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Mapping Food Access and Related Risk Factors in Forecasting Social Disorder

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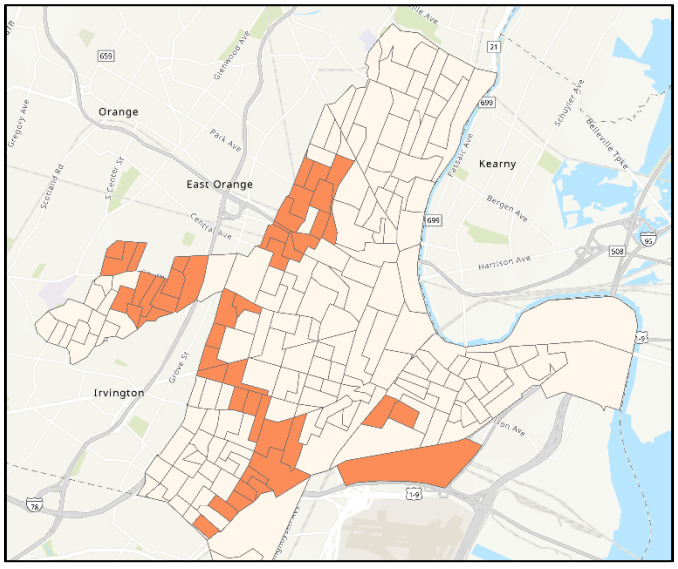
- In Newark, NJ, food deserts, or low access to food, negatively impact the health and wellbeing of community members.
- Individuals who frequent at-risk bodegas to get food have increased risks of becoming victims of aggravated assault.
- The environmental factors create dynamic conditions where behavioral factors like crime or assault can impact on people's ready access to food. In Newark, policy prescriptions must take this into account when trying to increase food access but also decrease criminogenic features that perpetuate crime.

Food deserts, "neighborhoods that lack healthy food sources" (USDA, 2019), are often seen as a key factor in contributing to household deprivation. While the direct effects of food access on health and wellbeing have been closely studied, we explore how food deserts and vulnerability created by other forms of disorder amplify problematic outcomes, such as, crime.

Finding Food Deserts

Food deserts are operationalized as "Low Access Scores" to grocery stores. This measure, produced by the New Jersey Economic Development Authority (NJEDA, 2022), indicates the degree to which residents of New Jersey are underserved by supermarkets in their neighborhoods. Figure 1 shows in orange areas of Newark with high levels of low food access.

Figure 1. Chloropleth Map: Low Access to Food (NJ EDA), Newark, New Jersey, 2021 – 2022

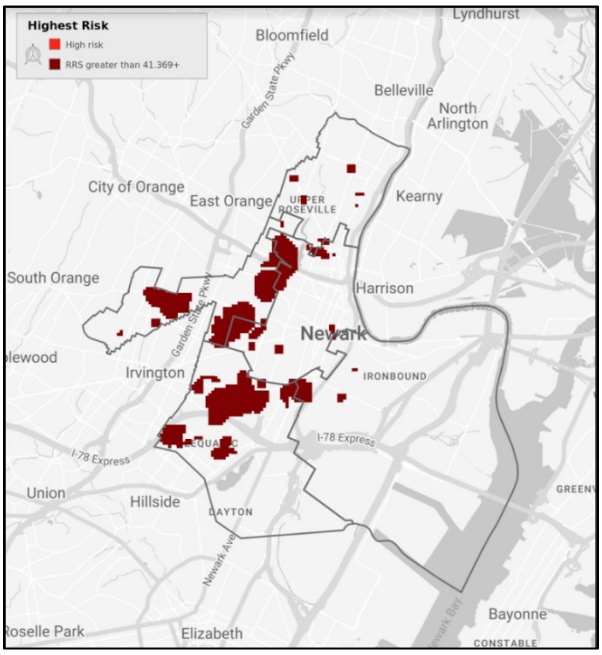


Examining Risky Environments

Once we establish where food deserts occur, the second step in our analysis is to examine in what ways risk factors within the built environment may amplify the effects of food insufficiency. To identify the spatial distribution of risky environments for crime, we picked a crime outcome as our dependent variable, aggravated assault, that is prevalent within Newark (Kennedy, et al, 2015; Caplan and Kennedy, 2016). We utilized RTMDx, a software product developed by the Rutgers Center on Public Security (Caplan and Kennedy, 2016) that automates the steps of risk terrain modeling (RTM). RTM is a technique that layers spatial risk factors onto maps to help identify vulnerable space for crime outcomes. The RTMDx software operationalizes the spatial influence of risk factors (i.e., environmental attractors or generators of crime outcomes). This analysis selects and validates the risk factors found to be associated with the location of past aggravated assault incidents. The process weights the risk factors with one another and produces the final risk terrain maps (see Figure 2) with tabular information pertaining to all statistically significant risk factors (Garnier, Caplan, and Kennedy, 2018).

After importing crime and spatial data and selecting relevant variables, the RTMDx software outputs a vector grid layer consisting of equally sized 200-foot by 200-foot cells. Each of these is given a relative risk value (RRV) depending on the relative level of victimization risk. In Figure 2 below, the highest risk areas for aggravated assault in Newark are color coded in dark red.

Figure 2. Highest Risk Areas for Aggravated Assault in Newark, NJ, May 2021 – May 2022

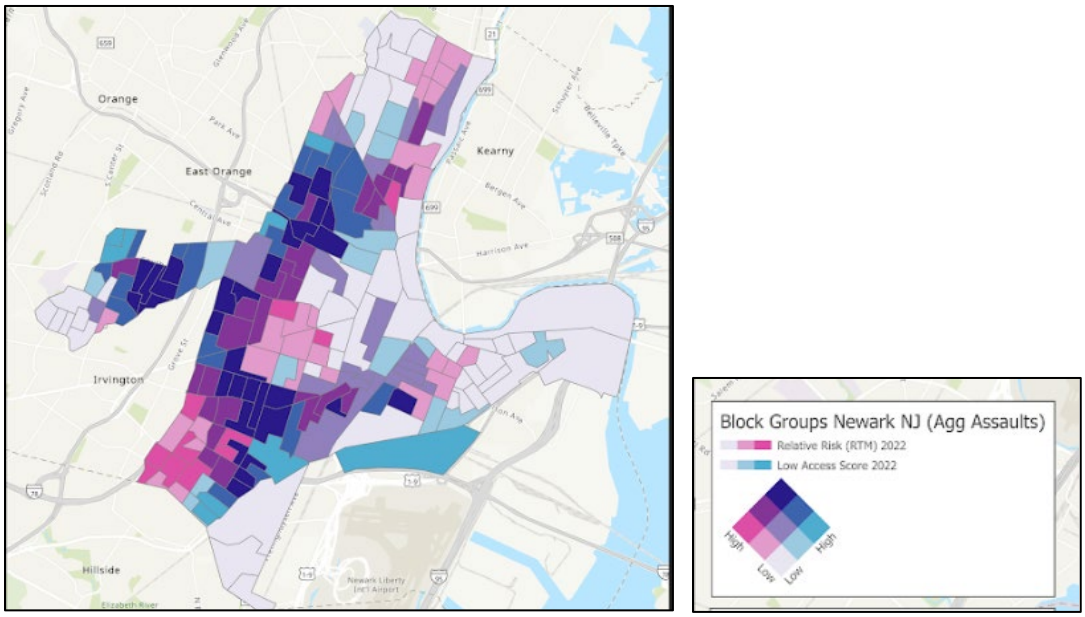


According to the results of the RTM analysis for aggravated assault incidents between May 2021 and May 2022, bodegas have the most significant weight (measured by its RRV) in the model with an RRV of 7.552. In contrast, abandoned property, vacant lots, carry-out restaurants, parks, and restaurants with no alcohol have RRVs of between 1 and 2. In other words, the risk of aggravated assault victimization increases by more than seven in areas within proximity to bodegas.

Food Access and Crime Vulnerability

To compare the distribution of risk for low food access, we transformed RTM's micro-level outputs to the block group level using the Average Neighborhood Risk of Crime (ANROC) approach (see Drawve, et al., 2016). By averaging micro-level risk values at the neighborhood level, we were able to visually inspect the distribution of neighborhood-level risk across Newark (see Figure 3).

Figure 3. Bivariate Map of Crime Vulnerability and Low Access to Food in Newark, NJ



The dark blue areas in the map above show neighborhoods where food deserts and high risk of victimization for aggravated assault overlap. Linking that to our previous finding, we find that bodegas, where many go to get food, are concentrated areas in which people have a higher risk of being assaulted. A pairwise correlation analysis confirms this relationship as statistically significant. In interpreting this finding, the existence of both food deserts and crime has amplified the deprivation felt by community members living in these areas (Macintyre, 2007).

Food deserts are not absolute. As we've seen in our analysis, deprivation can be amplified when environmental factors create conditions in which people can be victimized. In this example, individuals who are going to at-risk bodegas to get food are also increasing their risks of becoming victims of aggravated assault. The environmental factors create dynamic conditions where behavioral factors like crime or assault can impact on people's ready access to food. In Newark, policy prescriptions must take this into account when trying to increase food access but also decrease criminogenic features that perpetuate crime.

References

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