Affirmatively Furthering Fair Housing (AFFH) Data Documentation

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U.S. Department of Housing
and Urban Development*

.

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I. Overview

HUD has asked its program participants to evaluate fair housing issues in their jurisdictions and regions. The agency is taking a more active role in assisting program participants to prepare the required analysis by providing data and analytical tools to help grantees quantify and interpret particular fair housing issues. HUD provides a dynamic online mapping and data-generating tool (Data Tool) for communities to use in their completion of the Fair Housing Assessment Tool (AFH Tool). HUD accompanies these tools with guidance tailored to accommodate program participants of all capacity levels.

This document outlines the data, methods, and sources behind the tool that HUD provides. It describes demographic, socioeconomic, and housing characteristics, as well as access to community assets through a series of opportunity indices.

This data package is not exhaustive and should not supplant local data or local knowledge that is more robust, timely, or accurate. It represents a baseline effort to assemble consistent, nationally available data from a variety of sources compiled into one location.

II. Data Sources

Table 1 lists data sources, years, and the spatial scale used to populate the tables and maps in the Data Tool.

Table 1: Data Sources

Data Category	Variables	Geographic level or Primary Sampling Unit	Tables	Maps	Sources and years
Demographics	Race/Ethnicity population in 2010	Block-group	1, 2, 6	1, 5-7, 9-14	Decennial Census, 2010
Demographics	Race/Ethnicity population in 2000 & 1990	Tract	2	2	Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Demographics	Percent of race/ethnicity census tract	Tract	10	na	Decennial Census, 2010
Demographics	Limited English Proficiency (LEP) population; LEP languages; Foreign-born population; Foreign-born population place of birth (national origin)	Tract	1, 2, 5, 6	3, 4, 8, 9-14	American Community Survey (ACS), 2006-2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Demographics	Disability Type population; Disabled population by Age	Tract	1, 15, 16	15, 16	American Community Survey (ACS), 2008-2012
Demographics	Population by Age, Sex, Family Type	Tract	1, 2, 6	9-14	Decennial Census, 2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Socioeconomic	Racially/Ethnically-Concentrated Areas of Poverty (R/ECAP)	Tract	6, 9	1-16	Decennial census (2010); American Community Survey (ACS), 2006-2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Housing	Population, housing units, occupied housing units, race/ethnicity, age, disability status, household type, and household size by Housing Type	Development; Tract	7-9, 13, 17	na	Inventory Management System (IMS)/ PIH Information Center (PIC), 2013; Tenant Rental Assistance Certification System (TRACS), 2013
Housing	Low-Income Housing Tax Credit developments	Development	10	na	National Low-Income Housing Tax Credit (LIHTC) Database, 2013

Data Category	Variables	Geographic level or Primary Sampling Unit	Tables	Maps	Sources and years
Housing	Households with Housing Problems; Households with Severe Housing Problems; Households with Income Less than 31% of Area Median Income (AMI); Households with Housing Problems by Race, Household Type, Household Size	Tract	11, 12	7, 8	Comprehensive Housing Affordability Strategy (CHAS), 2007-2011
Demographics	Dissimilarity Index	Community Development Block Grant (CDBG); Core Based Statistical Area (CBSA)	3, 4	na	Decennial Census, 2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Opportunity Indices	Low Poverty Index, Labor Market Index	Tract	14	11, 13	American Community Survey (ACS), 2006-2010
Opportunity Indices	School Proficiency Index	Block-group	14	9	Great Schools, 2012; Common Core of Data (4th grade enrollment and school addresses), 2012; School Attendance Boundary Information System (SABINS), 2012
Opportunity Indices	Low Transportation Cost Index; Transit Trips Index	Tract	14	12	Location Affordability Index (LAI) data, 2008-2012
Opportunity Indices	Jobs Proximity Index	Block-group	14	10	Longitudinal Employer-Household Dynamics (LEHD), 2010
Opportunity Indices	Environmental Health Index	Tract	14	14	National Air Toxics Assessment (NATA) data, 2005

III. Levels of Geography and Weights

The Data Tool includes data for all U.S. states, the District of Columbia, and Puerto Rico. Users may access data through the Data Tool at various spatial scales, including geo-boundaries of Census tracts, the Community Development Block Grant (CDBG) and the Core-based Statistical Area (CBSA). As shown in Table 1, most data in the Data Tool are at the Census tract or block-group levels. The selection of a spatial scale to use as the initial basis for each data element is primarily based on the lowest level in which HUD has faith in its accuracy. For example, data elements constructed from the American Community Survey (ACS) data are based on Census tract estimates rather than block-group estimates due to concerns about sampling errors.

Data displayed in the Data Tool map views are at the Census tract level. Data displayed in the report tables are aggregated from smaller geographic units (i.e. either the Census tract or block-group level) to the CDBG[1] and CBSA levels. As shown in Table 1, the AFFH data are from multiple sources in various years. In order to compile them into one mapping tool database, data issued or released at different years need to be adjusted to the same year. The Census tract and block-group boundaries in the Data Tool are based on those released by Census in 2010. The Data Tool incorporates minor changes indicated in the ACS "Geography Release Notes" for 2011 and 2012 on the Census Bureau website,[2] resulting in boundaries and corresponding data adjusted to calendar year 2012. The CDBG boundaries are based on political jurisdiction boundaries for calendar year 2011. The CBSA boundaries are based on OMB 2013 definitions.

The CDBG level reflects the geographic boundaries for grantees that receive direct allocations of CDBG funds from HUD. CDBG jurisdictions are not census-designated areas, which means that CDBG jurisdictional boundaries do not fall consistently along Census tracts or block-groups. A series of technical procedures were necessary to construct a crosswalk between census-designated areas and CDBG jurisdictions. Census geographic identifiers at the summary level 070 (state-county-county subdivision-place/remainder) and summary level 080 (state-county-county subdivision-place/remainder-census tract) were matched to HUD CDGB jurisdiction geographic identifiers.

Weights

At the boundaries of CDBG jurisdictions, some Census tracts fell partially within the jurisdiction and partially outside of the jurisdiction. Data from these tracts were weighted by the share of the population within the CDBG boundary to approximate including only the portion of those tracts within the CDBG jurisdiction in aggregate figures reported at the CDBG level. In contrast, block groups were simply assigned to the CDBG jurisdiction that contained its centroid (i.e., central point).

IV. Race/Ethnicity

Among other protected characteristics, the Fair Housing Act prohibits housing discrimination based on race. HUD offers data on both race and ethnicity. Because the Fair Housing Assessment focuses

[1] CDBG jurisdictions in the Data Tool exclude non-entitlement jurisdictions.

[2] Tract changes between 2010 and 2011 are here: http://www.census.gov/acs/www/data_documentation/2011_geography_release_notes/; Tract changes between 2011 and 2012 are here: http://www.census.gov/acs/www/data_documentation/2012_geography_release_notes/

on discrimination, HUD provides data for non-Hispanic whites, considering Hispanics of any race as a separate race/ethnic category that can experience housing discrimination differently than other groups. Similarly, the data provided for the other race groups – Black, Asian and Pacific Islander, Native American, and other – also exclude information for people who identify their ethnicity as Hispanic. Other race/ethnicity data are discussed in sections IX and XI.

Data Source: American Community Survey (ACS) 2006-2010; Decennial Census, 2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Related Tables/Maps: Table 1, 2, 5, 6; Map 1, 2, 5-7, 9-14

V. National Origin and Limited English Proficiency (LEP)

The Fair Housing Act prohibits housing discrimination based on national origin. The Data Tool provides data for four indicators of national origin. The first two are the ten most common places of birth of the foreign-born population by jurisdiction and region and the number and percentage of the population that is foreign-born. The second two indicators are the most common ten languages spoken at home (for the population age 5 years and over) for those who speak English "less than 'very well,'" and the number and percentage of the population who speak English "less than very well."

Data on national origin and LEP originate from the 2006-2010 American Community Survey and Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 and 1990. Counts of each place of birth by tract were aggregated to the jurisdiction and regional level separately. Within these geographies, the counts for places of birth were ranked and the ten most populous groups were determined and are presented.

The full most common ten places of birth and LEP languages are displayed in the Tables, while the most common five are displayed in the Maps. HUD limits the number of categories for the maps to enable users to better visualize the most populous groups. National origin and LEP data were missing for Puerto Rico.

Data Source: American Community Survey (ACS) 2006-2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990.
Related Tables/Maps: Table 1, 2, 5, 6; Map 3, 4, 8, 9-14

VI. Disability Status and Type

The Fair Housing Act prohibits housing discrimination against any person based on disability. The Data Tool provides information on disability type, disability status by age group, and disability status by housing type. The disability type and disability status by age group measures are from the ACS, while the measure of persons with disabilities by housing type is from the PIC/TRACS data (see section IX). The definition of "disability" used by the Census Bureau may not be comparable to reporting requirements under certain HUD programs, which sometimes use different definitions of disability for purposes of determining eligibility.

The disability type categories are: hearing difficulty, vision difficulty, cognitive difficulty, ambulatory difficulty, self-care difficulty, and independent living difficulty. These categories are

based on a new set of disability questions introduced into the ACS in 2008 and are not comparable to disability type figures in prior years.

Data Source: American Community Survey (ACS), 2008-2012; Inventory Management System (IMS)/ PIH Information Center (PIC), 2013; Tenant Rental Assistance Certification System (TRACS), 2013
Related Tables/Maps: Table 1, 15, 16; Map 15, 16

VII. Sex

The Fair Housing Act prohibits housing discrimination against any person based on sex. The Data Tool provides information on male/female status.

Data Source: Decennial Census, 2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Related Tables/Maps: Table 1, 2

VIII. Families with Children and Age

The Fair Housing Act prohibits housing discrimination against any person based on familial status. For purposes of the Fair Housing Act, familial status includes one or more individuals under the age of 18 being domiciled with a parent or other person with legal custody of such individuals. The Data Tool provides information on families with children. Specifically, familial status is measured as the number and percentage of all families (with two or more related people in the household) that are families with children under age 18. The Data Tool also provides data on age group (under 18, 18-64, and 65+).

Data Source: Decennial Census, 2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Related Tables/Maps: Table 1, 2, 6; Map 9-14

IX. Households in Assisted Housing

The Data Tool provides data on households within the following housing categories: Public Housing, Section 8 Project-based Rental Assistance (PBRA), other assisted housing multifamily properties, Section 8 Housing Choice Voucher (HCV) Program, and Low-Income Housing Tax Credit (LIHTC). The "other assisted housing multifamily" properties include properties funded through the Supportive Housing for the Elderly (Section 202), Supportive Housing for Persons with Disabilities (Section 811), Rental Housing Assistance (Section 236), Rent Supplement (Rent Supp.), Rental Assistance Payment (RAP), and Below Market Interest Rates (BMIR) programs.

The sources for data on households in these housing types are:

- HCV: census tract-level data extract from the Family Report Form HUD-50058 (PIC)
- Public Housing: development-level data extract from the Family Report Form HUD-50058 (PIC)
- PBRA and other multifamily properties: development-level data extract from HUD-50059 (TRACS)

- LIHTC: National Low-Income Housing Tax Credit (LIHTC) Database

The Tool reports data by housing category differently depending on the report table. These details are outlined below:

Tables 7, 8, 13, and 17 present data on households in Public Housing, PBRA, other assisted housing multifamily properties, and HCV. Data on developments with fewer than 11 households reported or with fewer than 50 percent of occupied units reported at the CDBG and CBSA aggregations were omitted to ensure confidentiality.

Table 7 presents the total number of units in housing assistance programs and their share of the total number of housing units within CDBG jurisdictions. The denominator used in Table 7 is the total number of housing units in the 2010 census block-group aggregated at the CDBG level.

Table 8 presents data on the race and ethnicity of households in housing assistance programs. The race/ethnicity categories are non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic Asian or Pacific Islander. Information on the race and ethnicity of households with incomes at or below 30 percent of the area median income (AMI) is from the Comprehensive Housing Affordability Strategy (CHAS) database.

Table 9 reports the following data on households in housing assistance programs within the CDBG jurisdiction: race/ethnicity (percent white, black, Hispanic, and Asian or Pacific Islander), percent of households with at least one member with a disability, and percent of households where the head or spouse is age 62 or older. The data in this table are presented separately for properties/households located within and outside of racially/ethnically-concentrated areas of poverty (detailed below in section X) within the CDBG jurisdiction.

Table 10 presents data on the composition of households assisted through Public Housing, PBRA, and other assisted housing multifamily properties. Population characteristics – race/ethnicity (white, black, Hispanic, Asian), households with children, and poverty rate – of the census tracts that contain assisted housing are also presented. Although information on households in LIHTC properties is not displayed in Table 10, the data on geographic coordinates for properties were used to identify the list of census tracts presented. Data on properties with fewer than 11 households reported or with fewer than 50 percent of occupied units reported at the development and at the Census tract aggregation were omitted to ensure confidentiality.

Tables 9 and 10 include only developments with spatial information that is precise enough to accurately determine their location within a Census tract, such as a rooftop location or the ZIP+4 centroid associated with the address. Developments with less precise spatial information are omitted because they cannot reliably be located to the correct street block or the correct side of the street block.

In conjunction with Tables 9 and 10, Maps 5 and 6 also include only developments with spatial information that is precise enough to be accurately mapped. Over 96 percent of Public Housing, PBRA, and other assisted housing multifamily properties and 84 percent of LIHTC properties have sufficient geographic information to be included in the tables and maps.

Tables 13 and 17 present data on unit size (households in 0-1 bedroom units, 2 bedroom units, and 3 or more bedroom units), households with children, and households where at least one member has a disability.

Data Source: Inventory Management System (IMS)/PIH Information Center (PIC), 2013; Tenant Rental Assistance Certification System (TRACS), 2013; National Low-Income Housing Tax Credit (LIHTC) Database, 2013; Decennial Census, 2010; Comprehensive Housing Affordability Strategy (CHAS), 2007-2011
Related Tables/Maps: Table 7-10, 13, 17; Map 5, 6

X. R/ECAP

To assist communities in identifying racially/ethnically-concentrated areas of poverty (R/ECAPs), HUD has developed a census tract-based definition of R/ECAPs. The definition involves a racial/ethnic group concentration threshold and a poverty test. The racial/ethnic group concentration threshold is straightforward: R/ECAPs must have a non-white population of 50 percent or more. Regarding the poverty threshold, Wilson (1980) defines neighborhoods of "extreme poverty" as census tracts with 40 percent or more of individuals living at or below the poverty line. Because overall poverty levels are substantially lower in many parts of the country, HUD supplements this with an alternate criterion. Thus, a neighborhood can be a R/ECAP if it has a poverty rate that exceeds 40% or is three or more times the average tract poverty rate for the metropolitan/micropolitan area, whichever threshold is lower. Census tracts with this extreme poverty that satisfy the racial/ethnic concentration threshold are deemed R/ECAPs. This translates into the following equation:

$$R/ECAP_i = yes \ldots if \ldots \begin{cases} PovRate_i >= [3 * \mu_{PovRate}^{cbsa}] \\ or \\ PovRate_i >= 0.4 \end{cases} \bigcup \left[\frac{(Pop_i - NHW_i)}{Pop_i}\right] >= 0.50$$

Where *i* represents census tracts, ($\mu_{PovRate}^{cbsa}$) is the metropolitan/micropolitan (CBSA) mean tract poverty rate, PovRate is the *i*th tract poverty rate, (NHW_i) is the non-Hispanic white population in tract *i*, and Pop is the population in tract *i*.

While this definition of R/ECAP works well for tracts in CBSAs, places outside of these geographies are unlikely to have racial or ethnic group concentrations as high as 50 percent. In these areas, the racial/ethnic group concentration threshold is set at 20 percent.

Data Source: Decennial census (2010); American Community Survey (ACS), 2006-2010; Brown Longitudinal Tract Database (LTDB) based on decennial census data, 2000 & 1990
Related Tables/Maps: Table 6, 9; Map 1-16
References:
Wilson, William J. (1980). The Declining Significance of Race: Blacks and Changing American Institutions. Chicago: University of Chicago Press.

XI. Housing Problems and Disproportionate Housing Need

To assist communities in describing disproportionate housing need in their jurisdiction and region, the Data Tool provides data identifying instances where housing problems or severe housing problems exist. The Tool presents housing problems overall, as well as variations by race/ethnicity, household type and household size. The race/ethnicity categories presented are non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic Asian or Pacific Islander, non-Hispanic Native American, and non-Hispanic other. The household type and size categories presented are family households of less than five people, family households of five or more people, and non-family households of any size.

Information on housing problems is drawn from CHAS, which demonstrates the extent of housing problems and housing needs, particularly for low-income households. The CHAS data are produced via custom tabulations of ACS data by the U.S. Census Bureau.

The Data Tool provides data on the number and share of households with one of the following four housing problems:

1. Lacks complete kitchen facilities
2. Lacks complete plumbing facilities
3. More than one person per room
4. Cost Burden - monthly housing costs (including utilities) exceed 30% of monthly income

Additionally, the Data Tool provides data on the number and share of households with one or more of the following "severe" housing problems, defined as:

1. Lacks complete kitchen facilities
2. Lacks complete plumbing facilities
3. More than one person per room
4. Severe Cost Burden - monthly housing costs (including utilities) exceed 50% of monthly income

Grantees should review these data to determine where disproportionate housing need may be found. For example, a sub-group, such as households of a particular racial/ethnic group or household size, may experience housing problems more frequently than the overall population as a whole or than another sub-group.

Data Source: Comprehensive Housing Affordability Strategy (CHAS), 2007-2011
Related Tables/Maps: Table 11, 12; Map 7, 8

XII. Indices

HUD has developed a series of indices to help inform communities about segregation in their jurisdiction and region, as well as about disparities in access to opportunity. A description of the methodology for each of the following indices may be found below:

1. Dissimilarity Index
2. Low Poverty Index

3. School Proficiency Index
4. Jobs Proximity Index
5. Labor Market Index
6. Low Transportation Cost Index
7. Transit Trips Index
8. Jobs Proximity Index
9. Environmental Health Index

Tables 3 and 4 of the AFFH data tables provide values for the dissimilarity index. Table 14 of the AFFH data tables provides values for all the remaining indices.

To generate Table 14, index values were calculated for each census tract. These tract values were averaged and then weighted based on the distribution of people of different races and ethnicities within the CDBG jurisdiction or CBSA to generate composite index values for each race and ethnicity. A similar process was applied to weight the data based on the distribution of people of different races and ethnicities who are living in poverty within the CDBG jurisdiction and CBSA. The population estimates are based on the 2010 Decennial Census at the census tract or block-group level, depending on the geographic level at which the index was originally calculated.

The indices from Table 14 are also used to populate maps generated by the Data Tool, showing the overall index values of census tracts juxtaposed against data on race/ethnicity, national origin, and family type.

The following details each of the eight indices used in the Data Tool.

A. Analyzing Segregation

1. Dissimilarity Index

Summary

The dissimilarity index (or the index of dissimilarity) is a commonly used measure of community-level segregation. The dissimilarity index represents the extent to which the distribution of any two groups (frequently racial or ethnic groups) differs across census tracts or block-groups. It is calculated as:

$$\mathrm{D}_j^{WB} = 100 * \frac{1}{2} \sum_{i=1}^{N} \left| \frac{W_i}{W_j} - \frac{B_i}{B_j} \right|$$

Where *i* indexes census block-groups or tracts, *j* is the jth jurisdiction, *W* is group one and *B* is group two, and *N* is the number of block-groups or tracts *i* in jurisdiction j.

Interpretation

The values of the dissimilarity index range from 0 to 100, with a value of zero representing perfect integration between the racial groups in question, and a value of 100 representing perfect segregation between the racial groups. The following is one way to understand these values:

Measure	Values	Description
Dissimilarity Index [range 0-100]	<40 40-54 >55	Low Segregation Moderate Segregation High Segregation

Data Source: Decennial Census, 2010, 2000, 1990. Block-group level data were used for 2010, and census tracts were used for 2000 and 1990.
Related Tables/Maps: Table 3, 4
References:
Massey, Douglas S. and Nancy A. Denton. 1988. The Dimensions of Residential Segregation. Social Forces, 67(2): 281-315.

B. Analyzing Indicators of Access to Opportunity

HUD has developed a two-stage process for analyzing disparities in access to opportunity and has selected five opportunity indicators upon which to focus: poverty, education, employment, transportation, and health. These indicators were selected because existing research suggests they have a bearing on a range of outcomes.

The first stage involves quantifying the degree to which a neighborhood offers features commonly viewed as important opportunity indicators such as education, employment, and transportation.. In the second stage, HUD compares these opportunity indicators across individuals in particular racial and economic subgroups to characterize disparities in access to opportunities. To focus the analysis, HUD developed methods to quantify a selected number of the important "opportunities" in every neighborhood. Invariably, these opportunity indicators do not capture all that is encompassed in an individual's or a family's access to opportunity.

While these important dimensions are identified by research as important to quality of life, the measures are not without limitations. HUD constrained the scope of HUD-provided items to those that are closely linked to neighborhood geographies and could be measured consistently at small area levels across the country. For example, HUD's measure of school performance only reflects elementary school proficiency. It does not capture academic achievement for higher grades of schooling, which are important to a community's well-being, but may not be as geographically tied to individual neighborhoods as elementary schools. Similarly, the health hazard measure only captures outdoor toxins, missing indoor exposures. The national-availability restriction is a necessity given that all HUD program participants must complete an Assessment of Fair Housing. HUD realizes that there are other opportunity indicators that are relevant, such as housing unit lead and radon levels. However, these lack consistent neighborhood-level data across all program participant geographies. As a consequence, HUD encourages program participants to supplement the data it provides with local data and local knowledge on these other opportunity indicators so that the analysis is as thorough as possible. The five opportunity indicators are operationalized by seven indices, described below.

2. Low Poverty Index

Summary

The low poverty index captures the intensity of poverty in a given neighborhood. The index uses both family poverty rates and public assistance receipt, in the form of cash-welfare, such as Temporary Assistance for Needy Families (TANF). The index is a linear combination of two vectors: the family poverty rate (*pv*) and the percentage of households receiving public assistance (*pa*).

$$Pov_i = \left[\left(\frac{pv_i - \mu_{pv}}{\sigma_{pv}}\right) * -1\right] + \left[\left(\frac{pa_i - \mu_{pa}}{\sigma_{pa}}\right) * -1\right]$$

Where means (μ_{pv}, μ_{pa}) and standard errors (σ_{pv}, σ_{pa}) are estimated over the national distribution.

The poverty rate and public assistance for neighborhoods are determined at the census tract level.

Interpretation

Values are inverted and percentile ranked nationally. The resulting values range from 0 to 100. The higher the score, the less exposure to poverty in a neighborhood.

Data Source: American Community Survey, 2006-2010
Related Tables/Maps: Table 14; Map 13

3. School Proficiency Index

Summary

The school proficiency index uses school-level data on the performance of 4th grade students on state exams to describe which neighborhoods have high-performing elementary schools nearby and which are near lower performing elementary schools. The school proficiency index is a function of the percent of 4th grade students proficient in reading (*r*) and math (*m*) on state test scores for up to three schools (i=1,2,3) within 1.5 miles of the block-group centroid. *S* denotes 4th grade school enrollment:

$$School_i = \sum_{n=i}^{3} \left(\frac{s_i}{\sum^n s_i}\right) * \left[\frac{1}{2} * r_i + \frac{1}{2} * m_i\right]$$

Elementary schools are linked with block-groups based on a geographic mapping of attendance area zones from School Attendance Boundary Information System (SABINS), where available, or within-district proximity matches of up to the three-closest schools within 1.5 miles. In cases with multiple school matches, an enrollment-weighted score is calculated following the equation above.

Interpretation

Values are percentile ranked and range from 0 to 100. The higher the score, the higher the quality of the school system in a neighborhood.

Data Source: Great Schools (proficiency data, 2011-12 or more recent); Common Core of Data (school addresses and enrollment, 2011-12); SABINS (attendance boundaries, 2011-12).
Related Tables/Maps: Table 14; Map 9

1. Jobs Proximity Index

Summary

The jobs proximity index quantifies the accessibility of a given residential neighborhood as a function of its distance to all job locations within a CBSA, with distance to larger employment centers weighted more heavily. Specifically, a gravity model is used, where the accessibility (*Ai*) of a given residential block-group is a summary description of the distance to all job locations, with the distance from any single job location positively weighted by the size of employment (job opportunities) at that location and inversely weighted by the labor supply (competition) to that location. More formally, the model has the following specification:

$$A_i = \sum_{i=1}^{n} \left(\frac{E_i d_{ij}^{-2}}{\sum L_j}\right)$$

Where *i* indexes residential locations and *j* indexes job locations within a CBSA, and distance, *d*, is measured as "as the crow flies" between block-groups *i* and *j*. *E* represents the number of jobs in block-group *j* and *L* is the number of workers.

The Longitudinal Employer-Household Dynamics (LEHD) has missing jobs data in all of Puerto Rico and a concentration of missing records in Massachusetts.

Interpretation

Values are percentile ranked with values ranging from 0 to 100. The higher the index value, the better the access to employment opportunities for residents in a neighborhood.

Data Source: Longitudinal Employer-Household Dynamics (LEHD) data, 2010
Related Template Tables/Maps: Table 14; Map 10

2. Labor Market Index

Summary

The labor market index provides a summary description of the relative intensity of labor market engagement and human capital in a neighborhood. This is based upon the level of employment, labor force participation, and educational attainment in a census tract (*i*). Formally, the labor market index is a linear combination of three standardized vectors: unemployment rate (*u*), labor-force participation rate (*l*), and percent with a bachelor's degree or higher (*b*), using the following formula:

$$LBM_i = \left[\left(\frac{\mu_i - \mu_u}{\sigma_u}\right) * -1\right] + \left(\frac{l_i - \mu_i}{\sigma_l}\right) + \left(\frac{b_i - \mu_b}{\sigma_b}\right)$$

Where the means (μ_u, μ_l, μ_b) and standard errors (σ_u, σ_l, σ_b) are estimated over the national distribution. Also, the value for unemployment rate is inverted.

Interpretation

Values are percentile ranked nationally and range from 0 to 100. The higher the score, the higher the labor force participation and human capital in a neighborhood.

Data Source: American Community Survey, 2006-2010
Related Tables/Maps: Table 14; Map 11

3. Low Transportation Cost Index

Summary

This index is based on estimates of transportation costs for a family that meets the following description: a 3-person single-parent family with income at 50% of the median income for renters for the region (i.e. CBSA). The estimates come from the Location Affordability Index (LAI). The data used in the AFFH Tool correspond to those for household type 6 (hh_type6_) as noted in the LAI data dictionary. More specifically, among this household type, we model transportation costs as a percent of income for renters (t_rent). Neighborhoods are defined as census tracts. The LAI data do not contain transportation cost information for Puerto Rico.

Interpretation

Values are inverted and percentile ranked nationally, with values ranging from 0 to 100. The higher the score, the lower the cost of transportation in that neighborhood. Transportation costs may be low for a variety of reasons, including greater access to public transportation and the density of homes, services, and jobs in the neighborhood and surrounding community.

Data Source: Location Affordability Index (LAI) data, 2008-2012
Related Tables/Maps: Table 14; Map 12
References:
www.locationaffordability.info
http://lai.locationaffordability.info//lai_data_dictionary.pdf

4. Transit Trips Index

Summary

This index is based on estimates of transit trips taken by a family that meets the following description: a 3-person single-parent family with income at 50% of the median income for renters for the region (i.e. the Core-Based Statistical Area (CBSA)). The estimates come from the Location Affordability Index (LAI). The data used in the AFFH tool correspond to those for household type 6 (hh_type6_) as noted in the LAI data dictionary. More specifically, among this household type, we model annual transit trips for renters (transit_trips_rent). Neighborhoods are defined as census tracts. The LAI has missing transit trip information for Puerto Rico.

Interpretation

Values are percentile ranked nationally, with values ranging from 0 to 100. The higher the score, the more likely residents in that neighborhood utilize public transit. The index controls for income such that a higher index value will often reflect better access to public transit.

Data Source: Location Affordability Index (LAI) data, 2008-2012
Related Tables/Maps: Table 14; Map 12
References:
www.locationaffordability.info
http://lai.locationaffordability.info//lai_data_dictionary.pdf

5. Environmental Health Index

Summary

The environmental health index summarizes potential exposure to harmful toxins at a neighborhood level. The index is a linear combination of standardized EPA estimates of air quality carcinogenic (*c*), respiratory (*r*) and neurological (*n*) hazards with *i* indexing census tracts.

$$EnvHealth_i = \left[\left(\frac{c_i - \mu_c}{\sigma_c}\right) + \left(\frac{r_i - \mu_r}{\sigma_r}\right) + \left(\frac{n_i - \mu_n}{\sigma_n}\right)\right] * -1$$

Where means (μ_c, μ_r, μ_n) and standard errors (σ_c, σ_r, σ_n) are estimated over the national distribution.

Interpretation

Values are inverted and then percentile ranked nationally. Values range from 0 to 100. The higher the index value, the less exposure to toxins harmful to human health. Therefore, the higher the value, the better the environmental quality of a neighborhood, where a neighborhood is a census block-group.

Data Source: National Air Toxics Assessment (NATA) data, 2005
Related Tables/Maps: Table 14; Map 14
References:
http://www.epa.gov/ttn/atw/natamain/

C. Computing Indices by Protected Class

The Data Tool provides index values documenting the extent to which members of different racial or ethnic groups have access to particular opportunity indicators. The Data Tool provides a weighted average for a given racial or ethnic group. The generic access for racial or ethnic group *M* to asset dimension *R* in jurisdiction *j* is calculated as:

$$Index_M^R = \sum_i^N \frac{M_i}{M_j} * R_i$$

Where i indicates Census tracts in jurisdiction *j* for subgroup *M* to dimension *R*. *N* is the total number of Census tracts in jurisdiction j.

It is useful to provide an example of this in practice (Table 2). Consider Jurisdiction X with a total of three neighborhoods (A, B, and C). Each neighborhood has an index score representing the prevalence of poverty within that neighborhood (Column (1), with higher values representing lower levels of poverty. To compute the index value for a particular racial or ethnic group, the values are weighted based on the distribution of that racial or ethnic group across the three neighborhoods. For example, 40% of the jurisdiction's white population lives in neighborhood A, so the index value for neighborhood A represents 40% of the composite index value for the white population in the jurisdiction. The values for neighborhoods B and C are weighted at 40% and 20% respectively, based on the share of white individuals living in those neighborhoods, leading to a final weighted low poverty index for whites in the jurisdiction of 56.

Table 2. Example of Weighting of Low Poverty Index by Race in a Hypothetical Jurisdiction

	Dimension	White			Black		
Neighborhood	Low Poverty Index	white pop	%white of total pop	Index for whites [(1)*(3)]	black pop	%black of total pop	Index for blacks [(1)*(6)]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A	80	400	40%	32	100	20%	16
B	50	400	40%	20	150	30%	15
C	20	200	20%	4	250	50%	10
Total		1000	100%	**56**	500	100%	**41**

This exercise can be repeated for each racial or ethnic group. For example, the low poverty index among blacks in Jurisdiction X is 41. Using these indices, it is possible to identify disparities in access to c opportunity across protected classes.

To account for differences in household income across groups, the Data Tool also provides separate index values for persons with incomes below the Federal poverty line, again breaking out values by racial or ethnic group. This will aid jurisdictions in understanding whether there are meaningful disparities in access to opportunity across protected classes that cannot be explained by differences in poverty status. These index values for racial/ethnic groups and for racial/ethnic groups below the Federal poverty line are available in Table 14.