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Associations Between Neighborhoods and Summer Meals Sites: Measuring Access to Federal Summer Meals Programs

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Background

Access to healthy food plays an important role in the health of children, families, and communities, affecting behavioral, emotional, academic, and health outcomes.[1,2,3]. In an effort to increase food access, federal nutrition programs aim to alleviate food insecurity among families.[4,5] The Summer Meals Program (SMP) offers families and children access to healthy meals during the summer months, but access to these programs differs according to neighborhood environment and the location of sites. By examining the SMP administered by the United States Department of Agriculture (USDA), we hope to better understand the variables that affect the access of families and children to the SMP.

Food insecurity measures instability in a family's food supply—occurring when households are uncertain of having or being unable to acquire enough foods to meet the needs of their households. Food insecurity is measured in the Core Food Security Module in the American Community Survey. Nationally, 9.4% of households with children were food insecure in 2014, essentially unchanged from 9.9% in 2013 and 10.0% in 2011 and 2012.[6] In 2014, 17.2% of households in Texas were food insecure.[6]

USDA administers several child nutrition programs in order to provide additional resources to food-insecure families. Students in public and charter schools across the United States have access to at least 2 meals a day during the school year. The National School Lunch Program (NSLP) and the School Breakfast Program (SBP) provide lunch and breakfast to eligible low-income students at a paid, reduced-price or free status. Students are eligible for free meals if their family income is below 130% of the federal poverty line and reduced-priced meals if they are between 130% to 185% of the federal poverty line. Additionally, some schools may choose to offer free meals to the entire school population regardless of individual family eligibility if a high percentage of households represented in the school are eligible for free or reduced-price lunch.

Participation in the Supplemental Nutrition Assistance Program (SNAP) and NSLP has been shown to reduce food insecurity, though the effect of child nutrition programs like SMP and SBP is less understood.[7] Nutrition benefits of the programs are well documented. Secondary benefits of the child nutrition programs may include the alleviation of problem behaviors such as tardiness, absences, and referrals.[2,8] In particular, SBP has also been shown to increase nutrient intake.[3] In spite of this, very little is known about the effects of out-of-school meals. This is in part because data collection is much more difficult without the preexisting structure of a school administration. There is no record of which children return to a meal

site that is open to the public, making longitudinal studies logistically challenging.

As a way to offer continued support to families who may be food insecure, the USDA launched the SMP. During the summer months, students do not receive breakfast through the SBP and lunch through NSLP, requiring families to adjust their resources to provide food for their children.[9,10] Food access also has an impact on the economy of a neighborhood, as recent studies have shown that in areas where food is less accessible, prices skyrocket, and viable options for food are unhealthy.[11] Summer meals are provided through sponsors who prepare or purchase the food and then serve it at local meal sites.

Summer meals coverage—that is, the number of sites in an area—is not uniform across the nation, states, or even cities. Because limited access to healthy food promotes imbalances in dietary intake and health outcomes through availability or lack of health-promoting resources, understanding the coverage of SMP is crucial to the efficacy of the program.[12] Program participation is heavily dependent upon the location of the sites. Again, little is known about the process by which children arrive to eat a meal at a site, as open sites do not record identifying information of participants. Other federal nutrition programs require either applicant-level information (as in the case of SNAP) or school records, but SMP depends on a geographically varied collection of schools and nonprofits that do not subscribe to a standardized system of data collection. Thus, we approach the problem from the perspective of spatial site distribution.

Many variables affect the coverage and density of summer meals site in an eligible tract. Programmatically, meal sites can be located anywhere in a census tract that contains a school with at least 50% of its students eligible for free or reduced-price lunch (FRL). Furthermore, as noted by the Texas Department of Agriculture on squaremeals.org, Texas public school authorities with greater than or equal to 50% of students eligible for free or reduced-priced lunch are required to serve for at least 30 days during the summer months, though schools also have the option to waive out.

Site coverage in a neighborhood is dependent upon having a Contracting Entity (CE, sometimes referred to as a sponsor) that is willing to provide food to that area. Sites often require neighborhood collaborations that are able to supply a location for congregate meals, volunteers, and site monitors, as well as the ability to create spaces that are attractive for food-insecure children and families to attend[13].

Surveys of CEs have cataloged perceived barriers to participation and characteristics of thriving sites. In a nationwide survey in 2014, CEs

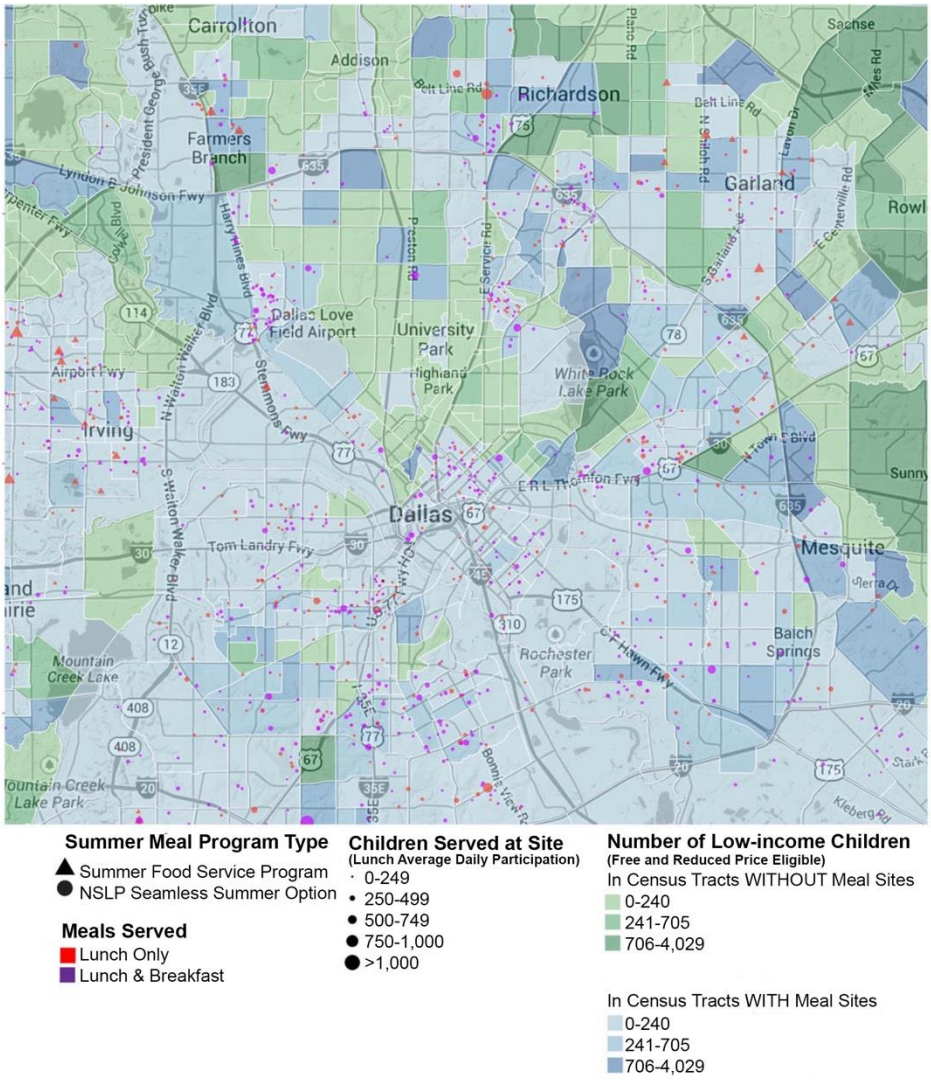
named transportation as the most frequently cited barrier.[13] Advocacy organizations have conducted a number of nonprobability sample surveys that provide limited insights into the possible determinants of successful SMP sites. Families may not participate in the program due to a lack of awareness about the program, a stigma associated with attending the program, or a lack of transportation to the program. The stigma associated with hunger often forces parents to hide the evidence of hunger within their family.[1] Food insecurity rates as well as participation in government programs may vary according to race or ethnicity.[14] Evidence from summer meal studies suggests Spanish-speaking families may encounter language barriers or perhaps be misinformed about the consequences of participating in a government program.[8] Employment may affect participation for families, as the children of working parents may not have the transportation to make it to the program.[15] Surveys also indicate barriers to implementation for sponsors and sites, but as the data on that are limited, we will focus here on accounting for neighborhood variables that may affect SMP coverage[13]. Critically, demographic and economic context matters most for families who are economically vulnerable but not yet poor, as they experience the greatest variation in food insecurity outcomes.[14]

Food access and participation in federal nutrition programs differs greatly depending on the urbanicity of an area.[4,11,16-19] Implementation of and participation in the SMP in an urban area has different dynamics than in rural areas. The aim of this paper is to better understand how neighborhood variables affect SMP coverage in different levels of urbanicity. For example, while transportation may not be a critical component of a successful site in a central urban location, a lack of a personal car may inhibit families from accessing a site in a rural area. By examining the relationship between the variables described above for different geographies within Texas, we hope to illuminate the different types of processes responsible for the site coverage in an eligible tract.

The question of site coverage is twofold. As described above, the first step is to understand the process by which tracts acquire sites or not. Beyond that question, we would also like to understand what variables may be associated with site density. Investigating variables associated with the site density helps to highlight sites that may be over- or underserved. Figure 1 shows a map of meal sites for the city of Dallas, Texas, as a sample, providing a visual for the summer meals landscape in an area. The Summer Meal Program type refers to two different programs that together comprise the SMP. The Seamless Summer Option (SSO) is a service option for schools who want to participate in the SMP with little disruption to their meal service during the school months. The Summer Food Service Program

(SFSP) is a branch of the SMP that allows a variety of community organizations to participate in SMP. Green areas indicate tracts without a site; blue indicates tracts with a site. Darker colored tracts have a higher number of children in need of summer meals per site.

Figure 1. Distribution of 2013 Summer Meal Sites in Dallas, Texas



Methods

Our analysis aims to determine what demographic, economic, and programmatic variables are associated with 1) site coverage and 2) site

density. We consider the presence of public housing units, as well as race, poverty, employment, and available transportation.

Regarding the issues of site density, we use a linear model to obtain insight into how many sites should be in an area based on the above variables. This provides some notion of underserved and high-capacity areas. Information about the location of public housing units was excluded from the regression as public housing has deterministic program requirements based on poverty thresholds. We used forward selection and backwards elimination, statistical techniques for variable selection, to determine the relative importance of each of the demographic and economic variables to estimating site density.

Sample

We analyzed summer meals sites for the state of Texas. Texas represents a variety of different types of geographies, levels of urbanicity, and demographic breakdowns. Addressing critical challenges in the state of Texas is crucial to understanding national challenges. Due to data availability, we analyzed summer meals sites for the state of Texas for the year of 2013. Data collected on program participations were submitted by Contracting Entities (CEs) that submitted an application to serve and be reimbursed for summer meals across the state of Texas. Our sample does not include private groups that may elect to serve summer meals without being reimbursed. The sample also only includes the meals for which CEs were reimbursed. In some instances, CEs may have submitted meals that were disallowed by the state agency. Other groups may have applied to be a CE but not awarded a contract. Organizations and schools that do not live in eligible areas are not allowed to be reimbursed for summer meals. Those operations are not collected by the state agency.

We merged the CE data with geolocation data of public housing sites. The literature documents a positive correlation between public housing and SNAP participation.[20] Furthermore, children in subsidized housing have been shown to have better nutritional outcomes than their peers without standardized housing.[21] The particular outcomes for the SMP have not been examined.

Information on CEs was geocoded and merged with publicly available data on census tracts. The census tract level was selected for analysis because summer meals eligibility is also determined at the census tract level. Texas contains 5,625 census tracts defined by the United States Census Bureau as areas with between 1,200 and 8,000 people, with an optimum size of 4,000 people. By examining a host of demographic tract

variables, we aim to determine what variables affect the coverage and density of summer meals sites.

Data Collection

We collected data from a number of sources. The Texas Department of Agriculture (TDA) supplied the information concerning the number of students eligible for free and reduced-price meals as well as summer meals sites and sponsors. USDA Rural Development provided the list of Food and Nutrition (FNS) housing units, which was added to an open data list of United States Department of Housing and Development (HUD) housing units. Data on demographics, transportation availability, and percentages of households living in poverty were collected at the census tract level from the United States Census Bureau's American Community Survey (ACS). The distinction between urban and rural tracts follows the methodology outlined for the 2,000 rural-urban commuting area (RUCA) codes, aggregated at the census tract level from the USDA's Economic Research Service (ERS). We used a 4-tier consolidation of the RUCA system: 1) urban core; 2) suburban; 3) large rural town; and 4) small town/isolated rural.[22]

Statistical Analysis

All statistical analyses were performed using the open source statistical software, R, and the data were geocoded using the *ggmap* package.[23,24] Variable subset selection analysis was performed using the *leaps* package in R.[25] Statistical significance according to different p-values is indicated in the tables. The distance between sites and from sites to schools was calculated using the ellipsoid method. Tests for trends were estimated using the *t.test* command, and linear regression used the base command in R. Stratified paired t-test models were estimated separately for each category of urbanicity.

Results

Access to Sites

Texas has 5,265 census tracts as a whole. Of those, 3,026 contain at least one school with more than 50% of students eligible for free or reduced-price lunch. The bar chart in Figure 2 shows the total number of tracts with and without sites according to areas of different urbanicity. While urban areas certainly have the largest number of tracts with sites, they also have the largest number of areas without sites. Rural and suburban areas have a larger ratio of tracts still without sites, although the absolute number of tracts is less than the urban areas. This is unsurprising, as urban poverty is

generally more visible, and residents may have increased access to government programs. The disparity suggests that both the causes of and methods of addressing food insecurity are quite different in urban areas versus rural or suburban areas.

Figure 2. Site Coverage in Texas According to Urbanicity in Summer of 2013

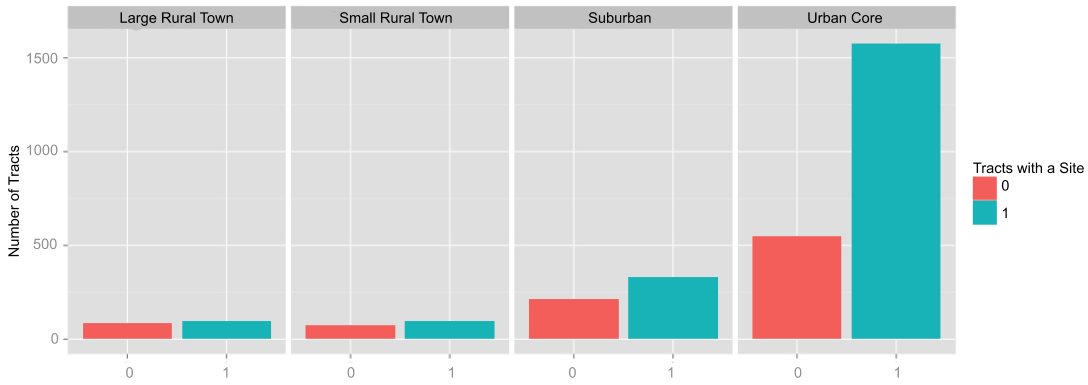


Table 1 shows the results of the paired t-tests for urban core areas. Transportation variables are significant at the $p<0.01$ level. Urban tracts with more sites are associated with more key wage earners who either carpool, take public transportation, or walk to work. This confirms anecdotal evidence that transportation accessibility is a key determinant in the success of a summer meals site.

Table 1. Urban Core Neighborhood Variables

Variable	Mean for tracts without a site	Mean for tracts with a site	p-value
FNS Housing Units	0.023	0.020	0.554
HUD Housing	1482.90	1515.81	0.663
White	733.58	751.50	0.447
Black	1209.42	1196.05	0.408
Hispanic	1465.43	1511.18	0.226
Poverty	242.02	246.04	0.599
Unemployed	211.08	222.39	0.136
Car	1171.39	1144.86	0.434
Carpool	272.11	299.06	0.002
Public	107.12	121.10	0.002

Walk	100.93	108.44	0.067

Table 2 shows the results of paired t-tests for suburban tracts. Food-insecure families are difficult to identify, and suburban food insecurity may be less visible than urban food insecurity. The presence of FNS housing sites is associated with summer meals site coverage with a $p<0.01$. Eligible suburban tracts without a site correspond with a higher black population.

Table 2. Suburban Neighborhood Variables

Variable	**Mean for tracts without a site**	**Mean for tracts with a site**	***p*-value**
FNS Housing Units	0.30	0.40	0.013
HUD Housing	1596.65	1533.30	0.073
White	696.22	809.23	0.414
Black	1082.70	1068.58	0.010
Hispanic	1513.47	1525.88	0.875
Poverty	204.05	199.08	0.735
Unemployed	245.26	224.39	0.188
Car	1245.78	1151.92	0.188
Carpool	273.04	283.15	0.568
Public	42.38	41.46	0.896
Walk	127.82	130.88	0.695

Table 3 displays the results of the paired t-test for rural tracts with large towns. Summer meals site coverage is associated with the presence of low-income housing, both of FNS and Section 8.

Table 3. Large Rural Neighborhood Variables

Variable	**Mean for tracts without a site**	**Mean for tracts with a site**	**p-value**
FNS Housing Units	0.18	0.41	0.045
HUD Housing	1549.49	1569.75	0.057
White	725.95	783.92	0.892
Black	1084.65	1136.49	0.483
Hispanic	1583.51	1401.20	0.221
Poverty	203.29	227.39	0.365

Unemployed	239.06	216.70	0.469
Car	1237.26	1167.61	0.602
Carpool	299.29	272.43	0.436
Public	43.40	59.98	0.206
Walk	127.80	144.59	0.209

Table 4 shows the results of analysis for rural areas with small towns. As with larger rural towns, we see the continued association of eligible tracts with sites and the number of public housing units. Tracts with more people who either drive or carpool to work are associated with the absence of a summer meals site, and tracts with people who walk are associated with having a site.

Table 4. Small Rural Neighborhood Variables

Variable	**Mean for tracts without a site**	**Mean for tracts with a site**	**p-value**
FNS Housing Units	0.49	0.82	0.001
HUD Housing	1205.71	1373.70	0.006
White	715.09	663.09	0.246
Black	1007.53	1045.66	0.551
Hispanic	1396.67	1490.91	0.525
Poverty	184.08	177.61	0.779
Unemployed	292.61	251.55	0.227
Car	1376.97	1012.05	0.017
Carpool	272.60	217.89	0.091
Public	40.65	50.43	0.527
Walk	135.65	154.94	0.126

Site Density

Site density affects the operation of the SMP. We regress the number of sites given the geographic variables shown above. As suburban and rural sites have far fewer sites and would inflate the model with a large number of tracts with either no sites or one site, we restrict our analysis to tracts classified as urban core. The results from the linear regression are shown in Table 5.

Stepwise regression with both forward selection and backwards regression was used to estimate the relative importance of each of the variables in the linear regression model. Both methods reveal public transportation as the most important indicator of site density. The

statistically significant coefficients in decreasing order of importance include the number of households that use public transportation, are unemployed, identify their race as other, identify as white, carpool to work, and that live in poverty. The linear regression model gives a residual standard error of 1.828 on 2114 degrees of freedom, an adjusted R-squared values of 0.01786, and a p-value of 0.0000006.

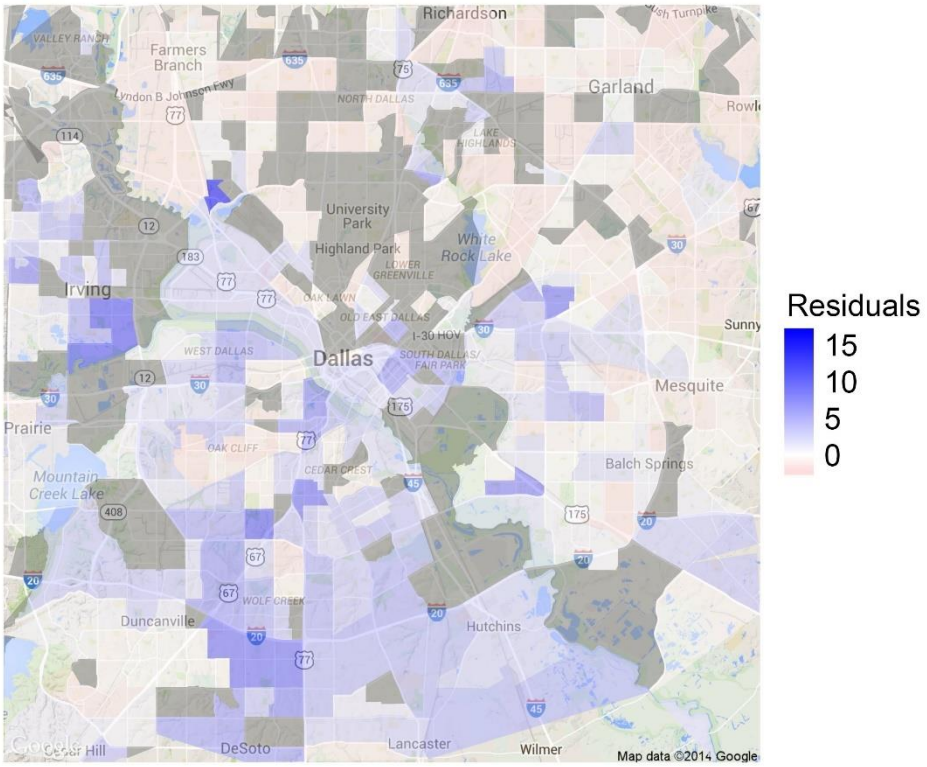
Table 5. Site Density Regression Coefficients for Urban Core Areas

Coefficient	**Estimate Std.**	***Pr*(>|t|)**
(Intercept)	1.410	$<2\times10^{-6}$
White	0.0001	0.012
Black	0.00007	0.414
Hispanic	0.00002	0.617
Other	-0.0002	0.004
Poverty	0.0005	0.051
Unemployed	0.0007	0.007
Car	-0.00008	0.1469
Carpool	0.0004	0.032
Public	0.001	0.0005
Walk	0.0007	0.104

Choropleth of residuals demonstrates one measure of high (blue) and one measure of low (red) site density. Sites not eligible for the program are gray. Site density is regressed on demographic, economic, and transportation variables shown in Table 5. The red areas are classified as underserved by the model. In other words, we expect to see more summer meals sites there.

Using this model, we check the residual values and plot them in the choropleth in Figure 3. This gives us an idea of the difference between the actual number of sites in a tract and how many sites there ought to be according to our linear model. Negative residuals may correspond to tracts with fewer sites and positive residuals correspond to sites with more sites than predicted. A small R-squared value of 0.017 indicates that a linear model does not account for the variance in site density in urban tracts in Texas. Thus, the model should not be used to prescribe an ideal number of summer meals sites to each tract. However, small p-values indicate that the dependent variables of the model are statistically significant to measuring site density.

Figure 3. Choropleth of site density residuals for Dallas, Texas



Discussion

Access to a Meal Site

Access to a summer meals site is a measure of 1) the receptiveness of the community to government nutrition programs; 2) the need expressed by a food-insecure neighborhood; 3) the capacity of local sites and sponsors; and 4) perceived need and actual need for food assistance in a community. We analyze several characteristics of tracts that have and do not have a site.

In addition to the simple binary question of whether or not a site has a tract, we also analyze the number of sites in a tract. Geospatial analysis gives a measure of capacity by shading census tracts according to how many children are eligible for free or reduced-priced lunch per summer meals site. Linear regression predicts the number of sites in a tract as a function of the neighborhood characteristics. A map of these residuals shows the tracts that have a large difference between the predicted and observed numbers of sites.

The results here are difficult to interpret because the directionality of time is not clear. Tracts with SMP coverage may be over-served, or they may indicate that the community is receptive to the program. Conversely, tracts without SMP coverage could highlight areas that are underserved, or else it could indicate areas where the area is not receptive to the program. The information provided here does not have clear implications for practitioners. However, these data could be improved upon by collecting longitudinal information about the consistency of sites over several summers or else through participation. At present, available data are severely limited.

Neighborhood Variables

The analysis of the relationship site coverage and various socioeconomic neighborhood indicators is shown in the tables for urban, suburban, and rural areas. We confirmed that the demographic variables vary according to urbanicity. Regarding the presence of public housing sites, tracts with more FNS housing units were more likely to have a summer meals site in suburban and rural areas. This association may be an artifact from the data, as several public housing sites participate in the SMP. The association of HUD housing sites with site coverage is statistically significant only at the small rural level. Our findings suggest that public housing units may be key areas of outreach for the SMP, particularly in suburban and rural areas. The inclusion of housing data represents a new addition to the summer meals literature.

Regarding socioeconomic data, we do not find a consistent pattern across the stratified communities with regard to race. In rural and suburban areas, households with an unemployed primary wage earner tend to live in tracts without access to summer meals sites. However, in urban areas, tracts with more unemployment correspond to tracts with a summer meals site. This corroborates the idea that unemployment as it affects food insecurity may be more hidden in suburban and rural areas. The literature contains mixed reviews on the relationship between demographic and economic variables and site coverage.[26]

Transportation variables played a particularly important role in urban and rural communities. Urban tracts with more people who carpooled, took public transportation, or walked to work were more likely to have a summer meals site available. In suburban areas, tracts with a larger number of households with access to the car were less likely to have a summer meals site. Rural tracts with higher numbers of households who walked and took public transport were more likely to have a site. Despite these differences

in transportation, some of the households in all of these tracts may benefit from access to the summer meals site.

This paper represents the effect of neighborhood dynamics on access to a federal nutrition program for children. The processes that influence site coverage are complex and may include: capacity of sponsors to add sites; level of trust within the community for a particular sponsor; and the experience of the sponsor. From the perspective of the neighborhood, we know that awareness of the program, cultural barriers, and transportation play roles in parents' decision to let their children attend a summer meals site.

Analysis of demographic variables may suggest that advocates examine the access of suburban black families and rural Hispanic families, as these two groups are associated with tracts that do not have access to a meal site. The challenge for rural Hispanic families corroborates anecdotal evidence suggesting that language barriers, cultural differences, and perhaps a distrust of government programs influence Hispanic parents' decision to access a summer meals site. However, studies also suggest that Hispanic families, particularly immigrants, are more likely to influence their children to participate in nutrition programs.

Transportation variables demonstrate the strongest association with site coverage. Advocates may struggle to identify methods to aid summer meals site. Our analysis here suggests that continuing to find innovative transportation methods might increase access to the SMP.

Limitations of the Study

Mistakes are common in geocoding, particularly in rural areas of Texas. It is likely that the geocoding returned coordinates with some error. Additionally, some studies show that information aggregated at the census tract level is difficult for outreach teams to identify with. Residents are not distributed equally through the site, and a number of residents may have access to a meal site across the street that happens to be in a different census tract. By using artificial geographical constructs, we lose some element of the neighborhood identity, but we gain statistical integrity.

This study is dependent on data aggregated at the census tract level. Research shows that residents rarely associate with a particular census tract, and these administrative boundaries may have little correspondence to reality.

Policy Recommendations

This study explores the fundamental differences in food insecurity for urban core, suburban, and rural areas with large and small towns. Access to public

transportation in urban areas is key. Consequently, partnering with local public transport to provide awareness of and access to the summer meals sites might increase participation. Leveraging geospatial analysis may help to determine how to better allocate community resources. As indicated by our results, local resources like housing sites may correspond to the existence of summer meals sites. Understanding catalysts and barriers to summer meals access fosters a better understanding of how access to healthy food shapes communities.

The rules and regulations governing federal child nutrition programs are a part of the Childhood Nutrition Reauthorization Act. Anecdotal evidence has long supported the notion that transportation is a crucial barrier to program participation, and USDA has explored several different alternatives. This includes a pilot program that administers more money to an Electronic Benefit Transfer card, allowing families to purchase their own food to prepare meals during the summer months.[27] As transportation proves to be such an important variable to measure both site coverage and site density, we suggest continued focus on innovative alternatives to provide access to transportation and perhaps alternative programs in areas without much public transportation. As discussions focus on where to set the threshold for eligibility for these programs that use an alternative mode of transportation, further investigating the demographics of these neighborhoods may help to establish those thresholds.

Future work consists of integrating more refined data and merging other preexisting data sets. As those data become available, we plan to investigate participation rates at the site level as well as the consistency of sites over several summers to provide a more robust picture of the summer meals dynamics that govern site coverage and density.

References

1. Weinreb L, Wehler C, Perloff J, et al. Hunger: its impact on children's health and mental health. *Pediatrics.* 2002;110(4):e41.
2. Beaulieu SM; RTI International, Center for Health and Environemtanl Modeling. *Current and Prospective Scope of Hunger and Food Security in America: A Review of Current Research*. Research Triangle Park, NC: RTI International; 2014. http://www.rti.org/pubs/full_hunger_report_final_07-24-14.pdf. Accessed May 28, 2014.
3. Nolen E, Krey K. The effect of universal-free school breakfast on milk consumption and nutrient intake. *Food Stud*. 2015:5(4):23-33.
4. Dunifon R, Kowaleski-Jones L. The influences of participation in the National School Lunch Program and food insecurity on child well-being. *Soc Sci Rev.* 2003;77(1):72-92.
5. Hur MH. The public school lunch program and its contribution to the alleviation of problem behaviors. *Int J Business Soc Sci.* 2012;*3*(18):142-150.
6. Coleman-Jensen A, Rabbitt MP, Gregory C, Singh A. *Household Food Security in the United States in 2014*. Washington, DC: US Dept of Agriculture, Economic Research Service; 2015. http://www.ers.usda.gov/publications/err-economic-research-report/err194.aspx. Accessed October 15, 2015.
7. Gundersen C, Kreider B, Pepper J. The economics of food insecurity in the United States. Appl Econ Perspect Policy. 2011;33(3):281-303.
8. Nalty CC, Sharkey JR, Dean WR. Children's reporting of food insecurity in predominately food insecure households in Texas border *colonias*. *Nutr J*. 2013;12:15.
9. Nord M, Romig K. Hunger in the summer: seasonal food insecurity and the National School Lunch and Summer Food Service programs. *J Child Poverty*. 2006;12(2):141-58.
10. Bartfeld JS, Ryu JH, Wang L. Local characteristics are linked to food insecurity among households with elementary school children *J Hunger Environ Nutr.* 2010;5(4):471-83.
11. Donkin AJM, Dowler EA, Stevenson SJ, Turner S. Mapping access to food at a local level. *Br Food J*. 1999;101(7):554-562.
12. Lamichhane A P, Warren J, Puett R, et al. Spatial patterning of supermarkets and fast food outlets with respect to neighborhood characteristics. *Health Place* 2013;23:157-164.
13. Texas Hunger Initiative; Food Research and Action Center; Share Our Strength. *National Summer Meals Sponsor Survey: Texas Results*. Baylor University website.

http://www.baylor.edu/texashunger/doc.php/226927.pdf. Published June 2014. Accessed October 15, 2015.
14. Bartfeld J, Dunifon R. State-level predictors of food insecurity among households with children. *J Policy Analysis Manage*. 2006:25(4):921-942.
15. Burns C M, Inglis AD. Measuring food access in Melbourne: access to healthy and fast foods by car, bus and foot in an urban municipality in Melbourne. *Health Place*, 2007;13(4):877-885.
16. Gordon A, Briefel R, Needels K, et al; Mathematica Policy Research, Inc. *Feeding Low-income Children When School Is Out: The Summer Food Service Program*. Washington, DC: US Dept of Agriculture, Economic Research Service, Food Assistance and Nutrition Research Program, 2003. http://www.ers.usda.gov/media/1487311/efan03001.pdf. Accessed October 15, 2015.
17. Smith C, Morton LW. Rural food deserts: low-income perspectives on food access in Minnesota and Iowa. *J Nutr Educ Behav.* 2009;41(3):176-187.
18. Ver Ploeg M, Breneman V, Dutko P, et al. *Access to Affordable and Nutritious Food: Updated Estimates of Distance to Supermarkets Using 2010 Data*. Washington, DC: US Dept of Agriculture, Economic Research Service; 2012. http://www.ers.usda.gov/media/956784/err143.pdf. Accessed May 28, 2014.
19. Hubley TA. Assessing the proximity of healthy food options and food deserts in a rural area in Maine. *Appl Geogr.* 2011;31(4):1224-1231.
20. Moffitt RA. *Multiple Program Participation and the SNAP Program.* Lexington, KY: University of Kentucky Center for Poverty Research; 2014. http://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1007&context=ukcpr_papers. Accessed October 15, 2015.
21. Meyers A, Cutts D, Frank DA, et al. Subsidized housing and children's nutritional status: data from a multisite surveillance study. *Arch Pediatr Adolesc Med*. 2005;159(6):551-556.
22. Washington State Department of Health 2009. Guidelines for Using Rural–Urban Classification Systems for Public Health Assessment. ⟨http://www.doh.wa.gov/ Data/guidelines/RuralUrban2.htm⟩
23. *R: A Language and Environment for Statistical Computing* [computer program]. Vienna, Austria: R. Foundation for Statistical Computing; 2015. https://www.R-project.org/. Accessed Month ##, 2015.
24. Kahle D, Wickham H. ggmap: spatial visualization with ggplot2. *R J*. 2013;5(1):144-161. http://journal.r-project.org/archive/2013-1/kahle-wickham.pdf. Accessed March 15, 2014.

25. Thomas Lumley using Fortran code by Alan Miller. leaps: regression subset selection. 2009; R package version 2.9. http://CRAN.R-project.org/package=leaps. Accessed October 15, 2015.
26. Alford S, Croake C, Crosby R, Vincensini V. *The Summer Food Service Program in Cook County: Issues, Challenges and Opportunities*. Chicago, IL: University of Chicago, The Harris School; 2006. http://harris.uchicago.edu/sites/default/files/practica/spring2006-report.pdf. Accessed May 28, 2014.
27. Collins AM, Briefel R, Klerman JA, et al; Abt. Associates Inc.; Mathematica Policy Research; Maximus. *Summer Electronic Benefits Transfer for Children (SEBTC) Demonstration: 2013 Final Report*. Alexandria, VA: US Dept of Agriculture, Food and Nutrition Service; 2014. http://www.fns.usda.gov/sites/default/files/ops/sebtc2013-Summary.pdf. Accessed October 15, 2015.