings in certain other studies (see, in particular, Small and McDermott 2006). Further, this result sheds some insight into the class versus race debate in studies of urban inequality, and provides more support for the importance of disparities by race over class. In fact, at least in the case of black neighborhoods, accounting for poverty and socioeconomic characteristics actually bolsters the effect of racial/ethnic segregation on several of the outcome variables. However, I also find that for grocery stores, these patterns differ in important ways by size with high poverty areas being significantly more likely to have small establishments and less likely to have large establishments. Thus, some portion of this seemingly unexpected result, at least for grocery stores, is the product of size differences between establishments. In sum, counter to the expectations of Wilson's concentration of poverty theory, high poverty alone does not account for the distribution of such resources, and it appears that racial/ethnic segregation remains an important component of these patterns (Wilson 1987).

Moreover, I also observe interesting patterns in the case of immigration as it relates to the theory discussed above. In the fully adjusted models, for 4 of the 14 health-related resources, I find a significant and positive relationship between having a higher immigrant population and the density of resources. This lends some support for the immigrant enclave hypothesis (Hypothesis 3) in that, at least for some resources, having a higher foreign-born population is related to greater organizational

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density. This measure, though, does not account for country of origin or length of stay in the United States, which are both important considerations in the discussion of immigration, health, and access in the United States It is important to note, though, that these results are without taking into account the distribution of Asians and Latinos as well, which are two groups often treated as purely immigrant groups. Thus, I find several disparities for those two groups net of the effect of immigration, and I find a separate positive effect of immigration on the density of health-related organizational resources.

These findings build on the literature on health-related organizations in urban space. The results track with previous studies, especially on food resources, which demonstrate that minority communities are less likely to have a variety of food resources (Beaulac et al. 2009; Walker et al. 2010). However, the results are notably different in that for a number of health-related resources, poverty is positively related to having a greater number of resources, which provides some support for the importance of race over class in such issues. Again, though, we observe some nuance to these findings when accounting for the size of the establishment, with disparities by poverty in large establishments, which is more in line with the current research.

Furthermore, the study provides several important advances over the current literature. I consider a wide variety of health-related resources, including health care, social services, and civic associations, in an attempt to move the literature beyond a fairly narrow understanding of the types of resources that may impact health. Additionally, I make several important advances in terms of how segregation is measured with more attention to how segregation processes differ from merely racial/ethnic density. I also include other groups, beyond black-white segregation, to observe how these spatial patterns may impact other groups and may differ between groups. Finally, I also measure segregation using a geographic approach and employ geographic statistical methods.

While the study presents with these contributions to the literature, there are several limitations of the study at hand. First, the data only account for commercial enterprises (for-profit and nonprofit) due to the nature of the data collection process, which excludes government enterprises. As a public good, government entities might be more evenly distributed throughout space, and as such, this gap in the data could potentially be quite important for drawing conclusions about the unequal distribution of certain resources. Or, conversely, for-profit service providers may be less likely to locate in areas with a high degree of government enterprise. Further, important distinctions in locational decision making and in organizational use by sector (nonprofit, for-profit, and government) have been shown in the literature (Galaskiewicz et al. 2013). However, the CBP count data are not available with a breakdown by sector. Relatedly, the data source only considers establishments with employees as the data come from tax records. Thus, the data may underestimate the counts of particularly small establishments or businesses where an individual may be self-employed.

Next, the data are limited to the zip code level of analysis. While this is smallest unit available in the data, it may not be the most indicative of what actually constitutes a neighborhood or how one would perceive the establishments available to them in their neighborhood. Further, the distinction of "what's available" to a person depends on their access to transportation resources, such as a personal car or public transportation. If something is not available in one's neighborhood, it does not prohibit access to such an entity, it only makes it more difficult to access, which for some people may not be a barrier to use. The study also is limited in its ability to make causal inferences due to the cross-sectional nature of the data. As such, we cannot definitively say whether or not racial residential segregation is causing such patterns, or how organizations are choosing to locate themselves across space. However, due to frequently changing boundaries of zip codes over time, longitudinal analysis using these data is not possible. Finally, the analysis does not relate the presence or absence of such organizations to health outcomes. It assumes that these organizations are related to health, but does not actually draw the connection empirically. In sum, while this analysis has the advantage of being a nationwide examination of the distribution of organizations, it is limited for understanding people's actual behaviors with regard to such organizations and how it relates to their health. These are important considerations for future research.

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Despite these limitations, the study here provides some noteworthy advances in the literature, both in terms of theory and measurement. I find support for the place stratification theoretical perspective and find that racial/ethnic segregation is consistently related to a disparity in a variety of health-related resources. This is especially true for the case of black neighborhoods, but I also find some disparities for Latino and Asian communities as well, moving this literature beyond black-white segregation. Furthermore, I suggest that this distribution may provide an important mechanistic link between the findings on segregation and adverse health outcomes. In sum, I suggest that racial/ethnic segregation should be an important consideration when examining how neighborhoods may impact health, in particular how it is related to the distribution of resources throughout urban space. These results suggest that one of the key ways to address racial/ethnic disparities in health by segregation is to improve the provision of local health-related resources.

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