Assessing the Role of Urbanicity

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ASSESSING THE ROLE OF URBANICITY

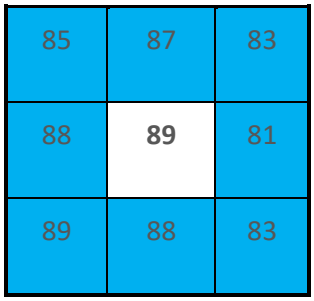
A distinctive feature of Claritas PRIZM Premier is the Claritas urbanicity model, a critical input to the earlier PRIZM® systems. Urbanicity measures have been developed and refined by Claritas over the past 30 years because the census does not provide adequate standard measures. Although the census does classify areas as being part of a central city, Combined Statistical Area (CSA), or Core Based Statistical Area (CBSA), these measures are insufficient for precise neighborhood classification.

The first PRIZM model, built using 1970 Census data, relied on data such as the presence or absence of items such as in-home freezers and city water systems versus dug wells or septic tanks to create mathematical models to classify neighborhood geography on an urban to rural continuum. This type of model had significant limitations.

In the 1980s, Claritas developed new algorithms using a density grid to classify neighborhoods based on density of population. In the simplest terms, this involved dividing the total population of a particular piece of geography—in the 1980s, Claritas used census tracts—by its land area and comparing the resulting score with all other tracts' density scores.

The density grid was created to cover the entire United States using latitude and longitude coordinates. Each cell in the grid is 1/30th of a degree (approximately two miles on each side of the cell). This creates a grid with more than 890,000 cells that contained population (and even more unpopulated ones). Each cell was used to assign a neighborhood density measure for the census tracts that lie within it. All density measures were then reduced to density centiles by calculating the density measures (population divided by area) for each of the grid cells, and then ranking and scoring all cells into one of a hundred possible groups. Group 0 is reserved for those cells with little or no population—these are the least dense neighborhoods and frequently include parks, cemeteries, industrial parks, and bodies of water. Group 99 contains the densest neighborhoods in the United States, many in the New York City borough of Manhattan.

This model was vastly superior to the previous model, and its principle benefit was providing a density measure for the tract in the context of its eight adjacent grid cells, as shown below.



Determining Urbanicity
1980s Model

The most critical limitation of this model was its inability to distinguish smaller, secondary cities and "edge" cities from the suburban sprawl of major metropolitan areas and their urban centers. Because the urbanicity model's purpose is to help assign neighborhoods to lifestyle-based segments, it became important to distinguish between households living in secondary cities and households living in suburbs when the density scores were in the same range.

Enhanced Density Model

For the 1990s PRIZM model, Claritas devoted extensive resources to creating a more accurate measure of urbanicity. The overarching concept was to improve the measurement of the relationships between adjacent grid cells, providing better context for the density assignment by assigning grid cells to their population center. This new technique calculated density deciles for very small areas—census blocks instead of tracts—and it was also better at distinguishing second cities from big-city suburbs. This measure was based on the density not of the specific census block, but of a larger geographic area not constrained by boundary definitions. For lifestyle purposes, the density experienced by persons living in a block group is not restricted to the geographic boundaries of their block group

As with the 1980s model, this refined model assessed a grid cell's density as well as the eight cells surrounding it (an area about 36 square miles). An averaging function provided better context for the block groups in the center of this nine-cell area. The result was the ability of the density measures to point up peaks and valleys in household density. Most important, those peaks and valleys were now a relative concept—how high the density was required to be for a cell to be considered a peak depended on the area around it.

Each grid cell, and ultimately each census block, was assigned a population center—and its density character—using a sophisticated algorithm that searched for peaks (the local maxima) and valleys (minimum density points between maxima) to separate the central city from its suburbs, exurbs, and rural areas. The process can be envisioned as the path that water would take if it were precisely poured on the top of a hill, and allowed to proceed down the hill in all directions until it found all the lowest points surrounding the peak. These low points are then used to draw boundaries and assign all the area within as belonging to the peak (or population center). When each block was assigned an owner, the distance, in terms of density from itself to its owner, could be used as a variable in the clustering model to identify

closer-in suburbs from further-out exurbs, and isolate smaller secondary cities that have fewer connections to the larger metropolitan area.

To determine the local population center, or maximum, the original grid cell and its 8 surrounding cells were increased by another ring of cells, excluding the corners, for a total of 21 cells, as shown below. The local maximum is the cell with the density centile greater than or equal to those of the eight cells surrounding it and the second ring around it, excluding the corners (approximately a five-mile radius).

	85	83	84	
82	85	87	83	73
87	88	**89**	81	77
83	89	88	83	82
	87	85	83	

Determining Urbanicity
1990s Model

In this example, the central cell has a density centile of 89, which is greater than or equal to all other cells (disregarding corners). As a result, this cell would be considered a local maximum or population center. The left lower corner of the first ring also has a density centile of 89, which could also be a local maximum for this purpose as well.

Population centers—mapped as peaks in density—were typically located in downtown, urban areas. Where the density measures were lowest, the map showed a relatively flat area—and they were typically rural. It became important to distinguish the neighborhood characteristics of the areas that were on the slope between the urban downtowns and the rural, low-density areas. These intermediate densities could have different neighborhood characteristics, and capturing those differences was crucial to properly assigning lifestyle segments.

One hypothetical example would be Chevy Chase, MD. Located in the Washington D.C. area, Chevy Chase is a close-in suburb that borders the northwest perimeter of Washington and has a density of 83. Gaithersburg is a satellite city 25 miles of northwest of Washington—and also has a density measure of 83. Our challenge was to develop a density measure that could allow the identical density score and yet differentiate between Chevy Chase's suburban attributes and Gaithersburg's second city attributes. To address this issue, we devised another factor that measured the relationship of the grid cells to their population center.

Refinements Replace Grid with Radii

The 1990s density grid made for easier division of the United States, and the 21-cell grid approach improved the assignment of neighborhoods to the appropriate density category. Claritas used improvements implemented with 2000 census data to update from the grid and further enhance the contextual measures.

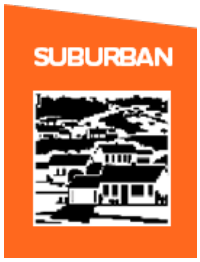
While the technique for the density measure in PRIZM was still mostly the same, each of the cells in the density grid framework was replaced by a 2-mile radius around each block group centroid. Using a network of circles in place of the square grid provides a more robust estimate for the block group because, in situations where only a fraction of a block group is included within the radius, the new technique allocates the population of that fraction to the radius. The result was a technique that even allows statisticians to establish the difference between a local maximum (a peak) and a blemish (a high density score that doesn't really belong).

Finally, Claritas statisticians evaluated many of the individual radii by hand. Fringe areas were assessed to judge the area as more similar to a city or a suburb. In addition, the circle-by-circle reviews allowed Claritas to create a touch list of geographies that have special constraints for their density context. For example, if a neighboring block group's two-mile ring requires crossing a bridge or is subject to some other barrier, it would not be included in a given block group's contextual assessment, even though the cell touches the block group of interest. Assessing all of the block groups in the U.S. one-by-one for barriers that merited being added to the touch list was not a trivial task, but one that Claritas deemed necessary for the most precise assignments to PRIZM segments.

Claritas Urbanicity Classes

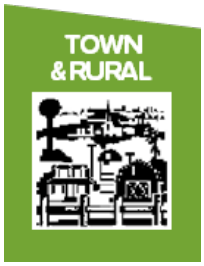
The result of these improvements was the identification of four distinct urbanicity classes: Urban, Second City, Suburban, and Town & Rural. Based on the urbanicity classification of the households within it, each PRIZM Premier segment is described as being part of one of the following five categories:

Urban segments are found in areas with population density scores (based on density centiles) mostly between 75 and 99. They include both the downtowns of major cities and surrounding neighborhoods. Households within this classification live within the classic high-density neighborhoods found in the heart of America's largest cities. While almost always anchored by the downtown central business district, these areas often extend beyond city limits and into surrounding jurisdictions to encompass most of America's earliest suburban expansions.



Suburban segments live in areas with population density scores between 40 and 90, and are tied closely to urban areas or second cities. Unlike second cities (defined below), suburban areas are not the population center of their surrounding community, but rather a continuation of the density decline from the city center. While some suburbs may be employment centers, their lifestyles and commuting patterns will be more tied to one another, or to the urban or second city core, than within themselves.

Second City segments are found in areas less-densely populated than urban areas, with population density scores typically between 40 and 90. While similar to suburban areas in their densities, second cities are the population centers of their surrounding communities. As such, many are concentrated within America's larger towns and smaller cities. This class also includes thousands of satellite cities, which are higher-density suburbs encircling major metropolitan centers, typically with far greater affluence than their small city cousins.



Town & Rural segments contain households that are classified with one of those two urbanicity classifications. The population density scores where they are found range from 0 to 40. This category includes exurbs, towns, farming communities, and a wide range of other rural areas. The town aspect of this class covers the thousands of small towns and villages scattered throughout the rural heartland, as well as the low-density areas far beyond the outer beltways and suburban rings of America's major metros. Households in the exurban segments have slightly higher densities and are more affluent than their rural neighbors.

2013 Urbanicity Update

By the 2013 set of releases, Claritas had fully incorporated the full one-year, three-year, and five-year American Community Survey (ACS) data into its demographic update. Claritas had also updated its cartographic rosters to reflect the 2010 census data and boundaries. In combination with the updated ACS and census data, which are inputs for its segmentation products, Claritas also focused on updating the urbanicity classifications into the new block group roster.

TECHNICAL SUPPORT

If you need further assistance, please contact the Claritas Solution Center between 9:00 a.m. and 8:00 p.m. (Monday through Friday, EST) at 800.866.6511.

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