Population and Poverty Estimates for Los Angeles County

CensusTract-City Split Areas by Age, Race-Ethnicity and Sex

July 1, 2010 and July 1, 2011

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**Table of Contents**

1. **Data Dictionaries and Summary Totals (Appendix A)**
2. **Estimation Methods**1

2.1 Input Datasets Source List2

2.2 Data Flow Diagrams and Narrative3

2.3 Numeric Examples of Impact of Process Steps on Populations by Race-Ethnicity10

1. **Comments on Reliability and Use of the Final Population Estimates11**
2. **List of Associated Data Products and Their Naming Convention12**
3. **List of References13**
4. End Notes14

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In July 2012 the Los Angeles County Internal Services Department contracted with Hedderson Demographic Services to provide population and poverty estimates by census tract-city split areas by age, race-ethnicity and sex for 2010 and 2011. We describe in the following documentation the estimate data sets and the methods used to obtain them.

The Race-Ethnicity categories specified by the contract were all Hispanics and 5 Non-Hispanic groups: White, African American, American Indian, Asian, and Pacific Islander. The 2010 Census counts for Non-Hispanic “Other” and Non-Hispanic “Multiracial” were distributed into the 5 Non-Hispanic groups based on their proportion of the population in each tract-city split by age and sex. Another contract specification was that the estimates be consistent with the official state estimates for county and city populations produced annually by the California Department of Finance, Demographic Research Unit.

1. **Data Dictionaries and Summary Totals**

Appendix A contains the data dictionaries (Table A.1 for 2010 and Table A.2 for 2011) and summary totals (Table A.3 for 2010 and Table A.4 for 2011) for the population and poverty estimate files for July 1, 2012.

1. **Estimation Methods**

**2.1 Data Sources**

The base population numbers came from the 2010 Census. We updated these numbers to July 1, 2010, using city estimates from the California Department of Finance, Demographic Research Unit. The data sources for this work are listed in **Table 2.1 Input Datasets Source List**

**Table 2.1**

**Input Datasets Source List**



**2.2 Data Flow Diagrams and Narrative**

The first steps in preparing the 2010 Census data for our estimation model are illustrated below in **Chart 2.1 Prepare Census 2010 Data For Estimation Modeling.** The steps in making the July 1, 2010 population estimates are illustrated in **Chart 2.2 Estimate July 1, 2010 Population.**

We obtained preliminary July 1, 2011 population estimates by applying mortality and migration rates to the July 1, 2010 estimates. For the less than age 1 population, we used Census 2010 data to estimate the net effects of births, deaths and migration for that group. The preliminary estimates were than controlled to city estimates from the California Department of Finance, Demographic Research Unit. These processes are illustrated below in **Chart 2.3 Estimate July 1, 2011 Population.**

**Detail Steps**

*2010 Census Data Preparation and July 1, 2010 Population Estimates:*

1. The 2010 Census tract-city split area population found in Summary File 1 was the base population. It was placed in 8 race-ethnicity groups (All Hispanics and 7 Non-Hispanic groups: White, African American, American Indian, Asian, Pacific Islanders, Others and Multiracial) by single year age categories and sex.
2. Since the Group Quarters population does not change over time in the same way as Household population, it was subtracted from the total population before aging, births, and deaths formulas were used.[[1]](#endnote-1)
3. The preliminary estimates were controlled at the city level to the California Department of Finance (DOF) City Estimates. The DOF estimates are for January of each year, and we used the mean of the January estimates from 2010 and 2011 to obtain city control numbers for July 1 of 2010.

*July 1, 2011 Population Estimates:*

1. Our July 1, 2010 household population was adjusted for mortality to July 1, 2011 by applying California State mortality rates by race-ethnicity, age and sex.
2. The Step 4 population was adjusted for migration to July 1, 2011 by applying PUMA level annual migration rates by race-ethnicity, age, and sex. These migration rates were estimated from PUMA level cohort changes adjusted for mortality effects between the 2000 and 2010 Censuses.
3. An estimate of the less than age 1 population by race-ethnicity and sex was added based on the less than age 1 and age 1 populations in the 2010 Census.
4. The estimates were adjusted based on the PUMA level race-ethnicity distribution from the 2010 ACS.
5. The estimates were controlled to the mean of city estimates for January 2011 and January 2012 published by the California Department of Finance, Demographic Research Unit.
6. The estimates were rounded to whole numbers.
7. The estimates were reviewed for validity using Los Angeles County administrative records on births, deaths, registered voters and housing units.
8. The Other Race and Two or More Races categories (both Non-Hispanic) were allocated by us to the above Non-Hispanic groups based on the race distribution in each Census tract split.

*July 1, 2010 Poverty Estimates:*

The procedure for producing the July 1, 2010 Poverty estimates are in **Chart 2.4**.

1. From 2010 ACS 1-Year PUMA poverty rates were calculated by race-ethnicity (8 groups) for age groups “less than 18”, “18 to 34”, “35 to 64”, “65 plus”. If the total for any race-ethnicity by age group is less than 200, County rates for that race-ethnicity group were used for its age categories. Because of their small sample size, for the Non-Hispanic groups American Indians, Pacific Islanders, and Other we used the County 2010 total poverty rates by age adjusted for each groups total poverty rates differences from county total poverty rate.
2. A tract adjustment was made by multiplying the 2010 ACS 5-Year County rates by the ratio of tract total poverty rate divided by the County total poverty rate. Therefore, if a tract has a total poverty rate higher than the County rate the PUMA race-ethnic by age rates will be adjusted upward for that tract. Similarly, if the tract has a lower than County total poverty, the PUMA rates will be adjusted downward for that tract.
3. The rates were multiplied by our single year age household population estimates for July 1, 2010 for each tract.
4. The poverty numbers were controlled to the 2010 ACS 1-Year County rates for the four age groups by sex.
5. The poverty numbers were next controlled to the 2010 ACS 1 Year County rates for each race group and then controlled to the County total 2010 poverty rate of 17.5 percent.
6. The poverty numbers were aggregated to the deliverable age groups and then rounded.
7. For the Non-Hispanic race-ethnic groups, the rounded numbers for Other and Multiracial were distributed into the White, African American, Asian, Pacific Islander and American Indian categories.

*July 1, 2011 Poverty Estimates:*

The procedure for producing the July 1, 2011 Poverty estimates are in **Chart 2.5**.

1. The 2010 poverty rates from Step 13 were applied to our single year age household population estimates for July 1, 2011 for each tract.
2. The estimates from Step 19 were controlled to 2010 ACS 1-Year PUMS file estimates of County poverty rates by race-ethnicity, age, and sex.
3. The estimates from Step 20 were controlled to the 2011 ACS 1-Year file estimates of County poverty rates by race-ethnicity. (The 2011 ACS 1 Year PUMS file was not yet available, which prevented us from extracting 2011 ACS poverty rates for our target race-ethnicity groups by age, and sex.)
4. The poverty numbers were aggregated to the deliverable age groups and then rounded.
5. For the Non-Hispanic race-ethnic groups, the rounded numbers for Other and Multiracial populations were distributed into the White, African American, Asian, Pacific Islander and American Indian categories.











* 1. **Numeric Examples of Impact of Process Steps on Populations by Race-Ethnicity**

**Table 2.3**

**Impact of Steps to create Eight category Race-Ethnicity Estimates for July 1, 2011**



1. **Comments on the Reliability and Use of the Final Population and Poverty Estimates**

Our population estimates for July 1, 2011 are only 15 months from the last decennial census, which contributes to their accuracy. We are confident that they are very useable for planning and evaluation purposes. However, no population estimates are perfect because the source data files, even the baseline counts from the 2010 Census, contain errors.

In addition, reasonable modeling assumptions about fertility, mortality and migration trends since the last census will not work perfectly for every age, sex, and race-ethnicity group in every tract-city split. In updating the 2010 counts, we look for evidence of unusual population trends in city population estimates from the California Department of Finance, county population estimates from the Bureau of the Census, and Public Use Microsample Area (PUMA) level data from the Bureau’s annual Amer. Community Survey (ACS). We also use Los Angeles County administrative records files that include births, deaths, licensed drivers, registered voters, housing unit files and school enrollments. We make adjustments to our tract-city level estimates to reflect unusual trends, but information on unusual trends is typically not precise and not complete.

We recommend that data users perform analyses with populations greater than 25,000 by merging tract-city splits or by combining age, sex, race/ethnicity categories. Our data file contains estimates for single year age cohorts and six race-ethnicity groups, which provide substantial detail for analysts. These detailed data categories are there to provide the users with flexibility in doing analyses, however, the users need to be prudent and not work with cell numbers that are too small. There are no simple, precise ways to measure the error in estimates. Groups and areas that have high migration, are usually more difficult to model. Being within 15 months of the 2010 Census, we expect from past experience that most aggregates of our data above 25,000 persons will be within 1 percent of the number that would be obtained if another census had been conducted for July 1, 2011. Aggregates of our data under 500 persons could easily differ by 10% or more from what another census would show.

In addition, the user should keep in mind that the 2010 Census, as all censuses, had undercount and overcount errors. Minorities, mobile, rural, elderly and other populations that are more difficult to count with standard mail questionnaires are less likely to be counted. These errors are built into all estimates that use the decennial census as a base estimate.

1. **List of Associated Data Products and Their Naming Convention**

In association with the current estimates we will be producing estimates for other years and special populations. The variable naming conventions for all the files have been standardized to facilitate their use.

**Variable Naming Conventions**

The mnemonic naming conventions for our variables are as follows:

*Geographic Variables*

CT10 = 2010 census tract identification number

FIPS10 = 2010 census city identification code

*Population and Poverty Variables*

The codes for the poverty estimate variable names are as follows. The first character indicates race:

W = White Non-Hispanics

B = Black or African American Non-Hispanics

I = American Indian or Alaskan Native Non-Hispanics

A = Asian Non-Hispanics

P = Pacific Islander or Hawaiian Native Non-Hispanics

H = Hispanic

Second character indicates sex:

F = Female

M = Male

The third and fourth characters indicate year. For example,

10 = 2010

If the fifth character is an underscore, the variable is a population estimate. If the fifth character is a letter, it indicates a federal poverty level estimate. For example,

“\_” = population estimate

“a” = estimate of persons below the 100% poverty level

“b” = estimate of persons below 130% of the poverty level

“c” = estimate of persons below 133% of the poverty level

“d” = estimate of persons below 200% of the poverty level

The final characters indicate the beginning of the age interval; the end of the age interval is one less than the beginning age of the next variable. For example,

hf10a0 = Hispanic females age less than 1, below 100% of poverty

hf10a1 = Hispanic females ages 1 below 100% of poverty

hf10a2 = Hispanic females ages 2 below 100% of poverty

hf10a3 = Hispanic females ages 3 below 100% of poverty

hf10a4 = Hispanic females ages 4 below 100% of poverty

hf10a5 = Hispanic females ages 5 below 100% of poverty

However, above age 5 the ages are grouped:

hf10a6 = Hispanic females ages 6 to 9, below 100% of poverty

hf10a10 = Hispanic females ages 10 to 12, below 100% of poverty

hf10a13 = Hispanic females ages 13 to 17, below 100% of poverty

hf10a18 = Hispanic females ages 18 to 19, below 100% of poverty

hf10a20 = Hispanic females ages 20 to 24, below 100% of poverty

And so on until

hf10a100 = Hispanic females ages 100 and older, below 100% of poverty

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1. **End Notes**

1. The Group Quarters populations were estimated using the following method.

   1. Extract SF1 tables pct13, pct13b through pct13i from files 18, 35, and 36. Table pct13 has household population counts for all races. Tables pct13b, pct13c, pct13d, pct13e, pct13f, and pct13g have household population counts for Black or African American Alone, American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and other Pacific Islander Alone, Other Race Alone, Two or More Races respectively. These categories include persons of Hispanic or Latino Origin. Pct13h has household population counts for Hispanic or Latino and pct13i has counts for White Alone, Not Hispanic or Latino. Hispanic or Latino and White Alone, Not Hispanic or Latino match race-ethnicity categories Hispanic and White used in our population estimates. The other race groups do not match our categories because they include persons of Hispanic or Latino Origin.
   2. Set household population data for the categories White and Hispanic, used in our population estimates, equal to the White Alone, Not Hispanic and Hispanic or Latino data from the SF1 by sex and age group.
   3. Subtract Hispanic or Latino and White Alone, Not Hispanic or Latino from the household population for all races by sex and age group.
   4. Add remaining household population races together (Black or African American Alone, American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and other Pacific Islander Alone, Other Race Alone, Two or More Races) by sex and age group.
   5. If any of the sex and age-group cells in the remaining race groups (Black or African American Alone, American Indian and Alaska Native Alone, Asian Alone, Native Hawaiian and other Pacific Islander Alone, Other Race Alone, Two or More Races) is equal to zero for household population, we know that the corresponding cells in estimate race groups (which do not include Hispanic Origin) are also set to zero.
   6. If the split census tract numbers by sex and age group from step d equal those from step e, we know that the household populations by sex and age group for the Non-Hispanic race groups used in our model are the same as the household populations reported in SF1 for race groups that do include Hispanic or Latino. Otherwise, the values are set to ‘missing.’
   7. Extract SF2 tables pct5 from file 4 iterations 453, 455, 457, 459, 461, 463. Table pct5 has household population counts. Iterations 453, 455, 457, 459, 461, and 463 have counts for Black or African American Alone, Not Hispanic or Latino; American Indian and Alaska Native Alone, Not Hispanic or Latino; Asian Alone, Native Hawaiian and other Pacific Islander Alone, Not Hispanic or Latino; Other Race Alone, Not Hispanic or Latino; Two or More Races, Not Hispanic or Latino respectively. These categories match our population estimate categories Black, American Indian, Asian, Pacific Islander, Other Race, Two or More Races.
   8. Merge results from step f with SF2 files. If there is a record in the SF2 file and the data using our population estimate race-ethnicity groups, based on the SF1 file is ‘missing’ then replace the ‘missing’ data with SF2 data. Data by race group is suppressed in the SF2 if there are fewer than 100+ persons in that geographic area.
   9. Extract SF1 tables PCT12H through PCT12O from files 27 through 34. Tables PCT12H through PCT12O has single year total population for race-ethnicity groups matching those used in our population estimates (Hispanic, White, Black, American Indian, Asian, Pacific Islander, Other Race, and Two or More Races.)
   10. Aggregate single year data to match age categories used in household data.
   11. Merge results from step 8 (household population data) with SF1 total population data. Where household population counts are ‘missing’ replace with total population counts. If the household population cannot be determined replace with the total population.
   12. Subtract household population from total population to get estimates of the group quarter’s population.
   13. Extract SF1 table PCT21. Table PCT21 has the total population in group quarter’s.
   14. Compare total group quarter’s estimates with total group quarter’s counts from SF1.
   15. Group quarter’s estimates are divided into single years based on the single-year population distribution in each tract, sex, race-ethnicity group.

   [↑](#endnote-ref-1)