

December 2020

## Technical Addendum: Mapping Displacement Pressure in Chicago, 2020

### 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 2020, IHS modified its methodology for calculating changing sales prices and added additional tract-level data on current conditions relevant to understanding the vulnerability characteristics and housing preservation opportunities in neighborhoods. This technical addendum addresses methodological changes and provides new maps and tables relevant to the 2020 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 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- or higher-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 2020 study as was used in previous studies. IHS plans to update the market segmentation layer when 2019 ACS data become available, expected to be reflected in the 2021 report. 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 2020 Mapping Displacement Pressure in Chicago project, including the Housing Market Analysis, the Displacement Risk Typology 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 (2020)

Consistent with the previous two analyses, this analysis uses parcel-level data on 1 to 4 unit property sales activity and geospatial techniques to identify neighborhood-level prices to 1) classify census tracts based on sales prices and 2) classify census tracts based on changes in prices between two periods of time. The analysis also uses the same data preprocessing, normalization, kriging interpolation techniques, aggregation, and qualitative testing method as the 2019, 2018, and 2017 studies.

In previous studies, IHS classified changes in sales prices relative to the overall City of Chicago average (negative price changes were classified as declining, positive price changes up to the average change in the City of Chicago were classified as stable, and price changes above the Chicago average were classified as rising or rapidly rising depending on the magnitude) and the comparison period was fixed to price levels in 2012. In its 2020 study, IHS changed its method of price change classification to be based on the average of a census tract's peer geographies (for example, price changes in a high cost census tract are classified based on the average price change observed in all *high cost areas* instead of the average in Chicago). IHS also changed the baseline year to a rolling average of the previous two data years. In 2020, the data year for determining market type (high-, moderate-, or lower-cost) is 2019 and the baseline data year for calculating price change is derived from combined 2017 and 2018 sales price data<sup>1</sup>.

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. Consistent with previous studies, IHS adjusted the two threshold values of the three housing market groups for the 2020 study (high-cost, moderate-cost, and lower-cost) to allow for comparison between each study year by using the Z stat of data year 2016 with the mean and the standard deviation of data year 2019.

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<sup>1</sup>In the 2017 study, the average change in sales prices for the City of Chicago from data year 2012 to 2016 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 from data year 2012 to 2017 was 14.9 percent and the median change was 12.1 percent. In the 2019 study, the average change in sales prices for the City of Chicago from data year 2012 to 2018 was 18.3 percent and the median change was 14.8 percent. In the 2020 study, the average change in sales prices from combined data year of 2017 and 2018 to 2019 was 1 percent for high-cost area, 3.3 for moderate-cost area, 7.9 for low-cost area and 3.6 for City of Chicago. And, the median change in sales prices from combined data year of 2017 and 2018 to 2019 was 0.9 percent for high-cost area, 2.5 for moderate-cost area, 7.7 for low-cost area and 2.4 for City of Chicago

Based on the inverse log of the range of values in data year 2019 multiplied by 1500, the approximate dollar value of a 1500 square foot property for each type follows:

*High-cost:* Greater than \$316,662

*Moderate-cost:* Between \$126,775 and \$316,662

*Lower-cost:* Less than \$126,775

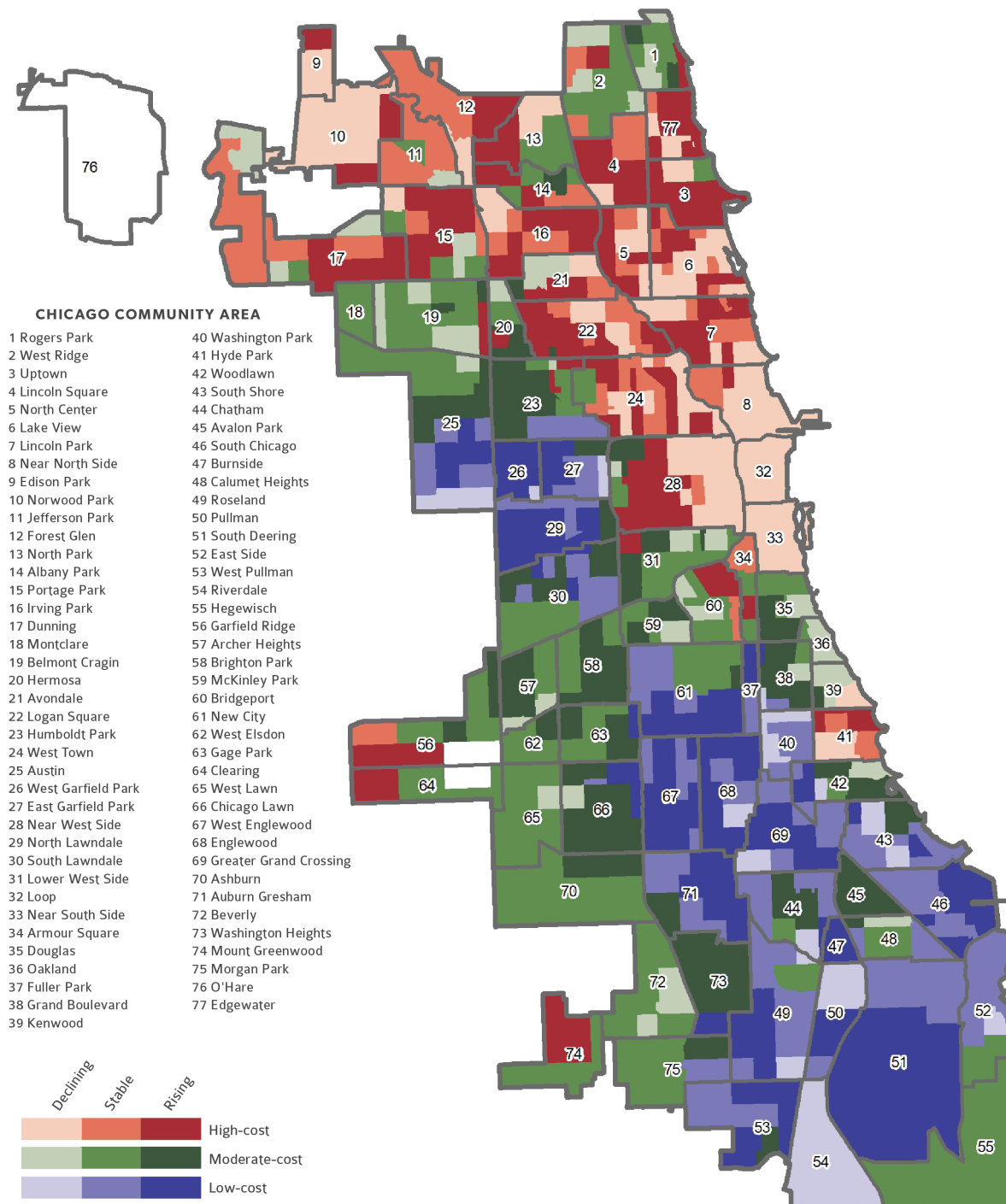
Figure 1 illustrates the results of the updated housing market analysis and Figure 2 maps these results. For more information on the techniques and data sources used see: Section 3 - Housing Market Analysis and Section 5 - Technical Appendix from: [Mapping Displacement Pressure in Chicago \(2017\)](#).

Figure 1. Results of the Housing Market Analysis for City of Chicago, Data Year 2019

Current Market Conditions in 2019	Declining (negative percent change)	Stable (less than average percent change)	Rising (above average percent change)	Total Census Tracts
High-Cost	100	60	148	308
Moderate-Cost	46	118	108	272
Lower-Cost	19	89	102	210
<b>Total Census Tracts</b>	165	267	358	790

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

Figure 2. Map of Results of the Housing Market Analysis for City of Chicago, Data Year 2019



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

## Displacement Risk Typology (2020)

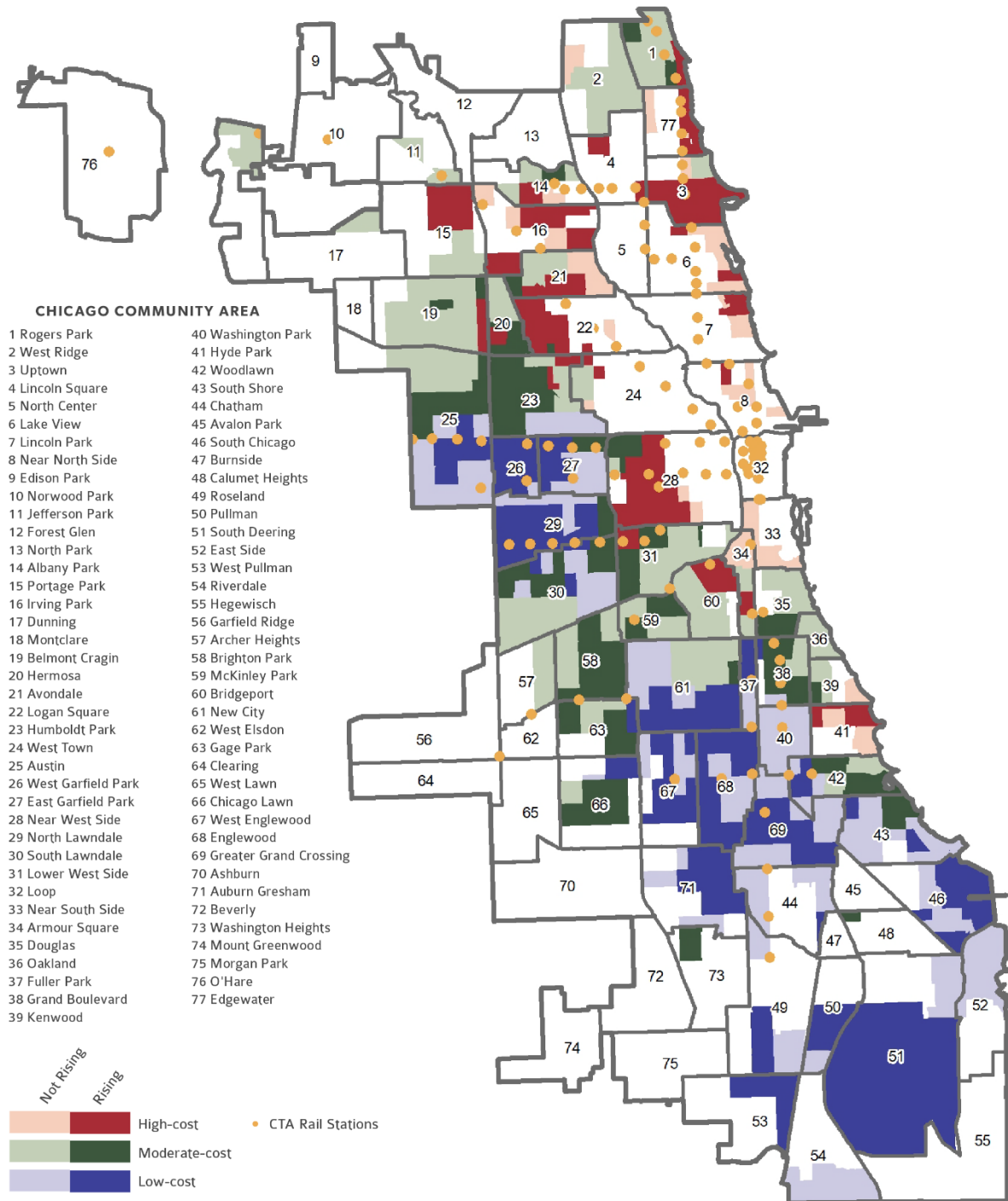
Consistent with previous Mapping Displacement Pressure in Chicago reports, this analysis combined the results of the market segmentation analysis and updated housing market analysis to identify census tracts with 1) high concentrations of population vulnerable to displacement in a rising cost environment and 2) census tracts where house prices were rising. In study year 2020, IHS changed its baseline year from 2012 to a rolling combined two years of data. In 2020, this baseline includes both 2017 and 2018 sales price data. Additionally, IHS no longer identifies “rapidly rising” census tracts and simplifies the data visualization on the Mapping Displacement Pressure tool to consolidate declining and stable price changes as “not rising”. Figure 3 illustrates the results of the combined segmentation study and housing market analysis, updated in 2020. For more information on the analysis and cluster definitions, see the Technical Appendix from [Mapping Displacement Pressure in Chicago \(2017\)](#). Figure 4 maps these patterns.

Figure 3. Results of the Housing Market Analysis for Vulnerable City of Chicago Submarkets, Data Year 2019

Vulnerable Clusters	Current Market Conditions in 2019	Not Rising		Rising (above peer average)	Total Census Tracts
		Declining (negative percent change)	Stable (less than peer average)		
Cluster 1	High-Cost	21.0%	9.5%	31.4%	61.9%
	Moderate-Cost	12.4%	12.4%	13.3%	38.1%
	Lower-Cost	0.0%	0.0%	0.0%	0.0%
	<b>Total Census Tracts</b>	33.3%	21.9%	44.8%	100.0%
Cluster 5	High-Cost	1.6%	3.3%	20.7%	25.5%
	Moderate-Cost	10.3%	24.5%	23.9%	58.7%
	Lower-Cost	0.0%	8.2%	7.6%	15.8%
	<b>Total Census Tracts</b>	12.0%	35.9%	52.2%	100.0%
Cluster 6	High-Cost	0.0%	0.0%	2.2%	2.2%
	Moderate-Cost	1.7%	2.8%	12.3%	16.8%
	Lower-Cost	7.3%	30.7%	43.0%	81.0%
	<b>Total Census Tracts</b>	8.9%	33.5%	57.5%	100.0%

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 and Market Type, Data Year 2019



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. These data were updated in 2019 and 2020 to reflect the most current data from each source. Figure 5 summarizes the tooltip data by market type:

Figure 5. Tooltip Data by Market Type, Data Year 2019

	Lower-Cost Markets	Moderate-Cost Markets	High-Cost Markets	Total Census Tracts
Units with Gross Rent Under \$900	50.7%	39.9%	20.3%	33.0%
Units in Two-to-Four Unit Buildings	38.9%	29.9%	18.0%	26.0%
Project-Based Section 8 Units	3.2%	1.7%	2.1%	2.2%
Housing Choice Voucher Units	11.4%	4.8%	1.5%	4.6%
Non-White Population	97.4%	80.1%	40.4%	67.2%

In 2020, IHS also added a simplified version of the non-residential land use data used in the kriging interpolation and aggregation of raster point data in the data development process to the interactive map. The goal of including this layer is to help practitioners more easily distinguish areas with housing and areas that have very little housing. For more information on the development of the non-residential layer, see the Technical Appendix from [Mapping Displacement Pressure in Chicago \(2017\)](#).

Additional information about the tooltip 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 2018 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 2018, the most recent data year available, 150 percent of poverty was an income of \$38,551.50 and an affordable gross monthly rent was \$964.00. In IHS's 2019 State of Rental Housing in Cook County report, IHS documented that the persistent affordability gap in the City of Chicago was driven not by increased demand for affordable rentals 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 tracked in IHS's 2018 and 2019 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 2019. The original source of the data is the Cook County Assessor.

*Share of total housing units that are Project- Based Section 8 or Housing Choice Voucher (HCV) Associated Units*

Whereas the majority of lower-income households who live in affordable housing [do not receive any subsidy](#), the subsidized or government-assisted rental stock can make up a substantial portion of housing units in certain neighborhoods. These indicators track two components of the government-assisted stock, units that have Project-Based Section 8 certifications and separately, units subsidized via the Housing Choice Voucher Program.

Voucher-based assistance is given directly to qualified households. Vouchers can be used in the private market to subsidize some or all of the cost of housing so that rents or housing costs are affordable to the participant family or tenant. While vouchers can be a strong tool to [maintain affordability in rising costs markets](#), voucher tenants may have to pay more than is affordable if rents increase beyond the voucher's value and are vulnerable to displacement should a landlord, or new landlord when a property sells, choose not to renew its contract with HUD.

Unlike voucher-based assistance that is given to households, Project-Based Section 8 is tied to housing units and have affordability periods that 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 and units that receive subsidy through the Housing Choice Voucher program were identified using data from Housing and Urban Development's [A Picture of Subsidized Households](#) as of 2019. Data on the universe of total housing units was derived from the 2018 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 are 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 2018 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, 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 \(2017\)](#).