RESEARCH AND PRACTICE
**The Neighborhood Context of Homelessness**

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Living in emergency shelters or on the streets amplifies the influence of environmental factors on homeless adults, which, in turn, makes a difficult situation even worse. People who find themselves without stable housing are vulnerable to high rates of victimization,[1,2] more health problems,[3,4] and less access to social support, sustainable employment, and affordable housing.

Several studies have suggested that homeless people have been geographically "warehoused" in concentrated urban areas and that the particular environmental attributes of these areas make it more difficult for homeless individuals to improve their situation.[5-9] For example, homeless people cite affordable housing as being critically important but also as one of the most difficult needs to meet.[10] If the surrounding environment where homeless adults are concentrated has less available and affordable housing and more economic distress, this spatial segregation may be one of the many real barriers to obtaining stable housing in the future.

Large urban areas with relatively high concentrations of poverty become the natural targets for the placement of emergency homeless shelters and other social services, developing into what Dear and Wolch[11] referred to as service ghettos. This dynamic is typically associated with the skid row era of the early and middle parts of the 20th century, and over the past 2 decades many cities have attempted to decentralize and disperse these areas of concentrated poverty in an ongoing policy of poverty management.[12] Although these policies have been mostly unsuccessful in dispersing those who are homeless, the geography of homeless individuals has become more complex and polynucleated than in previous decades.[13]

Few studies have examined the complexities of the physical and social environments surrounding people living on streets and shelters. One promising approach to understanding these environments is to use census data as indicators of social, economic, and housing conditions in the areas in which individuals reside before, during, and after homeless episodes. Culhane et al.[14] geocoded previous addresses collected from shelter admissions in New York City, New York, and Philadelphia, Pennsylvania. They matched these addresses with census tracts and corresponding census data for those areas and identified several predictors of shelter admission on the basis of previous residence, namely crowding, higher poverty rates, and higher rents. Generally, these neighborhoods also had higher proportions of African Americans and female-headed households. Using a similar data set from the Philadelphia shelter system and a factor-analytic approach, Wong and Hillier[15] reported associations between homelessness risk and what they labeled distressed neighborhoods (higher proportions of African Americans, poverty, boarded-up houses, vacant houses, unemployment, female-headed households, and public assistance income) and unstable neighborhoods (higher proportions of 1-person households, recent moves, and rentals and higher rent-toincome ratios). The authors of both of these studies highlighted the importance of prior neighborhood characteristics yet were unable to identify any longitudinal patterns after the initial shelter admission because they were restricted by the single point of contact collected in the administrative database.

In the current study, we explored and compared the neighborhood characteristics of where homeless people come from and end up after 1 or 2 years in a large urban area. By comparing neighborhood characteristics between these 3 points on the homeless pathway, we hoped to better understand whether and how homeless adults are concentrated or dispersed over each individual time course. Were there significant differences in demographics, economic distress, and housing from when they were last housed to where they ended up living in a shelter or on the streets? If we followed these individuals over the next 2 years, would they end up moving away

from baseline homeless locations to better or worse neighborhoods? We could only explore these questions in a combined spatial and longitudinal context, which is critical to understanding not just the "who" of homelessness, but also the "where." With this knowledge, city planners and homeless service providers can better use limited resources to address the barriers to housing on macro and individual levels.

METHODS

We collected the survey data used for this study from a sample of 400 participants in a longitudinal National Institute on Drug Abuse-funded study of homelessness called the SUNCODA project. We defined homelessness as having no current fixed address of one's own and having spent the previous 14 nights in a public shelter or in some other unsheltered location without a personal mailing address, such as a park, an abandoned building, a car, or the streets. Additionally, we included those who had spent the past 14 days in very inexpensive transient lodging if they had been there for more than 30 days. This definition also included individuals who had stayed in a public shelter or unsheltered location for most of the past 14 days if they had stayed less than one half of those days temporarily with friends or relatives or in temporary single-room-occupancy facilities.

We selected most (80%) of the sample randomly from 12 homeless shelters, and the remainder were recruited from street locations across the city. Study participants were selected from shelters in numbers proportionate to shelter census from randomly generated computerized schedules on the basis of current shelter rosters or bed counts. We conducted street recruitment on foot along 16 computerrandomized street routes, each with computerrandomized starting points within the routes. All individuals encountered on street routes were approached for screening, not just those who appeared to be homeless. Potential participants were screened with a few brief questions about where they had stayed recently. Eligible individuals were invited to participate in the study and on providing informed consent were scheduled for a baseline interview. The participation rate among those eligible was 92%. More details of the sampling procedures are described in earlier publications from this study.[16,17] We tracked the sample over the course of the following 2 years, and we reinterviewed them at the end of each year as well as contacted them every 3 months to provide updates on their status and activity. The 1-year reinterview rate was 71% (283 of 400), and 69% (257 of 400) completed interviews at both 1- and 2-year follow-ups.

Measurement

Participants took part in structured interviews at baseline and at the 1- and 2-year follow-up time points. These surveys included information about demographics, housing, social contacts, and service use.

We collected additional information about mental health and substance use diagnostic criteria using sections of the Diagnostic Interview Schedule,[18] the Diagnostic Interview Schedule Homeless Supplement,[19,20] and the Composite International Interview-Substance Abuse Module.[21] In this study, we defined serious mental illness as a lifetime diagnosis of major depressive disorder, bipolar disorder, or schizophrenia.

Geocoding and Census Data

At each annual interview (baseline, year 1, and year 2), participants were asked to provide the address of their usual place of residence over the previous year and where they had slept the previous night. Additionally, addresses were recorded for the location of the last stable housing arrangement. We geocoded all addresses to longitude and latitude coordinates and entered them into the ArcGIS software database (ESRI, Redlands, CA).[22] Because of irregularities in or unreliability of some of the addresses given, we were not able to geocode all addresses. Only addresses within the greater St. Louis, Missouri, area were included. This region includes St. Louis City and St. Charles, Franklin, and Jefferson Counties in Missouri and Madison, St. Clair, and Monroe Counties in Illinois (Figure 1). Of the original 400 participants, 368 were positively geocoded at baseline; of this baseline group, 291 had identifiable locations for last stable housing (last housed), and 200 had identifiable locations (both housed and homeless) for either the year 1 or year 2 time points (last wave). The last-wave time point was defined as the last available postbaseline geocodable location. We geographically masked spatial locations using the random perturbation methods described by Armstrong.[23]

We extracted housing and population data from the US Census 2000 Summary File 3 at the block group level[24] within the period of the collection study data. We used Census Bureau standards to calculate rates of crowding, unemployment, and vehicle ownership and rent-to-income ratios. As a measure of material deprivation, we calculated the Townsend Index for each block group. The Townsend Index is a sum of the logged and z-normalized values of the following proportions in each block group: (1) crowded households, (2) unemployed individuals eligible to work, (3) individuals with no private transportation, and (4) rented housing.[25] Values were normalized to the entire St. Louis region study area such that a value of 1.0 for the Townsend Index used here is 1 standard deviation above the mean for the region. Neighborhood material deprivation has been associated with

health and well-being in several studies from a variety of US urban sample populations using US Census data.26-29

Analytic Strategy

For each set of addresses, we calculated a mean center and a standard deviational ellipse using the ArcGIS software. The mean center provides a central point, which minimizes the distances between the individual locations in a group, and the standard deviational ellipse is a visual representation of the spatial dispersion in a group along 2 perpendicular axis lines. It provides both a general measure of dispersion and the primary directional ellipse of the dispersion.30

We compared differences in indicators for surrounding block groups for each individual location by means of a paired t-test analytic method. The primary comparisons were between last housed and baseline, baseline and last wave, and last housed to last wave. We performed all of the descriptive analyses and comparisons using the R programming language. 31 Area maps, overlays, and spatial measures were generated with the ArcGIS 9.3 software.22

RESULTS

The participants included in the study sample were primarily non-White (82.1%), male (74.7%), and single or divorced (94.3%), with a mean age of 41 years. Compared with participants in similar studies, this group had a relatively high prevalence of lifetime alcohol and cocaine use disorders (61% and 43%, respectively) and lifetime serious mental illness (43%). On average, participants had been homeless for more than 4 years, although the median value was 2 years. They also had relatively high rates of unemployment and lifetime history of convictions.

The study area population was approximately 2.48 million people in a 7-county area. The aggregate values for last-housed, baseline, and last-wave block groups reflect the urban character of the places where the adult homeless sample came from and moved to over the course of time. These regions had lower median incomes, higher unemployment, more public assistance, less car ownership, and less education than the larger St. Louis area as a whole (Table 1). Also, they had higher proportions of crowding, vacant housing, rental housing, and people with high rent-to-income ratios.

Spatial Dispersion

The standard deviational ellipse for the set of last-housed locations was more dispersed along both the major and the minor axes than that for sleep locations at baseline, which was also the case for the sleep locations at the last-wave interview, but not to the same degree. The baseline sleep locations were highly concentrated in the central urban area of the city and oriented generally along the Interstate 64 corridor, which bisects the City of St. Louis. One standard deviation along the major axis for baseline was approximately 4 miles, compared with 8 and 9 miles, respectively, for the last-housed and last-wave standard deviation estimates. These distributional comparisons, along with mean center locations, are shown in Figure 2.

Neighborhood Comparisons

Compared with where participants reported having last had stable housing, the baseline neighborhoods had a mean difference of 15% fewer family households and a less stable population-11% more people reported moving in the previous 5 years (Table 2). Median incomes were more than $6300 lower on average in baseline neighborhoods, and a higher proportion (10% more) of the population was below the federal poverty line. In the same manner, rates of unemployment were more than 5% higher in baseline areas. The percentage of households reporting no private car ownership was similarly lower for the baseline neighborhoods than the last-housed neighborhoods.

This pattern essentially reversed as participants were followed 1 and 2 years after the baseline surveys. The block group areas at the last wave had more family households, less residential mobility, higher median incomes, less unemployment, more car ownership, and less poverty than baseline neighborhoods. We found fewer differences between participants' last-housed locations and locations at last wave, but generally last-wave neighborhoods had lower median incomes and more households below the poverty level than last-housed locations.

Comparing housing variables, we found that baseline neighborhoods had much higher percentages of rental-occupied housing (30% more) but at the same time had higher median asked rent for vacant units and much higher housing values. Median house values were more than $96 000 higher in baseline neighborhoods

than in last-housed neighborhoods. Household rent-to-income ratios were somewhat higher (2.8% on average) in baseline neighborhoods than in last-housed areas. As with the demographic measures, significant differences in housing variables were in the opposite direction when comparing baseline to last-wave locations (less rental housing, lower rent-to-income ratios, and lower house monetary values at baseline). We found no significant difference in asked rent between baseline and last-wave neighborhoods. Percentages of vacant housing were not significantly different from baseline for either last-housed or lastwave neighborhoods, but at the last-wave interview, participants ended up in areas with higher percentages of vacant housing than their previously housed locations.

The measure of material deprivation (the Townsend Index) was significantly higher in baseline neighborhoods than in either last-housed or last-wave neighborhoods. The distributions of these census values can be visualized in map form (Figure 3) for rent-to-income ratios, unemployment, and material deprivation. As might be expected, higher concentrations of all of these indicators of distressed neighborhoods are concentrated in the downtown, highly urbanized areas of St. Louis that coincide with the distribution of the homeless sample at baseline.

DISCUSSION

The results of this study demonstrate the changing environmental factors that individuals face as they move from previously housed situations to homelessness and then at follow-up 1 and 2 years after baseline. When compared with previously housed locations, homeless adults in the St. Louis region were concentrated into a highly urbanized central core of the city of St. Louis. This is not surprising because these areas are where the bulk of the emergency shelters and other services used by homeless individuals have been located. In this study, we found that the surrounding neighborhoods of homeless individuals were more distressed in both economic and housing domains. Although proportions of rental housing were higher for the baseline time point than for the other time points, rental prices (median asked rent) were notably higher, as were percentages of people living in these baseline areas with high rent-to-income ratios. Taken together, these environmental factors may create barriers to gaining housing and economic stability for a group of adults who already face numerous individual barriers such as substance abuse and mental illness.

Limitations

We need to identify the limitations to this study. First, this study was restricted to the greater St. Louis metropolitan area, and the data cover the time period between 2000 and 2004. Each urban area has a unique history and local culture that influences how homeless people are treated and where it is acceptable for homeless people to live and work. Recent economic changes will almost certainly have an impact on housing dynamics and, thus, the spatial distribution of homeless individuals over time. This, if anything, should highlight the need for repeat longitudinal analyses across different environments. Second, in using a series of simple comparisons, we demarcated what was different between these areas at different points in the spatial history of the adult population who were homeless in this region. We were not able to identify whether moving to a particular area had any impact on future well-being or long-term housing and economic stability, which would require a longer time course and preferably some level of experimental randomization. Longitudinal surveys have been notoriously difficult with a population that is in many ways highly mobile and difficult to contact for follow-up interviews.

Last, even though a block group is a relatively small area compared with a zip code or census tract, the sleep location block group of these individuals may not have a direct correspondence with the actual area of influence. For example, where people sleep may not be the area in which they spend most of their time or look for work and housing, which again suggests the need for a more detailed set of data that would be able to detail the real places and spaces of a group of homeless adults, perhaps via the use of GPS or cell phones as part of future studies.

Conclusions

The changing spatial distribution of homeless adults in the urban context has been a missing piece of the complex puzzle of understanding homelessness. We visually demonstrated where homeless adults moved from before a homeless episode and where they moved to over the course of 2 years. In both cases, participants came from and moved to areas with less housing and economic distress and less material deprivation than where they were at baseline. Linking this type of spatial- longitudinal data with associated service accessibility and utilization data will give service planners the ability to develop efficient and more spatially relevant service networks.

Objectives. We examined and compared the changing neighborhood characteristics of a group of homeless adults over time.

Methods. We collected the addresses of previous housing and sleep locations from a longitudinal study of 400 homeless adults in the St. Louis, Missouri, region and compared census measures of housing and economic

opportunities at different points along individual pathways from housing to homelessness and at 1- and 2-year follow-up interviews.

Results. Sleep locations of homeless adults were much more concentrated in the urban core at baseline than were their previous housed and follow-up locations. These core areas had higher poverty, unemployment, and rent-toincome ratios and lower median incomes.

Conclusions. The spatial concentration of homeless adults in areas with fewer opportunities and more economic and housing distress may present additional barriers to regaining stable housing and employment. A big-picture spatial and time-course viewpoint is critical for both policymakers and future homelessness researchers. (Am J Public Health. 2013;103:679-685. doi:10.2105/AJPH.2012. 301007)

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