

# The Allegheny County Community Need Index: Update for 2021 with a Focus on the Connection between Race and Community Need



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## EXECUTIVE SUMMARY

The Community Need Index (CNI) was originally designed by the Allegheny County Department of Human Services (DHS) to identify suburban Allegheny County communities that are in greater need and/or at greater risk of further economic decline relative to other communities.<sup>1</sup> It includes indicators relevant to suburban communities and assesses need at the census tract level, a relatively small unit of analysis that can reveal a diversity of local conditions that would otherwise be masked by examination at the larger municipality level.

This report provides an updated mapping of community need in Allegheny County, using a newly revised CNI. The new index removes redundancies from the original version, applies a more meaningful sorting method for how tracts are classified, and adds a measure of gun violence, given research showing the profoundly negative effect of exposure to gun violence on children, families, and communities. It also covers all of Allegheny County, unlike the original index, which covered only the suburban areas.

Decades of research show that place matters in determining the long-term life outcomes of individuals, particularly so for younger children. Community level measures such as poverty, lack of educational attainment, unemployment, single parenthood, and gun violence are factors that play a key role in linking place to outcomes, per the literature. To quantify a tract's total level of need, its values for each of these five CNI measures were converted into z-scores. The five z-scores were then averaged into a single score for the tract. A tract's total score represents how far the tract falls from the mean Allegheny County tract in its level of need. Tracts were sorted into five levels of need, ranging from very low to extreme.

This report examines whether there are disparities in which racial and ethnic groups are exposed to greater levels of community need and roots existing disparities in the historical context of government-sanctioned racial and economic segregation. Additionally, this report observes changes in community need over time and identifies whether there are gaps between DHS service delivery and emerging need.

### Key findings

Using the new CNI, we found that levels of need among Allegheny County census tracts have stayed mostly consistent between United States Census Bureau American Community Survey (ACS) 2013 five-year estimates and 2018 five-year estimates, with two-thirds of tracts remaining within the same level of relative need over the two periods (see interactive map of need levels [here](#)). Eighty-nine percent of tracts that were high or extreme need as of 2009–2013 five-year estimates were still high or extreme need as of 2014–2018 five-year estimates.

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<sup>1</sup> For previous CNI reports, see <https://www.alleghenycountyanalytics.us/index.php/2015/12/01/community-need-index-reports-datasets/>

For the most part, higher levels of need have remained concentrated in the same geographic areas as before: A) Pittsburgh's Hill District, upper eastern neighborhoods, South Hilltop, sections of the Upper Northside and sections of the West End, B) McKees Rocks and Stowe, C) sections of Penn Hills and Wilkinsburg, D) much of the Monongahela River Valley, and E) sections of Harrison Township.

However, some census tracts have seen growing or decreasing levels of need:

- **Rapidly growing need:** Tracts in South Oakland and Robinson Township have experienced rapidly growing levels of need, having increased by at least two levels from very low or low need as of 2018 five-year estimates.
- **Emerging need:** There are also notable pockets of emerging need, areas that had low levels of need as of 2013 five-year estimates that have increased to a moderate level of need by 2018 five-year estimates. These areas are in parts of the City of Pittsburgh, Penn Hills and Plum, as well as in the Monongahela River Valley and parts of the South Hills such as Whitehall and Bridgeville.
- **Deepening need:** More than 30 tracts throughout the Monongahela River Valley, Pittsburgh's South Hilltop, and various parts of Pittsburgh's East End that were already moderate or high need moved up one level as of 2018 five-year estimates.
- **Rapidly decreasing need:** tracts in Downtown Pittsburgh, Bloomfield and Marshall-Shadeland have seen rapidly decreasing levels of need, having decreased at least two levels from extreme, high or moderate need as of 2018 five-year estimates.

Race lies central to discussions of community need in Allegheny County, which is of consequence given the causal connection between place and the divergent long-term life outcomes of individuals and families who reside in higher- versus lower-need areas. Our communities were segregated by design as the result of nearly a century of systemic, institutional, and interpersonal racism and exclusion, ranging from racist housing, lending and land-use policy to White flight, urban renewal and the war on drugs.

With few exceptions, census tracts in Allegheny County with a higher proportion of Black residents tend to have higher relative need while census tracts with a higher proportion of White residents tend to have lower relative need. Percent Asian, percent Native American, and percent Hispanic or Latino are not predictive of community need at the tract level. Nearly three-quarters of Black residents in Allegheny County reside in our moderate-, high- or extreme-need communities, with only about a quarter residing in low- or very-low-need communities. This is not the case for any other racial or ethnic group in Allegheny County.

Additionally, family income alone does not appear to explain segregated living patterns regarding where families of different races reside in Allegheny County. For example, White and Asian families with incomes below the federal poverty line (FPL) are still several times less likely to live in high- or extreme-need census tracts than Black families with incomes above the FPL. The connection between race and need is especially challenging given the strong persistence of racial segregation in Allegheny County tracts over the past four decades.

Overall, DHS serves a higher proportion of total residents in higher-need communities and a lower proportion of total residents in lower-need communities, which is what we would expect to observe. However, there are communities that are higher in need but have a comparatively low percentage of their total population served by DHS; such is the case for tracts in McKeesport and Swissvale. On the other side of the spectrum, there are communities that have seen declines in need that appear to be overserved by DHS, comparatively.

## BACKGROUND

Decades of research show that place matters in determining the long-term educational, economic and health outcomes of children and families.<sup>2,3,4,5</sup> It is important to state that place matters because race matters, and that community-level risk factors such as poverty, lack of educational attainment, unemployment, single parenthood and gun violence have been disproportionately concentrated in our Black communities as the result of policy decisions and lack of opportunity. With exceptions, our White communities in Allegheny County tend to be advantaged, well-resourced places with ample opportunity and thus tend to exhibit lower levels of need, while our Black communities tend to face disadvantages, disinvestment and lack of opportunity, and thus tend to be higher in levels of need.

The stark difference in relative need between our White and Black communities is the result of nearly a century of systemic, institutional, and interpersonal racism and exclusion. The state of our communities is directly tied to our nation’s and region’s legacy of discriminatory housing, lending and land-use policies<sup>6,7,8</sup> as well as the economically devastating and isolating effects of White flight, urban renewal, deindustrialization and the war on drugs.<sup>9,10</sup> These forces continue to influence levels of need, investment and opportunity in Black communities today. While our higher-need communities face challenges, they are also filled with rich cultural heritage, storied institutions and inspiring people, which should not be forgotten in discussions of community need.

<sup>2</sup> Wilson, W. (2012). *The Truly Disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

<sup>3</sup> Sharkey, P. (2013). *Stuck in Place*. Chicago, IL: The University of Chicago Press.

<sup>4</sup> Chetty, R.; Hendren, N.; and Katz, L. (2015). “*The Effects of Exposure to Better Neighborhoods on Children: New Evidence*

*from the Moving to Opportunity Experiment.*” The National Bureau of Economic Research.

<sup>5</sup> Chetty, R.; Friedman, J.; Hendren, N.; Jones, M.; and Porter, S. (2018). *The Opportunity Atlas: Mapping the childhood roots of social mobility*. (NBER Working Paper no. 25147). National Bureau of Economic Research.

<sup>6</sup> Rothstein, R. (2018). *The Color of Law*. NYC: Liveright Publishing Corp.

<sup>7</sup> Trounstine, J. (2018). *Segregation by Design: Local Politics and Inequality in American Cities*. Cambridge: Cambridge University Press.

<sup>8</sup> Exposing Housing Discrimination. n.d. Urban Institute. Retrieved from [here](#).

<sup>9</sup> Wilson, W. (2012).

<sup>10</sup> Alexander, M. (2010). *The New Jim Crow Mass Incarceration in the Age of Colorblindness*. N.p.: The New Press.

As the primary social services provider for Allegheny County, DHS seeks to understand which areas of the County have heightened levels of socioeconomic need, as well as how community needs have changed in recent years. The geographic dimensions of community need can help inform many aspects of DHS's strategic planning and resource allocation decisions, such as decisions on where to locate Family Centers<sup>11</sup> or new afterschool programs. A mapping of needs also helps other local service providers and nonprofits understand where their services are in demand. The socioeconomic diversity of Allegheny County's outlying suburbs can lead some communities to be overlooked in policy discussions of poverty and distress. A spatial analysis of community needs helps to reveal the perhaps lesser-known areas of the County that happen to have significant levels of socioeconomic instability.

## METHODOLOGY

This report quantifies community levels of need using an index called the Community Need Index (CNI). The CNI presented in this report builds upon the original version that was released in 2014.<sup>12</sup> The original version of the CNI was developed to examine community levels of need based on measures beyond just poverty rates, in recognition of the fact that a community's level of need is related to more than the incomes of its residents. The original analysis looked only at suburban census tracts, while a subsequent analysis examined City of Pittsburgh tracts separately.<sup>13</sup> The new version of the CNI presented here covers both the City of Pittsburgh and its surrounding suburban areas, giving a more complete picture of community need in the County.

The updated version of the CNI retains some of the measures used in the original version, while replacing or removing others that do not measure what we would otherwise like them to measure or those measures that are redundant given their very high relatability to other measures in the original index.

To update the CNI, DHS reviewed and identified those community level indicators that tend to be the most predictive of adverse family outcomes, for measures where data was readily and reliably available. Unlike the original CNI, we decided to add a measure of gun violence given the recent wave of research showing the negative impacts of exposure to gun violence on children, families and communities.<sup>14,16,17</sup> Likewise, we replaced the education measure in the original CNI with a measure on the percentage of those 25 and older without at least a bachelor's degree, given recent research showing its importance in shaping long-term outcomes.<sup>17</sup>

<sup>11</sup> Family Centers are a network of supportive centers that provide free programming for children, parenting support for adults, and home visits for pregnant mothers and families with infants and toddlers.

<sup>12</sup> Good, M.; Collins, K.; and Dalton, E. (2014). Suburban poverty: Assessing community need outside the central city. Allegheny County Department of Human Services. <https://www.alleghenycountyanalytics.us/index.php/2015/12/01/community-need-index-reports-datasets/>

<sup>13</sup> Dalton, E.; Good, M.; and Jennison, K. (2015). *Data Brief: Assessing Community Need Within the City of Pittsburgh*. Allegheny County Department of Human Services.

<sup>14</sup> Sharkey, P. (2010). The acute effect of local homicides on children's cognitive performance. *Proceedings of the National Academy of Sciences of the United States of America*, 107(26), 11733-11738.

<sup>15</sup> Smith, M. E. et al. (2020, February). The impact of exposure to gun violence fatality

on mental health outcomes in four urban U.S. settings. *Social Science and Medicine*.

<sup>16</sup> Abt, T. (2019). *Bleeding out: The devastating consequences of urban violence*. New York: Hachette Book Group, Inc.

<sup>17</sup> Chetty, R.; Friedman, J.; Hendren, N.; Jones, M.; and Porter, S. (2018). *Race and Economic Opportunity in the United States: An Intergenerational Perspective*. National Bureau of Economic Research.

Our measure of transportation was removed given the desire to build an index that would cover all of Allegheny County, and its inclusion could skew central city tracts with low vehicle access but good public transit access. Revisions aside, measures of poverty, unemployment and single motherhood carried over given their clear importance in the literature.

**Table 1** compares the new CNI components with the previous components. For more information about why measures were changed or added/removed, see the **Appendix**.

**TABLE 1: Measures Included in the Original and Current Versions of the Community Need Index**

ORIGINAL VERSION		CURRENT VERSION	
MEASURE	SOURCE	MEASURE	SOURCE
Percentage of individuals below the federal poverty line (FPL)	ACS 2009 5-year estimates Table C17002	Percentage of families (not individuals) living below the FPL	ACS 2018 5-year estimates Table S1702
Percentage of individuals below 200% of the FPL	ACS 2009 5-year estimates Table C17002	Removed	N/A
Percentage of families with related children under 18 headed by a single female	ACS 2009 5-year estimates Table B11004	Percentage of families with related children under 18 headed by a single female	ACS 2018 5-year estimates Table B11004
Percentage of occupied houses with no available vehicle	ACS 2009 5-year estimates Table B25044	Removed	N/A
Percentage of housing units that are vacant	ACS 2009 5-year estimates Table B25001 and B25004	Removed	N/A
Percentage of males ages 16 to 64 who are unemployed or unattached to the labor force	ACS 2009 5-year estimates Table B23001	Percentage of males ages 20 to 64 who are unemployed or unattached to the labor force	ACS 2018 5-year estimates Table B23001
Percentage of youth ages 16 to 19 who are not enrolled in school and not high school graduates	ACS 2009 5-year estimates Table B14005	Percentage of individuals ages 25 and older without a bachelor's degree or more	ACS 2018 5-year estimates Table S1501
Not in original version	N/A	Gunshot-related 911 dispatches per 500 people	Allegheny County Emergency Services 911 dispatch data

To quantify a tract's total level of need, its values for each of the five CNI measures were converted into z-scores.<sup>18</sup> The five z-scores were then averaged into a single score for the tract. A tract's total score represents how far the tract falls from the mean Allegheny County tract in its level of need. Tracts were sorted into five levels of need, ranging from very low to extreme, using the Jenks Natural Breaks method in ArcGIS Pro.<sup>19</sup>

Tracts that were missing data for one or more measures were excluded from the CNI. The excluded tracts are primarily parks, graveyards or commercial areas in the City of Pittsburgh with little to no population. Out of Allegheny County's 402 census tracts, 389 (97%) were included in the CNI. We calculated the new version of the CNI using both 2013 and 2018 five-year ACS estimates to examine how community need has changed over these periods.<sup>20</sup>

Data on race and ethnicity by individual and family were gathered via 2014–2018 and 2015–2019 ACS estimates to analyze race in the context of community need. Our measure of race for White, Black, Native American, Pacific Islander and Asian individuals does not include those who identify as Hispanics or Latinos. We pulled a separate estimate that counted those who identify as Hispanic or Latino *individuals*. However, the estimates presented for White, Black and Asian *families* by poverty status include those who identify as Hispanics or Latinos, given data limitations.

It should be noted that census categories for race and ethnicity are broad and so may not capture identities that individuals would otherwise more readily identify with. Likewise, specific subgroups of a given racial grouping may have differing experiences and outcomes that are masked by their being categorized under a broader group.

We used outcome data from Opportunity Insights' Opportunity Atlas to further assess the validity of the CNI.<sup>21</sup> The Opportunity Atlas is built on data from roughly 20 million Americans who are in their mid-thirties today, covering virtually every child born during 1978–1983 who has a Social Security number. The Opportunity Atlas uses this data to map adult outcomes to the census tracts where children grew up, by household income rank,<sup>22</sup> gender and race. We used average household income rank data by tract and cross referenced it with the CNI in Allegheny County tracts to examine whether our index correlated with historic outcome data from the Opportunity Atlas.

<sup>18</sup> A z-score measures how many standard deviations a tract lies below or above the mean of all tracts.

<sup>19</sup> Five classes were chosen to emulate the number of classes used in indices such as the Brandeis University's Child Opportunity Index, which can be accessed [here](#). The Jenks Natural Breaks method minimizes variance within classes and maximizes variance between classes. This method sorts

similar tracts into the same class and is less arbitrary than simply dividing a distribution into quintiles. For more information, see De Smith, M.; Goodchild, M.; and Longley, P. (2018). *Geospatial analysis: A comprehensive guide to principles, techniques, and software tools*. 6th ed. Winchelsea Press.

<sup>20</sup> The 2013 version of the CNI includes 911 gunshot data from only 2011 to 2013 because the data was not available for 2009 and 2010.

<sup>21</sup> <https://www.opportunityatlas.org/>

<sup>22</sup> Rank, or percent rank, indicates where household income fell on the distribution relative to all household income values by tract, for each census tract in the United States.

### Service usage methodology

To better understand where there might be gaps in service availability or access, we examined County residents' usage of human services and other public services in calendar year 2018. These data come from Allegheny County's DHS Data Warehouse. It includes clients who received services provided by DHS in 2018, such as services for older adults (at home, in senior centers and in the community, as well as caregiver support and adult foster care); publicly funded mental health services, including 24-hour crisis counseling; publicly funded drug and alcohol services; family-related services (child welfare, family strengthening services through family centers and other community providers, out-of-school-time services and programming for youth transitioning out of child welfare into independent living); at-risk child development and education services; emergency shelters and housing for the homeless; non-emergency medical transportation; and referrals for supports coordination for individuals with a diagnosis of intellectual disability.

Demographic and address information for Allegheny County residents receiving any such DHS services is recorded in Allegheny County's Data Warehouse. To reconcile differences in demographic and address information that might arise when clients receive different services, the information with most occurrences is selected. Clients whose address could not be determined were excluded. Known client addresses were geocoded, matched to the corresponding census tract, and then classified according to level of need in that tract.

### Limitations

ACS data are estimates that tend to have a sizeable margin of error at the census tract level due to small sample sizes. However, the CNI uses five-year estimates, which are far more stable than one-year estimates. Also, 2014–2018 ACS data may be outdated as of this writing for census tracts that have experienced rapid socioeconomic change in recent years.

The measure of gunshot-related dispatches does not capture all gunshots that occur in a neighborhood. It only captures those that resulted in a 911 call and subsequent dispatch or those census tracts in city limits picked up by the City of Pittsburgh's ShotSpotter system. Different communities may be more or less willing to call 911 when they witness violence, which makes 911 calls an imperfect source of information on the occurrence of gunshots. That said, we found that 911 dispatches per capita are strongly predictive of homicides per capita, by tract. Additionally, the 911 dispatch data that is used in this report does not cover all such dispatches in Allegheny County. It only covers the 911 dispatches that are handled by Allegheny County Emergency Services (ACES). A small number of municipalities in Allegheny County do not use ACES for their 911 dispatches, including Monroeville, Bethel Park and Upper Saint Clair.<sup>23</sup>

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23 This information comes from ACES.

The identification of current or time-specific addresses for individuals served by DHS is challenging because this information is not collected consistently across services and because as individuals change residency, their new addresses might not be immediately captured in administrative systems. In most cases, we have used the address that appears most frequently in the Data Warehouse.

More broadly, there are many dimensions of socioeconomic need that are not captured in the CNI. Research has stressed the importance of social capital, racial bias, school quality and pollutants, among other factors, in shaping family outcomes. Some of these factors lack readily available data or stem from various geographic boundaries that do not neatly confine to census tract boundaries, while others are not included in order to keep the index manageable.

## FINDINGS

### Levels of community need in Allegheny County, 2014–2018

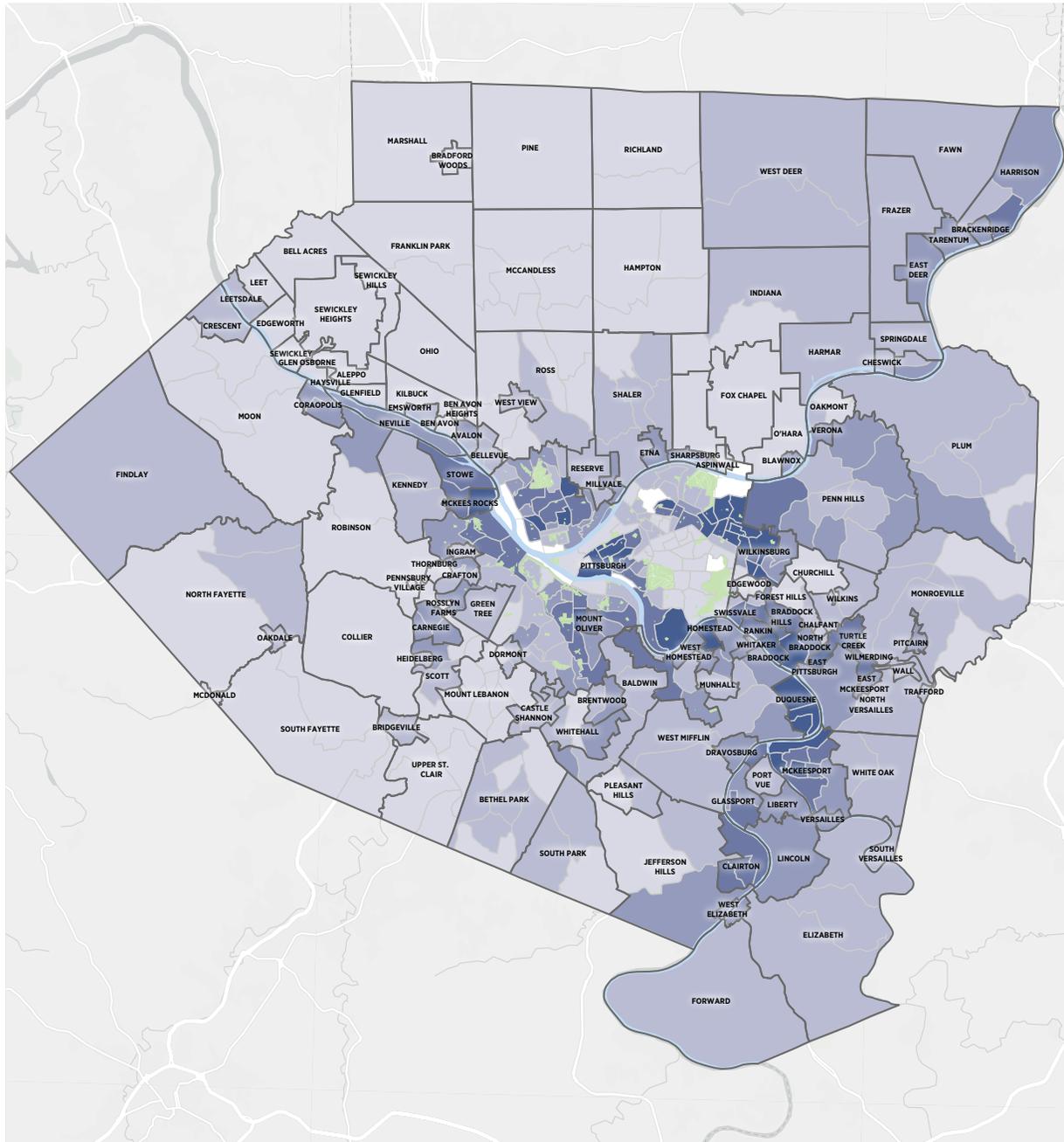
**Figure 1** presents a map of the CNI for all census tracts in Allegheny County for 2014 through 2018. **Figure 2** presents the same map with a focus on the Pittsburgh area.

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3 Lee, L. "Allegheny County reports increase in opioid overdose deaths." *Pittsburgh Post-Gazette*. July 10, 2020. <https://www.post-gazette.com/news/health/2020/07/10/Pittsburgh-Opioid-overdose-Naxolone-Allegheny-County-Health-Department/stories/202007100127>

4 Katz, J.; Goodnough, A.; and Sanger-Katz, M. "In Shadow of Pandemic, U.S. Drug Overdose Deaths Resurge to Record." *The New York Times*. July 15, 2020. <https://www.nytimes.com/interactive/2020/07/15/upshot/drug-overdose-deaths.html>

FIGURE 1: Community Need Index for Allegheny County Census Tracts, 2014–2018



**LEGEND**

<span style="display: inline-block; width: 15px; height: 10px; background-color: #d9e1f2; border: 1px solid #ccc; margin-right: 5px;"></span> Very Low Need	<span style="display: inline-block; width: 15px; height: 10px; border: 1px solid #ccc; margin-right: 5px;"></span> Pittsburgh Neighborhoods
<span style="display: inline-block; width: 15px; height: 10px; background-color: #c6d9f0; border: 1px solid #ccc; margin-right: 5px;"></span> Low Need	<span style="display: inline-block; width: 15px; height: 10px; border: 1px solid #ccc; margin-right: 5px;"></span> Municipalities
<span style="display: inline-block; width: 15px; height: 10px; background-color: #a6c9ec; border: 1px solid #ccc; margin-right: 5px;"></span> Moderate Need	<span style="display: inline-block; width: 15px; height: 10px; background-color: #90d990; border: 1px solid #ccc; margin-right: 5px;"></span> Pittsburgh Parks
<span style="display: inline-block; width: 15px; height: 10px; background-color: #70c9e8; border: 1px solid #ccc; margin-right: 5px;"></span> High Need	<span style="display: inline-block; width: 15px; height: 10px; background-color: #f0f0f0; border: 1px solid #ccc; margin-right: 5px;"></span> No data or lack of data
<span style="display: inline-block; width: 15px; height: 10px; background-color: #4090c0; border: 1px solid #ccc; margin-right: 5px;"></span> Extreme Need	

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.



The majority (60% or n=236) of census tracts in Allegheny County have low or very low levels of need, 19% (n=72) have moderate levels of need and 21% (n=81) of tracts have high or extreme levels of need (**Table 2**).

**TABLE 2: Census Tracts by Level of Need in Allegheny County, 2014–2018**

LEVEL OF NEED	NUMBER OF TRACTS	PERCENTAGE OF TOTAL TRACTS
Very Low Need	110	28%
Low Need	126	32%
Moderate Need	72	19%
High Need	45	12%
Extreme Need	36	9%
<b>Total</b>	<b>389</b>	<b>100%</b>

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.

Higher levels of need are concentrated in specific Pittsburgh neighborhoods and specific suburban areas. High- and extreme-need areas in Pittsburgh include the South Hilltop neighborhood; sections of the West End; the bulk of the Upper Northside; the Hill District; and East End neighborhoods such as Garfield, Homewood, Larimer, East Hills and Lincoln-Lemington. Outside of Pittsburgh, high- and extreme-need clusters exist in the Monongahela River Valley, sections of Wilkinsburg and Penn Hills, segments of the Ohio River Valley such as McKees Rocks and Stowe Township, and sections of Harrison Township in the most northeastern section of the County.

The Homewood North neighborhood of Pittsburgh has the highest CNI score among all census tracts in Allegheny County, followed by the Pittsburgh neighborhoods of Larimer, Homewood South and Bedford Dwellings. In Homewood North, 65% of families live in poverty, 67% of adult males are unemployed, and 35% of households are headed by single mothers. This neighborhood is also marked by frequent gun violence, with 26 average gunshot-related 911 dispatches from 2014–2018 per 500 residents. **Table 3** provides a list of tracts categorized as extreme need.

**TABLE 3: Extreme-Need Census Tracts in Allegheny County**

CENSUS TRACT	MUNICIPALITY	CITY NEIGHBORHOOD(S)	LEVEL OF NEED
5138	Braddock	N/A	Extreme Need
509	City of Pittsburgh	Bedford Dwellings	Extreme Need
103	City of Pittsburgh	Bluff (Uptown)	Extreme Need
2507	City of Pittsburgh	California Kirkbride	Extreme Need
305	City of Pittsburgh	Crawford-Roberts	Extreme Need
1306	City of Pittsburgh	East Hills	Extreme Need
2509	City of Pittsburgh	Fineview	Extreme Need
1016	City of Pittsburgh	Garfield	Extreme Need
5623	City of Pittsburgh	Glen Hazel/Hazelwood	Extreme Need
1301	City of Pittsburgh	Homewood North	Extreme Need
1302	City of Pittsburgh	Homewood North	Extreme Need
1304	City of Pittsburgh	Homewood South	Extreme Need
1303	City of Pittsburgh	Homewood South	Extreme Need
1207	City of Pittsburgh	Homewood West	Extreme Need
3001	City of Pittsburgh	Knoxville	Extreme Need
1204	City of Pittsburgh	Larimer	Extreme Need
1208	City of Pittsburgh	Larimer	Extreme Need
5619	City of Pittsburgh	Lincoln-Lemington-Belmar	Extreme Need
1203	City of Pittsburgh	Lincoln-Lemington-Belmar	Extreme Need
501	City of Pittsburgh	Middle Hill	Extreme Need
2609	City of Pittsburgh	Northview Heights	Extreme Need
511	City of Pittsburgh	Terrace Village	Extreme Need
510	City of Pittsburgh	Terrace Village	Extreme Need
4867	Duquesne	N/A	Extreme Need
4868	Duquesne	N/A	Extreme Need
4869	Duquesne	N/A	Extreme Need
5100	East Pittsburgh	N/A	Extreme Need
4838	Homestead	N/A	Extreme Need
5519	McKeesport	N/A	Extreme Need
5521	McKeesport	N/A	Extreme Need
5523	McKeesport	N/A	Extreme Need
4644	McKees Rocks	N/A	Extreme Need
5128	North Braddock	N/A	Extreme Need
5606	Wilksburg	N/A	Extreme Need
5611	Wilksburg	N/A	Extreme Need
5610	Wilksburg	N/A	Extreme Need

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.

On the other end of the spectrum, a tract in the Squirrel Hill North neighborhood of Pittsburgh has the lowest CNI score, meaning the lowest level of need, among all census tracts in Allegheny County, followed by census tracts in the Pittsburgh neighborhoods of Shadyside and North Oakland and another tract in Squirrel Hill North, as seen in **Table 4**. Census data estimates that zero families in tract 1401 in Squirrel Hill North live in poverty, and only 1% of households are headed by a single mother.

**TABLE 4: Top Fifteen Tracts in Allegheny County with the Lowest CNI Scores**

CENSUS TRACT	MUNICIPALITY	CITY NEIGHBORHOOD(S)	LEVEL OF NEED	RANK AMONG ALL TRACTS
1401	City of Pittsburgh	Squirrel Hill North	Very low Need	1
706	City of Pittsburgh	Shadyside	Very low Need	2
9822	City of Pittsburgh	North Oakland	Very low Need	3
1403	City of Pittsburgh	Squirrel Hill North	Very low Need	4
1404	City of Pittsburgh	Point Breeze	Very low Need	5
4220	Fox Chapel	N/A	Very low Need	6
4734.02	Mount Lebanon	N/A	Very low Need	7
4090	Pine Township	N/A	Very low Need	8
4735	Mount Lebanon	N/A	Very low Need	9
1410	City of Pittsburgh	Regent Square	Very low Need	10
203	City of Pittsburgh	Strip District	Very low Need	11
4742.01	Upper St. Clair Twp	N/A	Very low Need	12
5605	Wilkinsburg	N/A	Very low Need	13
4120.02	Franklin Park	N/A	Very low Need	14
5641	Rosslyn Farms/ Thornburg	N/A	Very low Need	15

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.

In general, the lowest- and highest-need communities in Allegheny County have vast disparities in socioeconomic status, as shown in **Table 5**. In the lowest-need communities, an average of 3% of families live in poverty. By contrast, an average of 39% of families in extreme-need communities live in poverty. The average percentage of adults without a bachelor's degree in the highest-need communities is more than double the average percentage in the lowest-need communities. The percentage of average unemployed adult males in the highest-need communities is more than triple the average rate in the lowest-need areas. On average, 5% of households are headed by a single mother in our lowest-need communities versus 44% in our extreme-need communities. Lastly, the rate of average gunshot-related dispatches per 500 people in extreme-need tracts is 21 times the average in very-low-need tracts.

**TABLE 5: Average Values of the CNI Measures, by Level of Need**

LEVEL OF NEED 2014-2018	# TRACTS	% TRACTS	FAMILY POVERTY RATE	25 AND UP WITHOUT BACHELOR'S OR MORE	MALE UNEMPLOYMENT/ UNATTACHMENT RATE (AGES 20-64)	SINGLE MOTHER RATE	SHOTS FIRED/ REPORTED RATE PER 500 PEOPLE
Very Low Need	110	28%	3%	38%	13%	5%	0.6
Low Need	126	32%	5%	63%	16%	8%	0.9
Moderate Need	72	19%	11%	74%	23%	16%	2.0
High Need	45	12%	22%	80%	31%	29%	5.9
Extreme Need	36	9%	39%	87%	46%	44%	12.4
Total	389	100%	8%	41%	20%	6%	1.9

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.

Note: In student-heavy tracts, male unemployment rate pertains to people ages 25–64 so that the data is not skewed by unattached males enrolled in college.

The highest- and lowest-need communities differ greatly on other important economic measures as well, which can be seen in **Table 6**. The average median home value in extreme-need communities is just \$57,633, compared with \$258,771 in very-low-need communities.<sup>24</sup> On average, almost half of households in extreme-need communities lack access to a vehicle, compared with just 8% in very-low-need communities.<sup>25</sup> In fact, the percent of households without access to a vehicle by tract is strongly correlated to level of need by tract ( $R = 0.77, p < .01$ ) and the percent of households without internet by tract is also strongly correlated with level of need ( $R = 0.83, p < .01$ ). Put simply, residents in census tracts with lower levels of need tend to have a much higher percentage of people with vehicles and household internet than those in higher-need tracts.<sup>26</sup>

**TABLE 6: Average Measures of Access and Value Not Included in the CNI, by Level of Need**

LEVEL OF NEED	MEDIAN HOME VALUE	MEDIAN GROSS RENT	OPPORTUNITY ATLAS OUTCOME: AVERAGE HOUSEHOLD INCOME RANK	PERCENT WITHOUT ACCESS TO VEHICLE	PERCENT WITHOUT ACCESS TO INTERNET
Very Low Need	\$258,771	\$1,175	\$42,666	8%	9%
Low Need	\$141,644	\$891	\$38,182	10%	15%
Moderate Need	\$97,126	\$781	\$33,719	16%	20%
High Need	\$66,118	\$727	\$27,706	27%	26%
Extreme Need	\$57,633	\$644	\$22,024	46%	34%

Source: Calculations based on data from 2014–2018 ACS estimates and outcome data from the Opportunity Atlas.<sup>27</sup>

Allegheny County census tracts can also be compared based on the degree of economic mobility that they offer to lower-income children across one generation to the next, by cross-referencing outcome data from the Opportunity Atlas with the CNI. The Opportunity Atlas pulls data for household income rank for adults who were born to low-income families (i.e., those born to parents at the 25th percentile of the income distribution from 1978 through 1983), for every census tract in the United States.

Average household income rank by tract for those born to low-income families from 1978 through 1983 is strongly correlated to our CNI by tract ( $R = .78, p < .01$ ). In very low need tracts, children raised by low-income families go on to earn an average of \$42,666 as adults, assuming outcomes at the tract level remain relatively constant, as seen in **Table 6**. In extreme-need tracts, however, these same types of children go on to earn an average of just \$22,024 as adults, assuming outcomes at the tract level remain relatively constant. Poor children raised in the very-low-need tracts thus make nearly twice as much money in adulthood on average as similarly poor children who are raised in the extreme-need tracts.

<sup>24</sup> ACS 2018 5-year estimates Table B25077.

<sup>25</sup> ACS 2018 5-year estimates Table B25044.

<sup>26</sup> ACS 2018 5-year estimates Table B28002.

<sup>27</sup> For the purpose of this table, we averaged average household income rank by level of need. Based on data from [www.opportunityatlas.org](http://www.opportunityatlas.org)

This disparity in adult earnings supports the finding from the Opportunity Atlas that children who grow up in needier communities face greater barriers to upward economic mobility, even when holding equal their childhood household income.<sup>28</sup> Poor children who grow up in less needy communities have access to advantages and opportunities for advancement that children in needier communities do not. Perhaps even more important is that low-income children who grow up in lower-need communities do not tend to face the same structural challenges and disadvantages that low-income children in higher-need communities tend to face, such as concentrated poverty, disproportionate community trauma such as gun violence and police violence, and exposure to toxins such as lead.

The urban areas of Allegheny County have different community need profiles from those of the suburban areas. **Table 7** compares the distribution of need between suburban census tracts and urban tracts. Urban tracts are defined as those within the City of Pittsburgh, City of Duquesne, City of McKeesport and City of Clairton, while suburban tracts are those outside of said second- and third-class cities in Allegheny County. The proportion of extreme-need tracts in urban areas is nearly seven times as large as in suburban tracts, and the proportion of high-need tracts in urban areas is roughly three and a half times as large as in suburban tracts. Need is much more heavily concentrated in our cities but is also heavily concentrated in our suburbs in the Monongahela River Valley and those to the west of Pittsburgh in McKees Rocks and Stowe.

**TABLE 7: Comparison of Need Between Suburban and Urban Tracts, 2014–2018**

LEVEL OF NEED	# OF SUBURBAN CENSUS TRACTS	% OF SUBURBAN CENSUS TRACTS	# OF URBAN CENSUS TRACTS	% OF URBAN CENSUS TRACTS
Very Low Need	83	33%	27	19%
Low Need	94	38%	32	23%
Moderate Need	49	20%	23	17%
High Need	16	6%	29	21%
Extreme Need	8	3%	28	20%
Total	250	100%	139	100%

Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES.

<sup>28</sup> Chetty, R. et al. (2018).

### Changes in level of need between 2013 five-year estimates and 2018 five-year estimates

Certain communities in Allegheny County have experienced notable changes in their level of need in recent years, while others have maintained the same level of need. To examine how each census tract’s level of need has changed, we calculated each tract’s CNI score using 2009–2013 ACS data and 911 dispatch data via ACES. This enables a comparison of the tract’s level of need between 2013 five-year estimates and 2018 five-year estimates. **Table 8** presents counts of census tracts according to their change in level of need between 2013 five-year estimates and 2018 five-year estimates.

**TABLE 8: Changes in Levels of Community Need, 2013 Five-Year Estimates to 2018 Five-Year Estimates**

CHANGE IN NEED FROM 2009–2013 CNI AND 2014–2018 CNI	SUMMARY OF CATEGORY CONDITIONS	# OF TRACTS THAT MET CONDITION	% TRACTS
Rapidly Emerging Need	At least 2 levels up from very low or low need	2	1%
Emerging Need	1 level up from low need	22	6%
Deepening Need	At least 1 level up from moderate or high need	33	8%
Consistent Level of Need	Same level of need over each 5-year period	260	67%
Lessening Need	1 level down from extreme, high or moderate need	30	8%
Rapidly Lessening Need	At least 2 levels down from extreme, high or moderate need	3	1%
N/A	1 level down from low need or 1 level up from very low need	39	10%

Source: Calculations based on data from 2009–2013 ACS estimates, 2014–2018 ACS estimates, 2011–2013 911 dispatches via ACES and 2014–2018 911 dispatches via ACES.

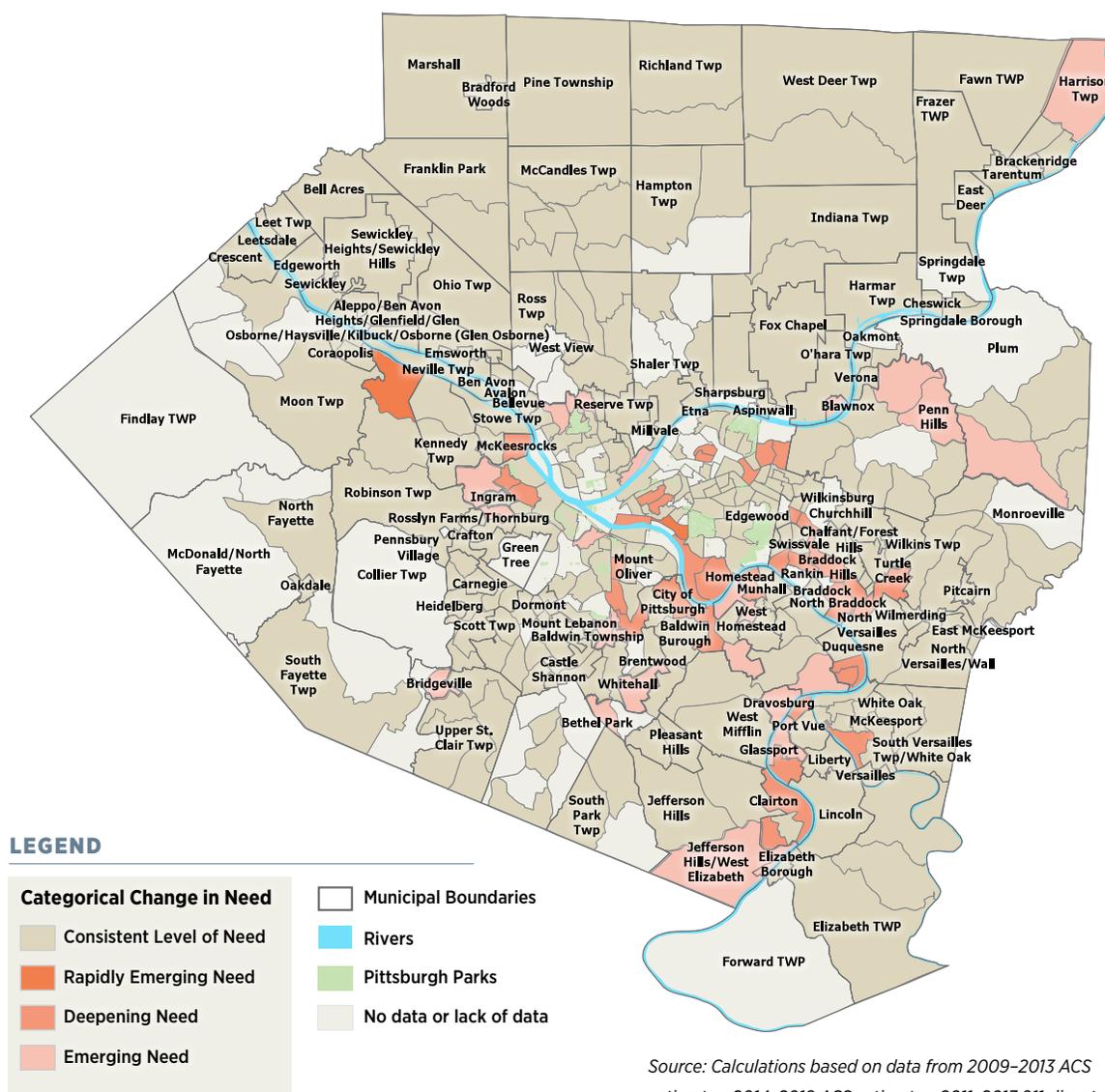
Note: The table includes 39 tracts whose change in need between 2013 and 2018 five-year estimates was not classified. These 39 tracts went from very low to low need, or from low to very low need between 2013 five-year estimates and 2018 five-year estimates. Given such marginal change in these lower-need communities, we did not feel the need to classify these tracts.

Two-thirds of census tracts (n=260) did not change regarding measures of relative need when comparing 2009–2013 CNI levels to 2014–2018 CNI levels. As such, consistent level of need in our communities tends to be the rule, not the exception. More so, 86% (n=129) of tracts that were either moderate, high or extreme need as of the 2009–2013 CNI were still either moderate, high or extreme need as of the 2014–2018 CNI, and 89% (n=64) of those originally classified as high or extreme need were still high or extreme need as of the 2014–2018 CNI. This finding holds with national research showing that most poorer communities tend to stay poor and is concerning given the causal connection to higher levels of need and adverse outcomes for vulnerable children and families who live there.<sup>29</sup>

<sup>29</sup> Cortright, J. (2014), September 12. “Lost in Place.” City Reports. Retrieved from [here](#).

While consistent levels of relative need are the rule, several tracts did experience significant changes in need. Two communities experienced a rapidly emerging level of need, having moved up at least two levels of need over the observed period. These are the South Oakland neighborhood in Pittsburgh and the northern section of Robinson Township. Another 22 tracts (6% of total tracts and 16% of tracts that were initially low need) are classified as having emerging need, while 33 tracts (8% of total tracts and 26% of tracts that were initially moderate or high need) are classified as having deepening need. **Figure 3** details these increases in relative need. Overall, tracts that changed on measures of relative need were more likely to increase in their level of need rather than decrease.

**FIGURE 3: Communities with Increasing Need in Allegheny County, 2013–2018**



Source: Calculations based on data from 2009–2013 ACS estimates, 2014–2018 ACS estimates, 2011–2013 911 dispatches via ACES and 2014–2018 911 dispatches via ACES.

Note: Refer to **Table 8** for categorical definitions.

While decreases in relative need were less likely than increases, several tracts saw significant declines in need. Three communities in Allegheny County experienced a rapidly lessening level of need, all within the City of Pittsburgh. These tracts are: Downtown Pittsburgh, the Woods Run section of Marshall-Shadeland, and the section of Bloomfield that contains West Penn Hospital. It is important to note that tracts in Downtown and Pittsburgh's Bloomfield neighborhood have been identified as those that have gentrified per national research on gentrification and displacement by the National Community Reinvestment Coalition (NCRC), with Downtown also cited as having experienced significant Black displacement from 2000 to 2013.<sup>30</sup> Marshall-Shadeland was not identified as a tract that gentrified. Lower levels of need are not beneficial to long-term, vulnerable residents if they are displaced. As such, efforts to protect vulnerable residents from displacement due to gentrification are vital.

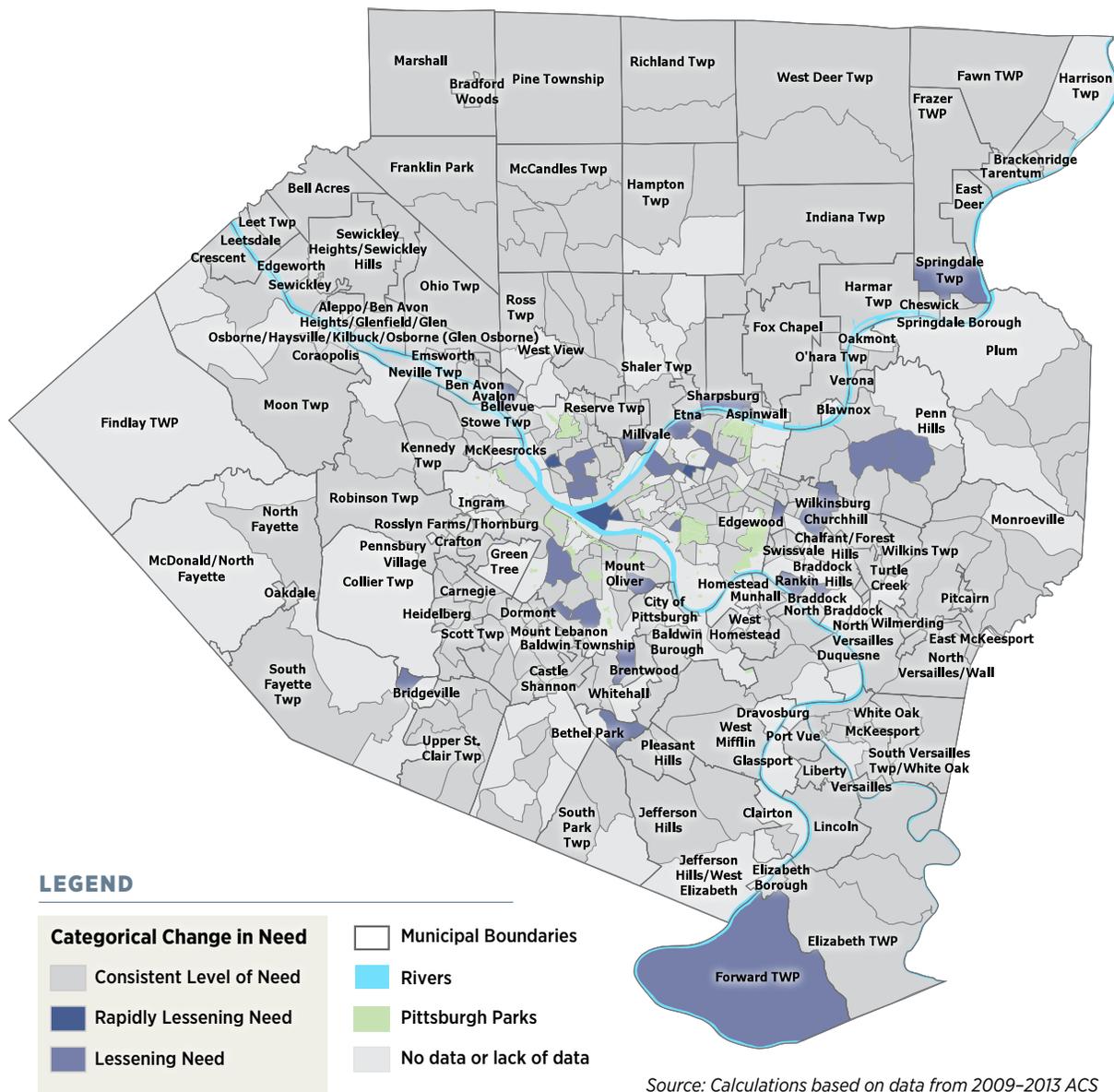
Other tracts saw more modest declines in need. Thirty tracts (8% of total tracts and 20% of tracts that were initially extreme, high or moderate need) have lessened in need by moving down one level from extreme, high or moderate need. A number of tracts identified as those experiencing lessening need have also been cited by NCRC as having experienced gentrification and/or displacement, while most tracts with lessening need were not identified as having experienced gentrification. This suggests that lessening need is not always connected to gentrification and so other factors may be at play. A replication of NCRC's study from 2000 to 2019 found results similar to those of the original NCRC study, although the author recognized that the demolition of public housing was likely a confounding factor in some gentrified neighborhoods.<sup>31</sup> Tracts that A) experienced lessening need and B) were identified as having experienced gentrification and/or displacement per the replication study are those in the Lawrenceville neighborhoods, Central Northside (the Mexican War Streets), Garfield and East Liberty, while all other tracts with lessening need did not gentrify and so other factors may be at play. **Figure 4** details decreases in need.

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<sup>30</sup> Jason Richardson, Bruce Mitchell and Juan Franco. March 2019. Shifting Neighborhoods. NCRC.

<sup>31</sup> The Pittsburgh Neighborhood Project replicated NCRC's study on gentrification and displacement but did so over a longer period and examined economic displacement in addition to racial displacement. The interactive map detailing the analysis and results can be accessed [here](#).

FIGURE 4: Communities with Lessening Need in Allegheny County, 2013–2018



Source: Calculations based on data from 2009–2013 ACS estimates, 2014–2018 ACS estimates, 2011–2013 911 dispatches via ACES and 2014–2018 911 dispatches via ACES.

Note: Refer to Table 8 for categorical definitions.

**Table 9** provides a closer look at the tracts with the largest positive and negative changes in need between 2013 and 2018 five-year estimates. The data reveal that the substantial changes in need in these five tracts have been driven by varying factors. For example, the rapidly emerging need in South Oakland has been characterized by a large increase in single motherhood, while the growing need in Robinson Township has been led by an increase in poverty, single motherhood and male unemployment. The rapidly lessening need in Marshall-Shadeland has been led by a large decline in male unemployment and has occurred despite an apparent increase in reporting of gun violence. The lessening need in Downtown Pittsburgh and Bloomfield have been marked by significant changes across multiple indicators. It should be noted that significant changes in need by indicator could also be due to margin of error in ACS estimates.

**TABLE 9: Changes in CNI Measures Among Tracts with Largest Changes in Need between 2013 Five-Year Estimates and 2018 Five-Year Estimates**

COMMUNITY	CHANGE IN NEED	CHANGE IN POVERTY RATE (PERCENTAGE POINTS)	CHANGE IN NO BACHELOR'S RATE (PERCENTAGE POINTS)	CHANGE IN ADULT MALE UNEMPLOYMENT RATE (PERCENTAGE POINTS)	CHANGE IN SINGLE MOTHER RATE (PERCENTAGE POINTS)	CHANGE IN GUNSHOT DISPATCHES PER 500
South Oakland	Rapidly emerging need	+18%	-5%	+9%	+30%	+0.03
Northern section of Robinson Township	Rapidly emerging need	+7%	-1%	+10%	+8%	+0.26
Woods Run section of Marshall-Shadeland	Rapidly lessening need	-20%	-15%	-41%	-21%	+2.79
Downtown Pittsburgh	Rapidly lessening need	+4%	-29%	-39%	+1%	+0.06
Section of Bloomfield containing West Penn Hospital	Rapidly lessening need	-24%	-29%	-13%	-8%	-0.32

Source: Calculations based on data from 2009–2013 ACS estimates, 2014–2018 ACS estimates, 2011–2013 911 dispatches via ACES and 2014–2018 911 dispatches via ACES.

### Racial dimensions of community need

We examined community need by racial and ethnic composition because the communities we reside in, and the advantages, resources and opportunity they provide, or lack thereof, cannot be separated from the effects of systemic, institutional and interpersonal racism. There is a strong positive relationship between a census tract’s percentage of Black residents and its level of community need ( $R = .84, p < .01$ ). To the contrary, there is a strong inverse relationship between a census tract’s percentage of White residents and its level of community

need ( $R = -.8, p < .01$ ). In other words, tracts with higher proportions of Black residents tend to be higher in community need and tracts with high proportions of White residents tend to be lower in community need, with exceptions. The percentage of Asian residents and the percentage of Latino residents did not predict level of need in Allegheny County tracts.<sup>32</sup>

Only 14 tracts in the County had both a low percentage of Black residents (below 25%) and a high level of need, such as Pittsburgh's Spring Hill, South Oakland and Carrick neighborhoods and tracts in municipalities such as McKees Rocks, Stowe and Clairton. On the other hand, nearly every majority-Black tract (51% or more) had a high or extreme level of need. Only one tract in the County had a Black majority and a low level of need. This tract is in Pittsburgh's Stanton Heights neighborhood.

The concentration of Black residents in higher-need areas of Allegheny County is largely a product of racist housing and lending practices that were sanctioned by federal, state and local governments until the late 1960s, as is the concentration of White residents in lower-need communities.<sup>33,34</sup> Local governments have used exclusionary land-use practices to insulate property values and inhibit minority access to public goods since the early 20th century. These practices have resulted in segregation within and between cities by race and class.<sup>35</sup>

Deindustrialization and economic restructuring have also had a disproportionate impact on Black people. These economic trends have been exacerbated by White flight and outmigration, yielding even greater concentrations of Black people in poor communities and the continuing concentration of White people in middle- and upper-income communities.<sup>36</sup> Urban renewal policies like the construction of the Civic Arena displaced thousands of Black families from the Lower Hill District, and White families fled Homewood as displaced Black families settled in the neighborhood — an event that highlights the role of both urban renewal and White flight in contributing to current patterns of racial and economic segregation.<sup>37,38</sup>

The war on drugs devastated Black communities<sup>39</sup> and research shows that police violence is linked with decreases in GPA, increased incidence of emotional disturbance, and lower rates of high school completion and college enrollment.<sup>40</sup> And poor Black communities are disproportionately impacted by gun violence,<sup>41</sup> with exposure to gun violence linked to poor academic outcomes and poor mental health outcomes.<sup>42,43</sup>

<sup>32</sup> ACS 2018 5-Year estimates Table DP05. Racial data used in correlation analysis was for individuals. White, Asian and Black population data for individuals does not include those who identified as Hispanic or Latino. Those who identified as Hispanic or Latino were counted and analyzed separately.

<sup>33</sup> Rothstein, R. (2018).

<sup>34</sup> Rutan, D.Q. and Glass, M.R. 2018. "The lingering effects of neighborhood appraisal: Evaluating redlining's legacy in Pittsburgh," *The Professional Geographer*, 70(3), 339-349.

<sup>35</sup> Trounstein, J. (2018).

<sup>36</sup> Wilson, W. (2012).

<sup>37</sup> Rutan, D. (2017, May 17). "How housing policy over the last century has made Pittsburgh what it is today." *Public Source*.

<sup>38</sup> Blackley, K. (2019, July 15). "Homewood Bound: How a Neighborhood Was Transformed by Disinvestment and the War on Drugs." *WESA Pittsburgh's NPR News Station*.

<sup>39</sup> Alexander, M. (2010).

<sup>40</sup> Ang, D. (2021, February). "The Effects of Police Violence on Inner-City Students." *The Quarterly Journal of Economics*, 136(1).

<sup>41</sup> Cotter, N. (2019). "Black communities are disproportionately hurt by gun violence. We can't ignore them." *Public Source*.

<sup>42</sup> Sharkey, P. (2010).

<sup>43</sup> Smith, M. (2020).

The forces of racial segregation by race and class continue today. Research shows that Black home buyers are still steered toward economically disadvantaged neighborhoods.<sup>44</sup> Various studies conducted by the Urban Institute have found that Black households face discrimination when trying to rent or buy a home and are more likely to receive a subprime loan than lower-qualified White households. Black households are also shown fewer apartments and homes than equally qualified White households. These findings persist despite the passage of the 1968 Fair Housing Act, which sought to prevent such unequal treatment.<sup>45</sup> One national study found that roughly two-thirds of Black children lived in areas of concentrated poverty in the decades before and after the passage of the Fair Housing Act, compared with only 1% of White children over both periods.<sup>46</sup>

Prior research from DHS shows that there are deep racial disparities between where Black families in the housing choice voucher program tend to move versus White families, with most Black families in the housing choice voucher program moving to tracts with the highest comparative levels of need and disadvantage. This remained true even when accounting for factors like income, household makeup and gender.<sup>47</sup> And research from Opportunity Insights shows that segregated moving patterns among voucher holders are primarily the result of barriers in the housing search process, not preference. When consenting voucher holders were given the assistance they needed to move to low-poverty census tracts, they were significantly more likely to do so than those who did not receive assistance.<sup>48</sup>

<sup>44</sup> Christensen, P. and Timmins, C. (2018, July). "Sorting or Steering: Experimental Evidence on the Economics Effects of Housing Discrimination." National Bureau of Economic Research.

<sup>45</sup> Exposing Housing Discrimination. n.d. Urban Institute. Retrieved from [here](#).

<sup>46</sup> Sharkey, P. 2013: 27. Sharkey defined areas of concentrated poverty as neighborhoods with at least 20% of their population below the federal poverty line.

<sup>47</sup> Cotter, N.; Halfhill, A.; Collins, K.; and Dalton, E. (2020, March). Moving to Opportunity or Disadvantage? An Analysis of Housing Choice Voucher and Rapid Rehousing Programs in Allegheny County. Allegheny Analytics.

<sup>48</sup> Bergman, P.; Chetty, R.; Deluca, S.; Hendren, N.; Katz, L.; and Palmer, C. 2019. "Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice." National Bureau of Economic Research.

The connection between systemic racism and need is clear in the data. By far, Black people in Allegheny County are the most heavily concentrated in our high- and extreme-need communities (53% or n=195,205) and the least concentrated in our low- or very-low-need communities (27% or n=42,135). Virtually every other listed racial and ethnic group/subgroup categorized by the American Community Survey has a population that is primarily located in our low- or very-low-need tracts, except for Black residents in Allegheny County. See **Tables 10 and 11** for details.

**TABLE 10: Tract Level of Need by Race and Ethnicity, for Hispanic or Latino, White, Black and Native Individuals**

LEVEL OF NEED	TOTAL POPULATION IN ALLEGHENY COUNTY	HISPANIC OR LATINO					NON-HISPANIC WHITE	NON-HISPANIC BLACK	AMERICAN INDIAN OR ALASKAN NATIVE
		ALL HISPANIC OR LATINO	MEXICAN	PUERTO RICAN	CUBAN	OTHER HISPANIC OR LATINO			
Very Low or Low Need	70%	66%	66%	58%	57%	74%	76%	27%	68%
Moderate Need	16%	15%	14%	19%	29%	12%	16%	20%	17%
High or Extreme Need	14%	18%	20%	23%	14%	14%	8%	53%	16%
Population Total	1,220,195	25,760	7,352	6,641	1,455	1,0312	958,492	154,304	1,023

Source: ACS 2019 5-Year Estimates Table DP05.

Note: Where possible, we included all listed racial/ethnic subgroups in the race and need analysis, via the Census. Because of broad categorizations such as Asian or Latino, the table may not reflect the realities of various ethnic identities that are categorized as Asian or Latino. While we were able to include a variety of ethnic identities in the table above, "Other Hispanic or Latino" is a broad category under the U.S Census and may not reflect the realities or identities of various subgroups.

**TABLE 11: Tract Level of Need by Race and Ethnicity, for Asian Individuals**

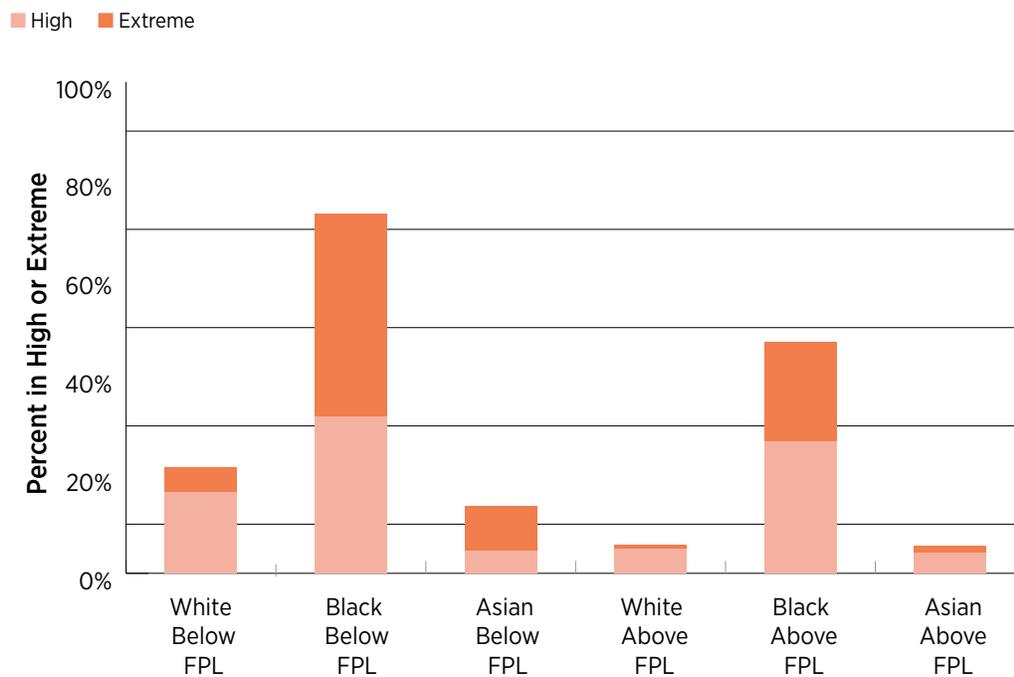
LEVEL OF NEED	TOTAL POPULATION IN ALLEGHENY COUNTY	ASIAN								NATIVE HAWAIIAN OR PI*
		ALL ASIAN	ASIAN INDIAN	ASIAN CHINESE	ASIAN FILIPINO	ASIAN JAPANESE	ASIAN KOREAN	ASIAN VIETNAMESE	ASIAN OTHER	
Very Low or Low Need	70%	84%	91%	87%	70%	88%	91%	77%	66%	56%
Moderate Need	16%	9%	4%	6%	11%	6%	4%	8%	24%	3%
High or Extreme Need	14%	7%	5%	7%	19%	5%	5%	15%	10%	41%
Population Total	1,220,195	45,363	16,232	13,027	2,195	1,081	3,148	1,970	7,710	253

Source: ACS 2019 5-Year Estimates Table DP05.

Note: Where possible, we included all listed racial/ethnic subgroups in the race and need analysis, via the Census. Because of broad categorizations such as Asian or Latino, the table may not reflect the realities of various ethnic identities that are categorized as Asian or Latino. While we were able to include a variety of ethnic identities in the table above, "Asian Other" is a broad category under the U.S Census and may not reflect the realities or identities of various subgroups. Additionally, percentages under Native Hawaiian or Pacific Islander should be interpreted with caution because the total population in AC is less than 300 people.

Racial differences are even more stark when examined at the intersection of race and income for families. As seen in **Figure 5**, a staggering 73% (n=6,600) of Black families below the federal poverty line (FPL) live in high- or extreme-need tracts, compared with only 22% (n=2,715) of White families below the FPL and 14% (n=125) of Asian families below the FPL. Forty-seven percent (n=11,874) of Black families above the FPL reside in high- or extreme-need areas, compared with only 6% (n=14,026) of White families above the FPL and 6% (n=491) of Asian families above the FPL.

**FIGURE 5: Percent of Families Living in High- or Extreme-Need Tracts, by the Family’s Race and Poverty Level**

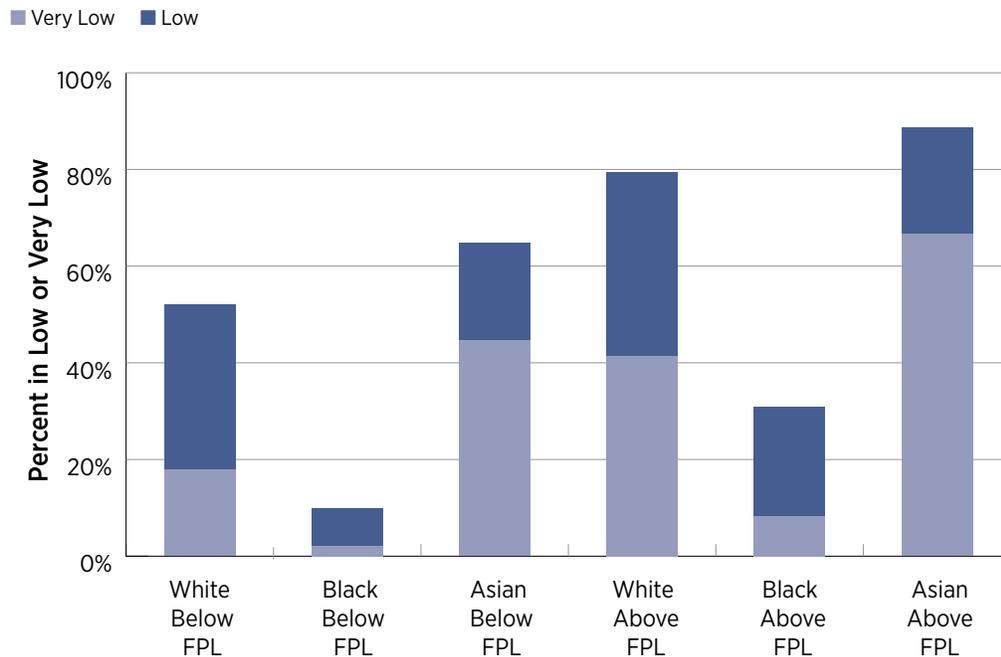


Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES. Population estimates for families by race and poverty status are from ACS 2018 5-year estimates via table S1702.

Note: White, Black and Asian population data for families by poverty status include those who identify as Hispanic or Latino. Hispanic or Latino families were not counted separately in this analysis due to data limitations.

On the opposite end of the spectrum, **Figure 6** shows that the majority (52% or n=6,533) of poor White families and the majority of poor Asian families (65% or n=594) reside in low- or very-low-need tracts, compared with only 10% (n=892) of Black families below the FPL. The vast majority (79% or n=191,303) of non-poor White families and non-poor Asian families (89% or n=7,724) live in low- or very-low-need tracts, compared with 31% (n=7,798) of Black families above the FPL.<sup>49,50</sup>

**FIGURE 6: Percent of Families Living in Low- or Very-Low-Need Tracts, by the Family’s Race and Poverty Level**



Source: Calculations based on data from 2014–2018 ACS estimates and 2014–2018 911 dispatches via ACES. Population estimates for families by race and poverty status are from ACS 2018 5-year estimates via table S1702.

Note: White, Black, and Asian population data for families by poverty status include those who identify as Hispanic or Latino. Hispanic or Latino families were not counted separately in this analysis due to data limitations.

Observationally, while income matters regarding which sort of tracts families within the same racial group live, family income alone does not appear to explain differences across racial groups, and the data reveal disparities in how this plays out by race. Black families are disproportionately likely to live in higher-need communities, whether they are above or below the federal poverty line. For example, Black families above the poverty line

<sup>49</sup> ACS 2018 5-Year estimates Table S1702. White, Black and Asian population data for families by poverty status include those who identify as Hispanic or Latino. Hispanic or Latino families were not counted separately in this analysis due to data limitations.

<sup>50</sup> “Asian” is a broad category under the U.S census and may not reflect the realities or identities of various Asian subgroups.

are still four times as likely as White families below the FPL and twice as likely as Asian families below the FPL to live in extreme-need tracts, as seen in **Figure 5**. Likewise, **Figure 6** shows that Black families above the FPL are two times less likely than White families below the FPL and six times less likely than Asian families below the FPL to live in very-low-need tracts.<sup>51</sup>

Finally, using the dissimilarity index method to measure segregation between the number of Black versus White residents per tract in Allegheny County,<sup>52</sup> 63% of Black people would need to move to have equal proportions of Black and White people per census tract in Allegheny County. The connection between race, place and need in Allegheny County is even more challenging when considering the strong persistence of racial segregation over long stretches of time. Whether measured between adjacent decades or across non-adjacent decades between 1980 and 2018 five-year estimates, percent Black at the tract level remained strongly correlated between one decade and another over time in Allegheny County (**Table 12**).

**TABLE 12: Correlation Matrix Measuring the Relationship between Percent Black by Tract in Allegheny County over Time, from 1980 to 2018 Five-Year Estimates**

CORRELATION MATRIX FOR ALLEGHENY COUNTY CENSUS TRACTS, BY PERCENT BLACK AND YEAR	% BLACK BY TRACT 1980	% BLACK BY TRACT 1990	% BLACK BY TRACT 2000	% BLACK BY TRACT 2010	% BLACK BY TRACT 2014-2018
% Black by tract 1980	1				
% Black by tract 1990	0.98	1			
% Black by tract 2000	0.93	0.98	1		
% Black by tract 2010	0.87	0.91	0.97	1	
% Black by tract 2014-2018	0.82	0.86	0.92	0.97	1

Source: Data from Longitudinal Tract Data Base (LTDB).

Note: The LTDB is housed at Brown University and allows researchers to measure demographic change at the census tract level over time by holding tract-level boundaries constant, which is necessary given that census tract boundaries can change from decade to decade. LTDB uses public data from 1970 to the present to create estimates within 2010 tract boundaries. The LTDB can be found [here](#). The correlation matrix presents values for R across adjacent and non-adjacent decades where R is the strength of the relationship between percent Black by tract in one decade and another (between -1 and 1).

Persistent racial segregation and its connection to higher levels of need is the norm in Allegheny County, not the exception. It is important to note that our White communities tend to be just as segregated but have been able to maintain wealth, resources and systemic advantages as the result of intentional racism and exclusion, the negative consequences of which have been profound on our Black communities.<sup>53,54</sup>

<sup>51</sup> ACS 2018 5-Year estimates Table S1702. White, Black and Asian population data for families by poverty status include those who identify as Hispanic or Latino. Hispanic or Latino families were not counted separately in this analysis due to data limitations.

<sup>52</sup> Source: Dissimilarity index method used with individual population data from ACS 2018 5-year estimates via table DP05.

<sup>53</sup> Zuberi, A.; Duck, W.; Hopkinson, R.; and Gradeck, B. (2015). "Neighborhoods, Race, and Health: Examining the Relationship Between Neighborhood Distress and Birth Outcomes in Pittsburgh." *Journal of Urban Affairs*.

<sup>54</sup> Teixeira, T. and Zuberi, A. (2016). "Mapping the Racial Inequality in Place: Using Youth Perceptions to Identify Unequal Exposure to Neighborhood Environmental Hazards." *International Journal of Environmental Research and Public Health*.

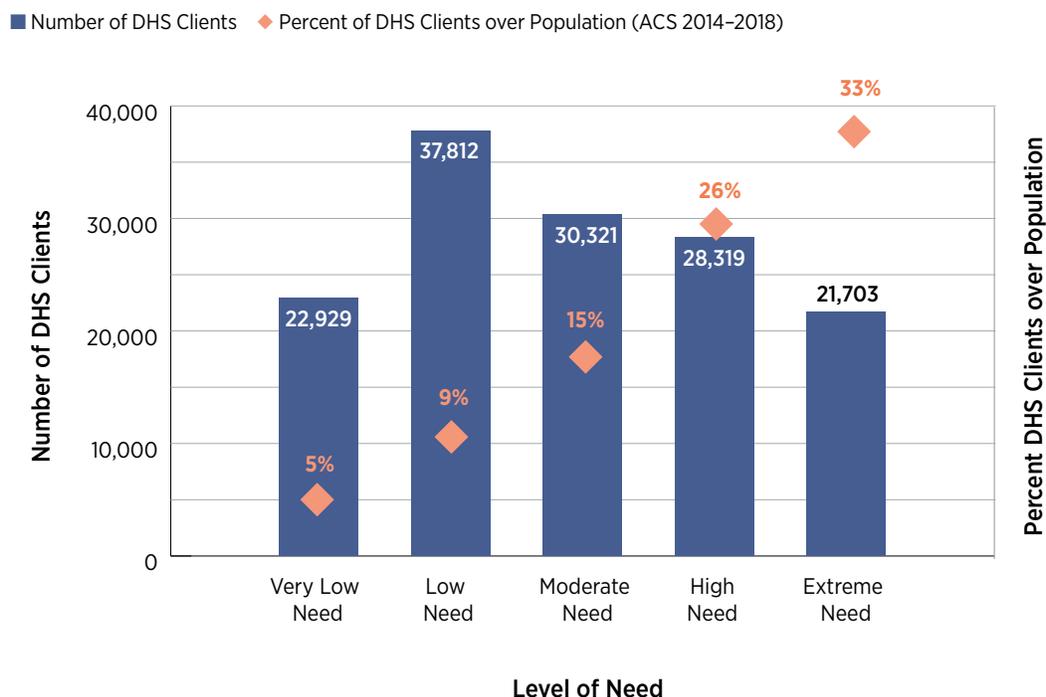
### Population receiving DHS services

To understand more about communities' need levels and their access to human services and supports, we explored residents' usage of services by need level in their communities. DHS provides a wide range of services, including services for older adults; mental health services (including 24-hour crisis counseling); drug and alcohol services; child protective services; at-risk child development and education; emergency shelters and housing for the homeless; non-emergency medical transportation; and referrals for supports coordination for individuals with a diagnosis of intellectual disability.

DHS served 154,577 clients in 2018, which is 12% of Allegheny County's population, or 1 out of every 8 residents. These individuals are County residents who were served directly by DHS or through contracted providers. DHS had a valid address for about 91% of them, or 141,084 clients. This section focuses on the service usage of the subset of clients for whom we have addresses, unless otherwise noted.

While approximately 12% of County residents were served by DHS, a higher proportion of residents in high-need communities received DHS services. In other words, as the need level of a community increases, the proportion of clients served by DHS also increases. For example, in tracts with extreme need, the percentage of people receiving DHS services is 33%, which is almost three times the average; in very-low-need tracts, the percentage of people who are DHS clients is 5%, less than half the average (**Figure 7**).

**FIGURE 7: Clients Served by DHS in 2018, by Community Level of Need (N=141,084)**



Source: Calculations based on data from 2014-2018 ACS estimates, 2014-2018 911 dispatches via ACES, and Allegheny County Data Warehouse.

Looking at tracts in specific levels of need, we find that the percentage of residents involved with DHS varies by tract. The census tracts with the highest and lowest service utilization rates for each level of need are shown in **Table 13** (City of Pittsburgh tracts) and **Table 14** (outside the City of Pittsburgh). Tracts with high levels of need and relatively low client service usage rates (bottom right of the table) indicate areas where there may be gaps in service availability or outreach. For example, Bluff (Uptown), a City of Pittsburgh tract categorized as extreme need, has the lowest service usage of all the tracts in that need level (10% of clients utilizing services). Outside of Pittsburgh, a tract in McKeesport is similar in that it has extreme need, but only 22% of its residents receive DHS services. On the other end of the spectrum is Terrace Village, an extreme-need Pittsburgh community where most residents are involved with DHS.<sup>55</sup>

The Bluff (Uptown) may appear underserved, but the gap between extreme need and service utilization may be due to the presence of the Allegheny County Jail, which would inflate need for the general population outside of the jail. Likewise, the Oakland neighborhoods may have inflated need due to the high concentration of students, although we tried to address this issue via our CNI methodology. Alternatively, both the Bluff and the Oakland neighborhoods may have real need, but students may be receiving services through their educational institutions rather than from the Department of Human Services.

**TABLE 13: City of Pittsburgh Census Tracts by CNI Level of Need and Percent of Population Served by DHS**

	CITY AREA WITH HIGHEST PERCENT OF POPULATION SERVED BY DHS, 2018	PCT. OF POPULATION SERVED BY DHS	CITY AREA WITH LOWEST PERCENT OF POPULATION SERVED BY DHS, 2018	PCT. OF POPULATION SERVED BY DHS
Very low Need	Downtown – 0201	13% <sup>56</sup>	North Oakland – 9822	0.28%
Low Need	Perry North – 2607	20%	Central Oakland – 0406	3%
Moderate Need	Marshall-Shadeland (Woods Run) – 2704	25%	Central Oakland – 0405	3%
High Need	Esplen/Sheraden – 5625	39%	South Oakland – 0409	9%
Extreme Need	Terrace Village – 0511	100%	Bluff (Uptown) – 0103	10%

Source: Calculations based on data from 2014–2018 ACS estimates, 2014–2018 911 dispatches via ACES and Allegheny County Data Warehouse.

<sup>55</sup> The number of individuals served by DHS was higher than the population estimate for tract 511 in Terrace Village. As a consequence, we made the service utilization rate 100% in tract 511, even though 100% of residents in tract 511 may not be served by DHS. This discrepancy is a limitation of our address analysis method for this report and margins

of error around ACS population estimates. Our address method analyzed the most common address for a DHS resident, not a time-specific, verified current address. As a result, there are likely people with a Terrace Village address who no longer live there, but we used their address because it was their most common address in our Data Warehouse.

<sup>56</sup> The relatively high rate of service usage in the downtown tract may be in part related to individuals experiencing homelessness or unstable housing using a P.O. box or other downtown location as their address.

**TABLE 14: Allegheny County Census Tracts (Minus the City of Pittsburgh) by CNI Level of Need and Percent of Population Served by DHS**

LEVEL OF NEED 2014-2018	NON-PITTSBURGH AREA WITH HIGHEST PERCENT OF POPULATION SERVED BY DHS, 2018	PCT. OF POPULATION SERVED BY DHS	NON-PITTSBURGH AREA WITH LOWEST PERCENT OF POPULATION SERVED BY DHS, 2018	PCT. OF POPULATION SERVED BY DHS
Very low Need	Ross Twp - 4296	9%	Edgeworth - 4460	1%
Low Need	Baldwin Burrough - 4801.01	18%	Pennsbury Village - 4592.02	2%
Moderate Need	Pitcairn - 5220	24%	Jefferson Hills/West Elizabeth - 5645	7%
High Need	Clairton - 4928	41%	Swissvale - 5151	20%
Extreme Need	Wilkinsburg - 5606	48%	McKeesport - 5521	22%

Source: Calculations based on data from 2014-2018 ACS estimates, 2014-2018 911 dispatches via ACES and Allegheny County Data Warehouse.

Table 15 shows the 25 percent of communities with the lowest rates of residents receiving DHS services in Extreme Need areas. In order to get a sense of the needs of these communities, the table includes the metrics of the community need index that are higher than average for that particular need level. Four out of the nine communities in Table 15 have (1) higher than average family poverty rates, (2) higher than average rate of adults without a bachelor’s degree and (3) higher-than-average adult male unemployment. The gunshot dispatches rate is higher than average in three out of the nine communities, and the rate of households led by single mothers is higher than average in two out of the nine communities.

**TABLE 15: Underserved Communities in Extreme Need Areas: Communities Where the Percent of Population Served Is within the First Quartile (within the 25% with a Lower Proportion Served)**

AREA WITH LOWEST PERCENT OF POPULATION SERVED BY DHS, 2018	CENSUS TRACT	PCT. OF POPULATION SERVED BY DHS	INDICATORS HIGHER THAN AVERAGE OF EXTREME NEED COMMUNITIES	TOTAL POPULATION (2010)
Bluff (Uptown)	0103	10%	Family Poverty Rate Single Mothers Rate	1,159
Terrace Village	0510	19%	Family Poverty Rate No bachelor’s rate Adult male unemployment rate	6,668
Lincoln-Lemington-Belmar	1203	22%	Gunshot dispatches rate	2,139
McKeesport	5521	22%	Adult male unemployment rate Gunshot dispatches rate	1,492
Lincoln-Lemington-Belmar	5619	23%		1,076
Fineview	2509	26%	Single Mothers Rate No bachelor’s rate	1,755
Homewood North	1302	28%	Family Poverty Rate No bachelor’s rate Adult male unemployment rate	1,661
Garfield	1016	28%	Family Poverty Rate No bachelor’s rate Gunshot dispatches rate	993
Wilkinsburg	5611	29%	Adult male unemployment rate	2,541

Source: Calculations based on data from 2014-2018 ACS estimates, 2014-2018 911 dispatches via ACES and Allegheny County Data Warehouse.

**Table 16** displays the 10 communities with the highest proportion of clients served. These 10 communities make up 4% of all DHS clients served, while the population of these communities is 1% of the county’s population. All of these communities are in high or extreme need areas, indicating that services are being provided in areas where help is needed.

**TABLE 16: Ten communities with highest proportion of clients served**

AREA WITH HIGHEST PERCENT OF POPULATION SERVED BY DHS, 2018	CENSUS TRACT	MUNICIPALITY	LEVEL OF NEED	N. DHS CLIENTS	PCT. OF POPULATION SERVED BY DHS
Terrace Village	0511	City of Pittsburgh	Extreme Need	232	100%
Northview Heights	2609	City of Pittsburgh	Extreme Need	877	64%
Larimer	1208	City of Pittsburgh	Extreme Need	382	49%
Homewood South	1303	City of Pittsburgh	Extreme Need	562	49%
Wilksburg	5606	Wilksburg	Extreme Need	416	48%
Braddock	5138	Braddock	Extreme Need	821	47%
Homewood North	1301	City of Pittsburgh	Extreme Need	757	47%
Bedford Dwellings	0509	City of Pittsburgh	Extreme Need	587	45%
Homewood South	1304	City of Pittsburgh	Extreme Need	443	45%
Duquesne	4868	Duquesne	Extreme Need	671	44%

Source: Calculations based on data from 2014–2018 ACS estimates, 2014–2018 911 dispatches via ACES and Allegheny County Data Warehouse.

We also explored percentage of residents who received DHS services by census tract in relation to changing levels of community need. **Figure 8** compares the average rate of DHS client usage by changing community need. Tracts are grouped by their 2018 need level, with colored bars representing changing needs within that need level. The red line shows the average usage rate for each need level.

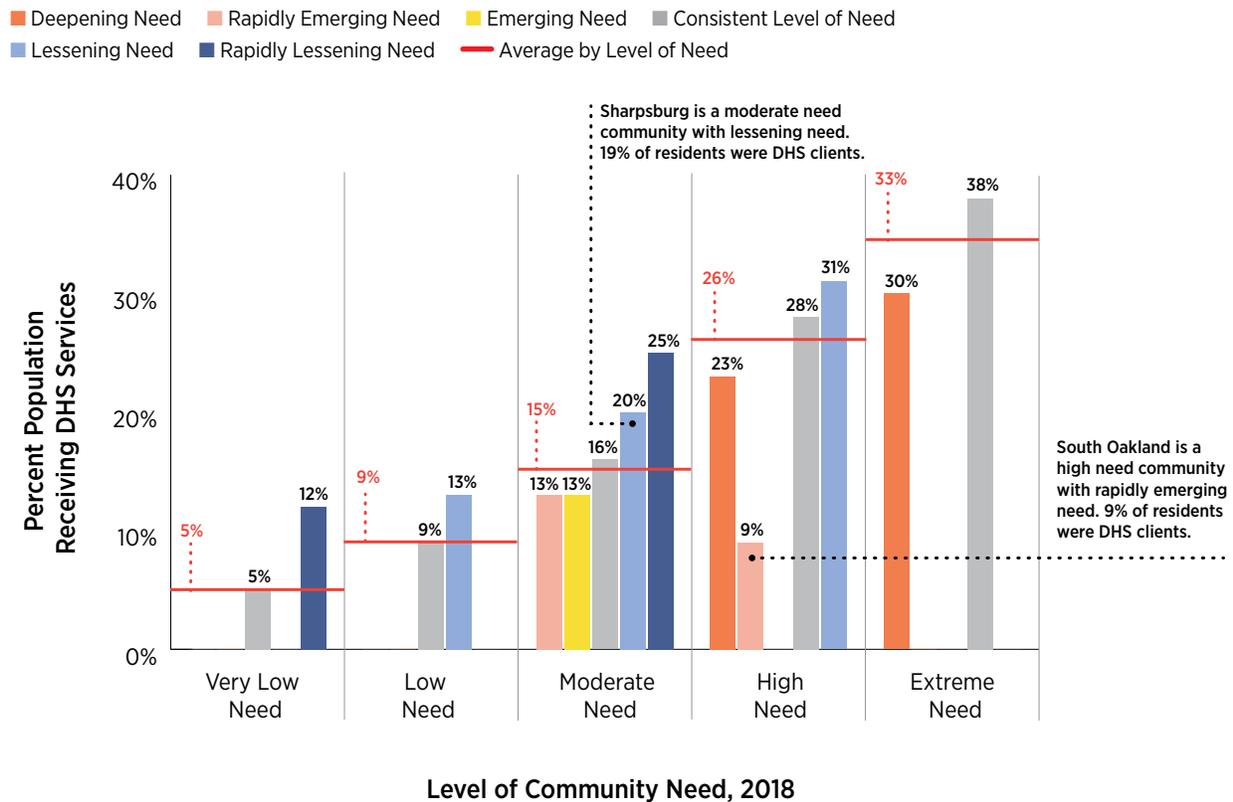
In communities with lessening or consistent needs, the proportion of people using DHS services is higher than the average for that need level. For example, at the left of the chart, tracts with rapidly lessening need (represented by the blue bar) have higher DHS service usage (12%) than the average (5%) for very low need tracts. The opposite is true in communities with deepening, emerging or rapidly emerging needs, where DHS service usage is below the average in most cases. These communities experiencing increasing need and lower than average service usage may represent communities that are underserved and where DHS service availability has lagged behind changes in need.

South Oakland is one community that has experienced a rapidly emerging level of need. In 2013, the area had a low level of need, but by 2018 it was categorized as having a high level of need. This change of two need levels categorizes the neighborhood as experiencing rapidly emerging need. Looking at **Figure 8**, South Oakland would fall in the high need category on the horizontal axis and in the light orange bar, which represents communities with rapidly emerging needs. In South Oakland only 9% of its population received services in 2018, compared to the average of 26% receiving services in high need areas (as shown by the red bar).

Conversely, areas experiencing lessening need are often served at rates higher than the average for their current level of need. An example of this dynamic is Sharpsburg, which experienced lessening need between 2013 and 2018 five-year estimates, going from high need to moderate need. Although Sharpsburg now experiences

moderate need, 19% of the population receives services, which is four percentage points higher than the average of 15% for moderate need areas.

**FIGURE 8: Percent of Residents Receiving DHS Services by Level of Need and Change in Need, 2018**



**DISCUSSION**

There are several trends revealed by the CNI that warrant further investigation. Two neighborhoods stand out as having experienced a rapid increase in socioeconomic need between 2009–2013 and 2014–2018. These neighborhoods, located in South Oakland and northern Robinson Township, went from having a relatively low level of need to a moderate or high level of need in a short amount of time. On the other hand, census tracts in Bloomfield, Marshall-Shadeland and Downtown Pittsburgh have recently experienced rapid decreases in their level of need.

Unbridled neighborhood investment and changes in community demographics can lead to gentrification, reduced affordability and the displacement of incumbent residents. While studies show that gentrification is

<sup>57</sup> Richardson, J. et al. (2019).

not the major trend in most U.S. cities, higher-need communities are at-risk for gentrification, and Pittsburgh was identified as one of the most gentrified metro areas in the U.S, although most eligible tracts in the Pittsburgh metro area did not gentrify.<sup>57</sup> This research shows that the rapid decline in need in Downtown and Bloomfield is likely the result of gentrification, while other forces may be at work in Marshall-Shadeland.

Another key finding in the report is that the vast majority of higher-need communities in Allegheny County per 2009–2013 ACS estimates remained higher-need as of 2014–2018 ACS estimates, which is in line with national research on the tendency of community poverty to persist over long periods of time.<sup>58</sup> Of the 72 tracts classified as high or extreme need as of 2013 five-year estimates, 64 (89%) remained in this range of need as of 2018 five-year estimates. The persistent higher need in these communities poses an ongoing challenge for policymakers seeking to promote economic stability in Allegheny County, especially when considering the causal connection between higher-need communities and adverse long-term outcomes for vulnerable residents who reside there.

By far, our Black residents in Allegheny County are the most concentrated in high- or extreme-need communities and the least concentrated in our low- or very-low-need communities. The connection between segregation and need is the result of nearly a century of systemic, institutional and interpersonal racism, ranging from racist housing, lending and land-use policy to white flight, urban renewal and the war on drugs. The connection between race and need is especially challenging given how persistent racial segregation has been in Allegheny County tracts over the past four decades.

Analysis of DHS service usage found that people residing in higher-need census tracts tend to have higher rates of DHS involvement, which suggests that people in need are generally the ones receiving services. When looking at particular levels of need, rates of usage vary widely by census tract, meaning that there may be communities where service gaps exist. The exploration of service usage by changing level of need can help to inform DHS about where service availability and outreach may be lagging behind increasing need. Identifying those communities with increasing need and lower-than-average service usage will be an important step in improving DHS offerings and engagement with the most vulnerable residents.

Overall, the Community Need Index presented in this report is intended to be a resource for local public officials and community stakeholders. The index can inform discussions around human services policy and planning to help direct resources to the areas where they are most needed.

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<sup>58</sup> Cortright, J. (2014).

## APPENDIX

## APPENDIX: DETAILED METHODOLOGY EXPLANATION

The percentage of those living below 100% of the federal poverty line is retained in the updated 2014–2018 Community Need Index (CNI) due to the central importance of poverty when measuring community need. Additionally, children who move from high-poverty census tracts to low-poverty tracts do significantly better in the long run on measures of income, college attendance, incarceration, academic performance and more when compared to their peers who remain in higher-poverty neighborhoods, further illustrating the importance of community measures of poverty.<sup>59,60</sup> The measure of adult male unemployment is also retained in the updated CNI, in light of research that shows how community unemployment can A) isolate men and their families from employment networks and mainstream norms,<sup>61</sup> and B) negatively impact social mobility.<sup>62</sup> The updated CNI also retains the measure of single motherhood, given recent evidence from Opportunity Insights showing that single parenthood plays a significant role in shaping economic mobility.<sup>63</sup> These three measures were used in a separate index of community distress that informed DHS's original CNI project in 2014.<sup>64</sup>

The percentage of individuals below 200% of the poverty line was removed for the updated version of the CNI. This measure was included in the previous version with a focus on the suburbs in mind, to capture residents who may qualify for social services even though they are above the poverty line. Since the updated CNI covers both urban and suburban areas, it was decided that this measure of moderate incomes is less important. More importantly, the percentage of individuals below 200% of the poverty line is very strongly correlated to the percentage of individuals living below 100% of the poverty line by census tract in Allegheny County ( $R = .92$ ,  $p < .01$ ). As such, its inclusion in the CNI would not add any nuance to the index.

The measure of vacant housing has also been removed. While abandoned housing has been linked to adverse birth outcomes and crime,<sup>65</sup> ACS vacancy estimates only capture point-in-time estimates of all vacancy, meaning that it does not differentiate between abandoned housing and short-term vacancy due to market turnover. The updated CNI no longer includes the measure of household vehicle access. Access to a vehicle can be an important dimension of need, especially in communities with inadequate transit options, but it is a difficult measure to generalize across urban and suburban areas, because of differences in public transit access. While access to transit was not included in the CNI itself, it is worth noting that there is a strong correlation between the CNI and percentage of the population without access to a vehicle by tract, which is discussed in our findings under Levels of Need in Allegheny County.

<sup>59</sup> Chetty, R.; Hendren, N.; and Katz, L. 2015. "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment." National Bureau of Economic Research.

<sup>60</sup> Schwartz, H. 2010. "Housing Policy Is School Policy: Economically Integrating Housing Promotes Academic Success in Montgomery County, Maryland." The Century Foundation.

<sup>61</sup> Wilson, W. (2012). *The Truly Disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

<sup>62</sup> Chetty, R.; Friedman, J.; Hendren, N.; Jones, M.; and Porter, S. (2018). *The Opportunity Atlas: Mapping the childhood roots of social mobility*. (NBER Working Paper no. 25147). National Bureau of Economic Research.

<sup>63</sup> Chetty, R. et al. (2018).

<sup>65</sup> O'Hare, W. and Mather, M. *The Growing Number of Kids in Severely Distressed Neighborhoods: Evidence from the 2000 Census*. Annie E. Casey Foundation, Population Reference Bureau, October 2003.

<sup>66</sup> Zuberi, A.; Duck, W.; Gradeck, B.; and Hopkinson, R. (2015). "Neighborhoods, Race, and Health: Examining the relationship between neighborhood distress and birth outcomes in Pittsburgh." *Journal of Urban Affairs*, 38(4), 546-563.

## APPENDIX

The updated CNI replaces the measure of high school completion with a measure of bachelor's degree attainment. High school completion is a common measure of community need, but recent research has highlighted the importance of exposure to individuals with a bachelor's degree or more.<sup>66</sup> Additionally, the census variable used to capture youth ages 16 through 19 without a diploma or enrolled in school in the original index suffered from very little variance (almost always being estimated at “zero”) and high error margins.

In another departure from the original version, the poverty measure in the updated CNI is measured at the family level instead of the individual or household level. Measuring poverty at the individual or household level can lead to inflated estimates of poverty in university neighborhoods, by counting students or housemates who have temporary low incomes while in school but are otherwise not struggling financially. Family-level poverty measurements avoid this issue by linking students to their respective families.<sup>67</sup> We also adjusted the working-age male unemployment/unattachment measure in student-heavy census tracts by using rates for men ages 25 to 64, instead of 20 to 64. We defined student-heavy tracts as those with college enrollment rates more than two standard deviations above the mean tract.

The updated CNI includes a measure of exposure to gun violence, in response to the mounting evidence that such violence affects families' educational, economic and health outcomes.<sup>68,69,70</sup> Neighborhood-level gun violence is difficult to measure using homicides, because homicides are rare events that can cause a neighborhood's per capita rate of gun violence to fluctuate dramatically over time. Homicide rates can also depend on a neighborhood's distance to a hospital, which creates a confounding factor in the measurement of violence in the neighborhood.<sup>71</sup>

We therefore measure a neighborhood's level of gun violence in terms of its rate of gunshot-related 911 dispatches per 500 people. A 911 dispatch occurs when police, fire or medical services are sent to the location of the emergency as a result of 1) a 911 call, or 2) a gunshot being recorded by the City of Pittsburgh's ShotSpotter gunshot detection system. We count each census tract's number of 911 dispatches that are related to gunshots by year and average them over a period of five years. Average five-year 911 dispatches for gun violence by tract are then divided by five-year ACS population estimates and set per 500 people. Dispatches for gun-shot-related activity encapsulate a more wholistic look at local gun violence than simply observing homicides alone. 911 dispatches for shots fired per capita are strongly predictive of homicides per capita, by tract.

<sup>66</sup> Chetty, R.; Friedman, J.; Hendren, N.; Jones, M.; and Porter, S. (2018). *Race and Economic Opportunity in the United States: An Intergenerational Perspective*. National Bureau of Economic Research.

<sup>67</sup> For more information, see <https://www.census.gov/programs-surveys/cps/technical-documentation/subject-definitions.html#:~:text=The%20count%20of%20family%20household,See%20the%20definition%20of%20family>.

<sup>68</sup> Smith, M. E. et al. (2020, February). The impact of exposure to gun violence fatality on mental health outcomes in four urban U.S. settings. *Social Science and Medicine*.

<sup>69</sup> Abt, T. (2019). *Bleeding out: The devastating consequences of urban violence*. New York: Hachette Book Group, Inc.

<sup>70</sup> Sharkey, P. (2010). The acute effect of local homicides on children's cognitive performance. *Proceedings of the National Academy of Sciences of the United States of America*, 107(26), 11733-11738.

<sup>71</sup> Crandall, M.; Sharp, D.; Unger, E.; Straus, D.; Brasel, K.; Hsia, R.; and Esposito, T. (2013). “Trauma deserts: Distance from a trauma center, transport times, and mortality from gunshot wounds in Chicago.” *American Journal of Public Health*, 103(6), 1103-1109.

## APPENDIX

To quantify a tract's total level of need, its values for each of the five CNI measures were converted into z-scores.<sup>72</sup> The five z-scores were then averaged into a single score for the tract. A tract's total score represents how far the tract falls from the mean Allegheny County tract in its level of need. Tracts were sorted into five levels of need, ranging from very low to extreme, using the Jenks Natural Breaks method in ArcGIS Pro.<sup>73</sup> This method of classifying the tracts differs from the method used previously. In the original version of the CNI, tracts were assigned a rank for each component measure, and then the ranks for each measure were summed to create a single rank for each tract. The tracts were then classified into ten equally sized groupings (deciles).

We chose to classify tracts in this report using z-scores instead of summed ranks in order to retain the underlying shape and spread of the measure values. This is helpful when categorizing tracts using the Jenks Natural Breaks method, because the Jenks method uses the unequal spacing between data points to identify optimal cutoff values for each category. As a result, the Jenks method helps better ensure that tracts sorted into the same level are systematically similar and that different levels of need are different from one another. As such, the Jenks method is less arbitrary than simply dividing a distribution into equally sized groupings. Summed ranks follow an approximately normal distribution regardless of how the underlying data is shaped. Therefore, applying the Jenks method to summed ranks makes the category groupings less reflective of the actual magnitude of the differences between tracts. We chose to use five classifications of need to A) mirror the number of classes used in composite indexes such as the Brandeis University's Child Opportunity Index,<sup>74</sup> and B) simplify the number of classifications used given that the sorting method in the new CNI is more purposeful.

<sup>72</sup> A z-score measures how many standard deviations a tract lies below or above the mean of all tracts.

<sup>73</sup> Five classes were chosen to emulate the number of classes used in indices such as the Kirwan Institute's Child Opportunity Index. The Jenks Natural Breaks method minimizes

variance within classes and maximizes variance between classes. This method sorts similar tracts into the same class and is less arbitrary than simply dividing a distribution into quintiles. For more information, see De Smith, M., Goodchild, M., and Longley, P. (2018). *Geospatial analysis: A comprehensive guide to principles, techniques, and software tools*. 6th ed. Winchelsea Press.

<sup>74</sup> Brandeis University's Child Opportunity Index can be accessed [here](#).