

November 2018

# Technical Addendum: Mapping Displacement Pressure in Chicago, 2018

## Project Overview

In 2017, IHS developed an analysis and interactive, web-based mapping tool that visualizes neighborhood-level displacement risk and housing affordability pressures across the City in order to 1) support ongoing and future public investment decisions and 2) guide practical and proactive responses to preserving housing affordability in neighborhoods. The Mapping Displacement Pressure in Chicago project brings together the housing market and demographic information needed to begin an evaluation of the potential displacement risk surrounding a proposed project and to help inform conversations about lost housing affordability and displacement throughout the City.

In 2018, IHS updated its Mapping Displacement Pressure in Chicago project with 1) updated data for changing sales prices and current conditions, 2) additional tract-level data on current conditions relevant to understanding the vulnerability characteristics and housing preservation opportunities in neighborhoods, and 3) an analysis that identifies neighborhoods with emerging and intensifying displacement pressure compared to the previous study released in 2017.

This technical addendum addresses methodological changes and provides new maps and tables relevant to the 2018 study. For more detail on the project purpose, supporting literature, study components, and technical features, see the full 2017 technical paper for the project: [Mapping Displacement Pressure in Chicago \(2017\)](#).

## Mapping Displacement Pressure in Chicago (2018) Analysis Components

The Mapping Displacement Pressure in Chicago project includes two separate analytical layers for City of Chicago census tracts: 1) a market segmentation analysis that identifies neighborhood types with similar demographic, socioeconomic and housing stock characteristics associated with vulnerability to displacement in a rising cost environment and 2) a geospatial analysis of housing sales data for 1 to 4 unit properties that classifies neighborhoods with rising costs and the risk of declining affordability.

Given that the data used in the market segmentation analysis layer largely come from census tract-level American Community Survey (ACS) sources, the same analytical layer for defining vulnerability is used in the 2018 study as was used in the 2017 study. This is because the ACS data reflecting the rolling 5-year period 2011 to 2015 used in the previous study is largely the same as the new ACS 5-Year period 2012 to 2016. IHS will continually evaluate the differences between ACS samples and will reissue the market

segmentation layer when significant changes in the data are identified. For more information on the method, data sources, and results of the market segmentation analysis see: Section 2 - Market Segmentation Analysis from: [Mapping Displacement Pressure in Chicago \(2017\)](#).

This technical addendum documents data sources, summary tables and maps, and methods for the updated and new components of the 2018 Mapping Displacement Pressure in Chicago project, including the Housing Market Analysis, the Displacement Risk Typology, the identification of census tracts with emerging and intensifying displacement pressure compared to the previous study, and sources and methods for deriving the contextual data features included in the [Mapping Displacement Pressure in Chicago interactive mapping tool](#).

## Housing Market Analysis (2018)

Consistent with the 2017 report which used 2016 data, this analysis uses parcel-level data on 1 to 4 unit property sales activity and geospatial techniques to identify neighborhood-level prices in 2012 and 2017 relative to surrounding areas to 1) classify census tracts based on 2017 sales prices and 2) classify census tracts based on changes in prices between these two periods relative to the City of Chicago as a whole. The analysis also uses the same data preprocessing, normalization, kriging interpolation techniques, aggregation, and qualitative testing method as the 2017 study.

In 2018, IHS did alter the method for typology development to allow for comparison between the 2017 and 2018 studies. For the 2017 study, the aggregated values derived from the kriging interpolation were distributed into seven separate classes by equal intervals, where the top category represented approximately the highest 14 percent of sales values for the entire range of values in the given year, and so on. These were further consolidated into three groupings for easier visualization, known as high-cost, moderate-cost and lower-cost areas. In order to reflect the relative change in data from 2016 to 2017 given overall changes in Chicago's housing market in 2017, IHS adjusted the two threshold values of the three housing market groups in 2017 (high-cost, moderate-cost, and lower-cost) by using the Z stat of 2016 with the mean and the standard deviation of 2017. Based on the inverse log of the range of values in 2017 multiplied by 1500, the approximate dollar value of a 1500 square foot property for each type follows:

- *High-cost*: Greater than \$285,250
- *Moderate-cost*: Between \$96,738 and \$285,250
- *Lower-cost*: Less than \$96,738

The classification for declining, stable, rising, and rapidly rising sales prices did not change between the current 2018 study and the previous 2017 study.<sup>1</sup> The current study maintains the same category thresholds in order to allow for comparisons to the previous study.

Figure 1 illustrates the results of the update housing market analysis and figure 2 maps these results. For more information on the techniques and data sources used see: Section 3 - Housing Market Analysis and Section 5 - Technical Appendix from: [Mapping Displacement Pressure in Chicago \(2017\)](#).

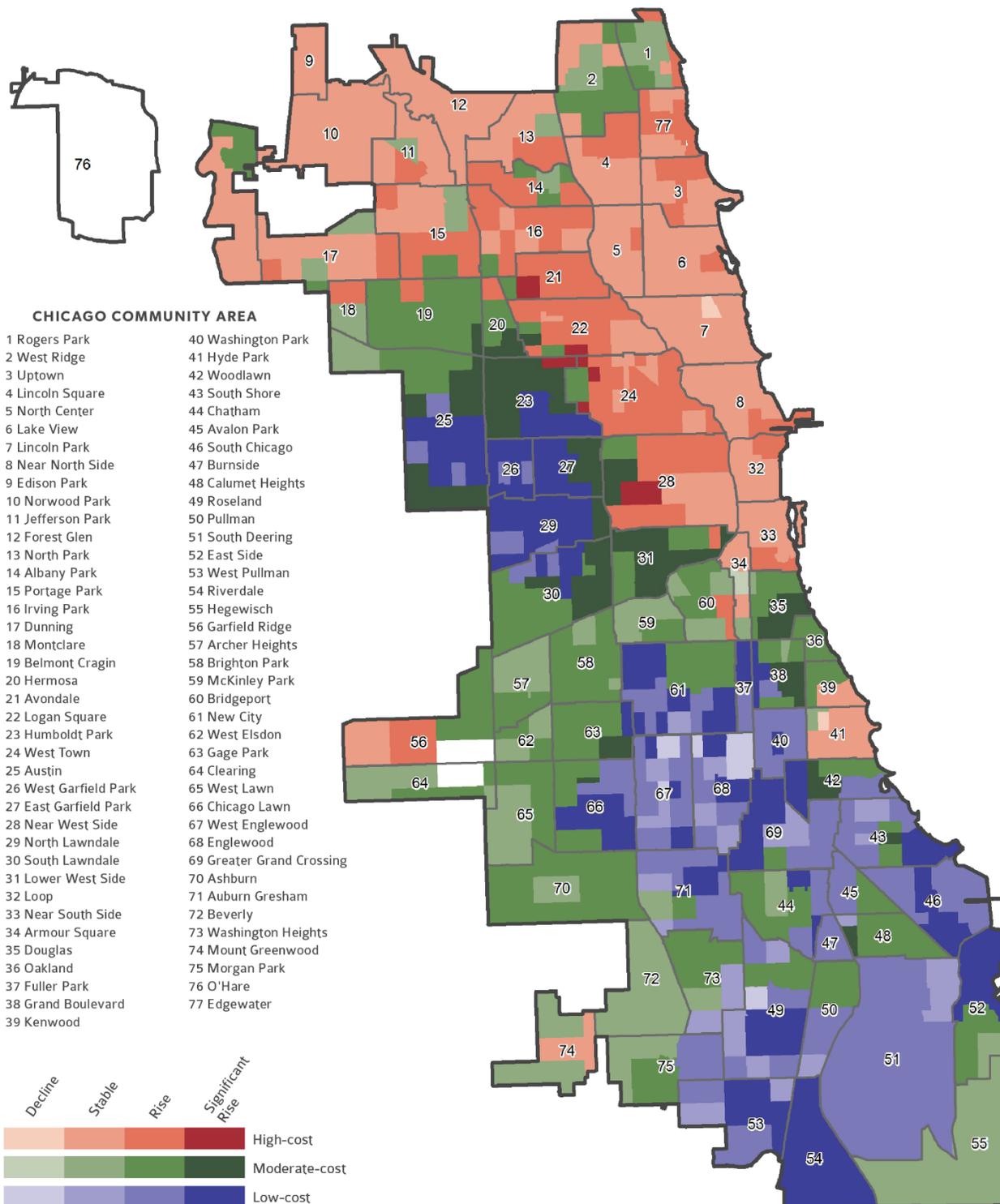
Figure 1. Results of the Housing Market Analysis for City of Chicago, 2017

Current Market Conditions in 2017	Change in Sales Prices, 2012 to 2017				Total Census Tracts
	Declining (negative percent change)	Stable (less than 9.5 percent change)	Rising (9.5 to 21.6 percent change)	Significantly Rising (greater than 21.6 percent change)	
High-cost	3	182	114	11	<b>210</b>
Moderate-cost	2	61	151	56	<b>270</b>
Lower-cost	6	25	82	97	<b>310</b>
<b>Total Census Tracts</b>	<b>11</b>	<b>268</b>	<b>347</b>	<b>164</b>	<b>790</b>

Source: IHS calculations of data from Cook County Recorder of Deeds via Property Insight, Record Information Services, Cook County Assessor

<sup>1</sup> The category thresholds did not change, but it is worth noting that the average change in sales prices between 2012 and 2017 for the City of Chicago is different. In the 2017 study, the average change in sales prices for the City of Chicago was 11.3 percent and the median change was 9.5 percent. In the 2018 study, the average change in sales prices for the City of Chicago was 14.9 percent and the median change was 12.1 percent.

Figure 2. Map of Results of the Housing Market Analysis for City of Chicago, 2017



Source: Source: IHS calculations of data from Cook County Recorder of Deeds via Property Insight, Record Information Services, Cook County Assessor

## Displacement Risk Typology (2018)

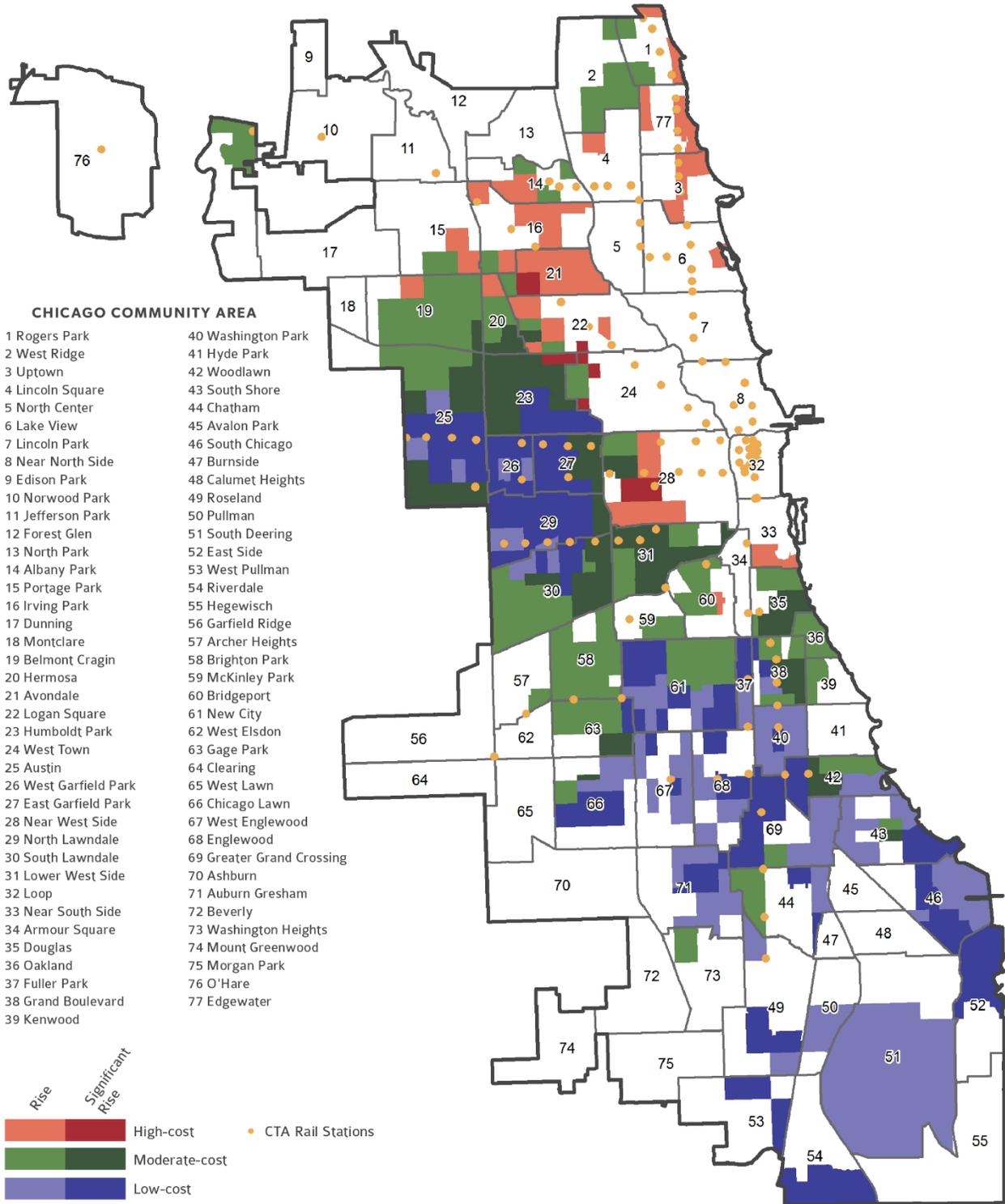
Consistent with the 2017 report, this analysis combined the results of the market segmentation analysis and updated housing market analysis to identify census tracts with 1) high concentrations of population vulnerable to displacement in a rising cost environment and 2) census tracts where house prices were rising or rapidly rising between 2012 and 2017. Figure 3 illustrates the results of the combined segmentation study and housing market analysis, updated in 2018. Figure 4 maps these patterns.

Figure 3. Results of the Housing Market Analysis for Vulnerable City of Chicago Submarkets, 2017

	Current Market Conditions in 2017	Change in Sales Prices, 2012 to 2017				Total Census Tracts
		Declining (negative percent change)	Stable (less than 9.5 percent change)	Rising (9.5 to 21.6 percent change)	Significantly Rising (greater than 21.6 percent change)	
<b>Cluster 1</b>	High-cost	1.9%	45.7%	18.1%	0.0%	<b>65.7%</b>
	Moderate-cost	0.0%	10.5%	17.1%	4.8%	<b>32.4%</b>
	Lower-cost	0.0%	0.0%	1.9%	0.0%	<b>1.9%</b>
	<b>Total Census Tracts</b>	<b>1.9%</b>	<b>56.2%</b>	<b>37.1%</b>	<b>4.8%</b>	<b>100.0%</b>
<b>Cluster 5</b>	High-cost	0.0%	2.7%	15.8%	4.9%	<b>23.4%</b>
	Moderate-cost	1.1%	8.2%	34.8%	14.7%	<b>58.7%</b>
	Lower-cost	0.0%	1.6%	6.0%	10.3%	<b>17.9%</b>
	<b>Total Census Tracts</b>	<b>1.1%</b>	<b>12.5%</b>	<b>56.5%</b>	<b>29.9%</b>	<b>100.0%</b>
<b>Cluster 6</b>	High-cost	0.0%	0.0%	1.1%	0.6%	<b>1.7%</b>
	Moderate-cost	0.0%	0.6%	6.7%	11.7%	<b>19.0%</b>
	Lower-cost	2.8%	8.4%	27.9%	40.2%	<b>79.3%</b>
	<b>Total Census Tracts</b>	<b>2.8%</b>	<b>8.9%</b>	<b>35.8%</b>	<b>52.5%</b>	<b>100.0%</b>

Source: IHS calculations of data from Cook County Recorder of Deeds via Property Insight, Record Information Services, Cook County Assessor

Figure 4. Vulnerable City of Chicago Submarkets with Rising Sale Values, 2017



Source: IHS calculations of data from Cook County Recorder of Deeds via Property Insight, Record Information Services, Cook County Assessor

## Analyzing Changes in Displacement Risk, Emerging and Intensifying Areas

As part of its 2018 Mapping Displacement Pressure in Chicago report release, IHS produced an accompanying report analyzing changes between the 2017 displacement risk map and the 2018 displacement risk map. The published analysis focused specifically on areas where displacement pressure has intensified during this period - profiling neighborhoods that have graduated to a higher risk category or areas where displacement risk has been a recent development. IHS also observed other types of shifts including census tracts where the risk was moderated between 2016 and 2017 or census tracts that were price stable or experienced slight declines in prices, however. As discussed above, in order to ensure that the changes observed between 2016 and 2017 were a result of the shifting price levels in the census tract and not due to an overall shift in values citywide, IHS normalized the threshold values to facilitate comparison between 2016 and 2017. The definitions for each type of shift follows and figure 5 illustrates these shifts for census tracts in the City of Chicago.

### *Intensifying*

A census tract where displacement pressure increased between 2016 and 2017. This is a census tract that is vulnerable to displacement with rising costs in both periods, but where the relative level of affordability (high-cost, moderate-cost, lower-cost) increased as of the 2018 report. For example, a census tract that was vulnerable to displacement with moderate prices that were rising in 2016 that in 2017 is now defined as high-cost.

### *Emerging*

A vulnerable census tract that had stable or declining prices in 2016, but where prices are now rising above the city average as of the 2018 report. These census tracts were not flagged as neighborhoods with displacement risk in 2016 but are flagged in the 2017 map.

### *Moderating*

A vulnerable census tract that became relatively more affordable in 2017 relative to the City as a whole and its previous price level in 2016. Slight shifts in price levels are normal, and these shifts were not significant enough that IHS would say that vulnerable households are no longer experiencing pressure.

Figure 5. Changes in Displacement Pressure Risk Typology in 2016 and 2017

	2017 Vulnerable-rising			Total Tracts
	Lower-cost	Moderate-cost	High-cost	
Intensifying Displacement	0	14	11	<b>25</b>
Emerging Displacement	39	19	12	<b>70</b>
Moderating Displacement	10	8	0	<b>18</b>
Others	105	106	37	<b>248</b>
<b>Total Vulnerable-rising Tracts</b>	<b>154</b>	<b>147</b>	<b>60</b>	<b>361</b>

Source: IHS calculations of data from Cook County Recorder of Deeds via Property Insight, Record Information Services, Cook County Assessor

## Sources and Methods for Contextual Interactive Map Tooltip Data

In response to feedback that additional context would be helpful to better understand more about the nature of affordability and displacement pressures occurring in census tracts, IHS updated its [Mapping Displacement Pressure in Chicago Interactive Map](#) in 2018 with contextual data on neighborhood rents, housing stock, and the share of the population that is non-white. Additional information about these data as well as the sources and methods for calculating these data follows:

### *Share of rental units with gross rents that are less than \$900*

Data on the share of units in a particular census tract with gross rents that are below \$900 is an indicator tracked by IHS to approximate the unsubsidized or “naturally occurring” affordable housing stock. Affordable rental housing that receives no subsidy comprises the vast majority of the stock of affordable units across the United States. The source of these data is the 2016 ACS 5-Year Estimates table B25063. Census tracts with unreliable estimates, i.e. margins of error exceeding 30 percent, are flagged in the tooltip.

A gross rent level roughly at or below \$900 has been the benchmark for a unit with affordable rent used by IHS to study shifts in the County’s “affordability gap” in its annual report on the [State of Rental Housing in Cook County](#). The relationship between the number of rental households that demand affordable housing (defined as a household earning 150 percent of poverty or a household occupying a unit affordable to a household earning 150 percent of poverty) and the number of rental units affordable to these households at 30 percent of their income is the basis for IHS’s “affordability gap” calculation. In 2016, the most recent data year available, 150 percent of poverty was an income of \$36,844.50 and an affordable gross monthly rent was \$921.11. In IHS’s 2018 State of Rental Housing in Cook County report, IHS was able to document that the growing affordability gap in the City of Chicago

was driven not by increased demand for affordable rental by these households, but rather by a declining supply of units affordable to these households.

*Share of total housing units that are in two to four unit buildings*

Two to four unit buildings are a critical component of the unsubsidized affordable rental housing stock in many cities, including Chicago. According to analysis by [Enterprise Community Partners and University of Southern California](#), two to four unit buildings have the lowest rents and are more likely to serve the lowest-income renters than rental housing located in other building types. IHS research has shown that while the [largest share of Chicago's rental housing is in buildings with between two and four units](#), this critical component of the rental stock is threatened in both strong and weak housing markets. Between 2010 and 2016, [nearly 15,000 units in two to four unit buildings disappeared from the stock](#) due to conversion to single family homes, demolition, or deterioration. It is likely that the decline in the affordable supply that was identified in IHS's 2018 State of Rental Housing in Cook County report can be attributed to the disappearance of the two to four stock in Chicago neighborhoods.

The share of housing units that are in 2 to 4 unit buildings is calculated from data maintained in the IHS Data Clearinghouse of parcel level administrative data and is current as of 2017. The original source of the data is the Cook County Assessor.

*Share of total housing units that are Project Based Section 8*

Whereas the majority of lower-income households who live in affordable housing do not receive any subsidy, the subsidized or government-assisted rental stock makes up a substantial portion of housing units in certain neighborhoods. This indicator tracks a component of the government-assisted stock, units that have Project-Based Section 8 certifications. Unlike voucher-based assistance which is given to households, Project-Based Section 8 is tied to housing units and have affordability periods which require them to remain affordable until that term expires. As housing demand and costs increase in a neighborhood, owners of these units can be targeted to extend these affordability requirements. Additionally, a large share of units with project-based section 8 certificates may moderate the displacement risk in a community due to their affordability terms.

Information on the number of units that receive subsidy through the project-based section 8 program were identified using data from Housing and Urban Development's [A Picture of Subsidized Households](#). Data on the universe of total housing units was derived from the 2016 ACS 5-Year Estimates table B25001. Census tracts with unreliable estimates, i.e. margins of error exceeding 30 percent, are flagged in the tooltip.

*Share of total population that is people of color*

In order to ensure that the issue of displacement risk could be viewed through a lens of racial equity, IHS included the share of the population that is people of color as a census tract-level indicator in the Mapping Displacement Pressure in Chicago interactive map tooltip. These data are sourced from the 2016 ACS 5-Year Estimates table B03002 and includes counts of individuals in the category of 'Hispanic or Latino' and counts of individuals in the category of 'Not Hispanic or Latino' minus individuals in the 'White alone' category. Census tracts with unreliable estimates, i.e. margins of error exceeding 30 percent, are flagged in the tooltip.

IHS's market segmentation analysis, developed to identify neighborhoods with population-level vulnerability to displacement due to housing affordability pressures, did not include race or ethnicity in the clustering process. Race and ethnicity were not included in the clustering process due to the ways in which historical geographic patterns of racial segregation in the City of Chicago overwhelm the modeling algorithm and overpower other factors strongly associated with displacement risk, such as renter share, cost-burden, income, age, and etc. Post analysis included in the 2017 study highlights that most areas experiencing displacement pressure have high concentrations of people of color. For more on these results, see Section 2 - Overview of Market Segmentation Clustering Results from: [Mapping Displacement Pressure in Chicago \(2017\)](#).