

Appendix L Activity Data Analysis Report

L.1 Introduction

The Office of Environmental Health Hazard Assessment (OEHHA) and the Air Resources Board (ARB) staff have updated the exposure assessment methodologies and the data used for conducting Health Risk Assessments (HRA) as prescribed under the Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill 2588; Health and Safety Code Section 44300 et seq.). The mandates of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels. This report focuses on two of the exposure variables (i.e. exposure duration and exposure frequency) used in estimating a person's lifetime average daily dose by considering the time a person lives in his or her primary residence and the time a person spends daily at home.

Staff looked into various data sources to determine the residency duration at the household level and the daily activity pattern at the individual level. The data sources the staff examined include the National Human Activity Pattern Survey (NHAPS), the National Household Travel Surveys (NHTS), the National Longitudinal Surveys, the American Time Use Survey Data Extract Builder, the Integrated Public Use Microdata Series (IPUMS-USA) census data, the Southern California Association of Governments (SCAG) 2000 regional travel survey data, and the California Department of Transportation (Caltrans) 2000-2001 California Statewide Household Travel Survey (CHTS) data. The staff determined that IPUMS-USA, SCAG 2000 regional travel survey, and Caltrans 2000-2001 CHTS represent the most current and California-specific residence and activity data and therefore were used as the basis for the conclusions stated in this report.

Results show that, from 2006 to 2009, over 91% of California householders had lived at their current home address for less than 30 years, and over 63% of householders had lived at their current residence for 9 years or less. No data were available for householders who lived in their homes over a 70 year period.

The 2000-2001 CHTS data show that, on average, Californians spend approximately 73% of their time at home per day. When looking at the data by age group, the time increases to 85% for children under 2 years old. Individuals that are 2 years or older, but less than 16 years old, spend 72% of their time at home whereas Californians that are 16 years or older spend 73% of their time at home.

L.2 Data Sources Analyzed

L.2.1 IPUMS-USA data

IPUMS-USA consists of more than fifty samples of the American population drawn from fifteen federal censuses and from the American Community Surveys (ACS). ACS is a nationwide survey that collects and produces population and housing information every year from about three million selected housing unit addresses across every county in the nation (ACS). IPUMS-USA samples, which draw on every surviving census from 1850-2000 and the 2000-2009 ACS samples, collectively constitute the quantitative information on long-term changes in the American population. These records for the period since 1940 only identify geographic areas with equal or larger than 100,000 residents (250,000 in 1960 and 1970) (IPUMS-USA).

IPUMS-USA census data contain residency duration, travel to work data, residence and work location, age, household and personal income, and ethnicity data.

L.2.2 SCAG Year 2000 Post-Census Regional Household Travel Survey Data

The second set of data the staff evaluated was the Post-Census Regional Household Travel Survey sponsored by the Southern California Association of Governments (SCAG). SCAG is the federally designated metropolitan planning organization (MPO) for the Los Angeles region of California. The survey targeted households in the six counties of the SCAG region: Imperial, Los Angeles, Orange, San Bernardino, Riverside, and Ventura (SCAG, 2003).

SCAG survey has data of time spent at home, trip data, geo code for locations, home address, age, income, ethnicity, and limited residency duration (months lived at home location).

L.2.3 Caltrans 2000-2001 California Statewide Household Travel Survey Data

Caltrans maintains statewide household travel data to estimate, model, and forecast travel throughout the State. The information is used to help in transportation planning, project development, air quality analysis, and other programs. The CHTS obtained sample household socioeconomic and travel data at the regional and statewide levels.

In the raw survey database obtained from Caltrans, there are data about trip duration, activity duration, location type, geo code for destination, address, age, income, and ethnicity. There are no data about residency duration.

Caltrans is currently developing a new 2011-2012 CHTS, which is a joint effort among Caltrans, SCAG and other MPOs. ARB is part of the Steering Committee.

L.2.4 Data Sources Summary

Table L.1 summarizes the activity data sources the staff analyzed, which include IPUMS census data, SCAG 2000 regional travel survey data, and Caltrans 2000-2001 CHTS data. It shows the data availability based on the HRA related categories.

Table L.1 Activity Data Sources

Sources			
HRA related Categories	IPUMS-USA Census Data 2000-2009	SCAG 2000 Travel Survey	Caltrans 2000-2001 CHTS
Residency duration	Year moved in	Months lived at home location	N/A*
Time at home per day	N/A	At home activity duration	At home activity duration
Time away from home	Hours worked, Travel time to work	Trip duration, activity duration	Trip duration, activity duration
Trip distance	N/A	Geo code for origin and destination	Geo code for destination
Residence location	City. No zip code	Address	Address
Age	Yes	Yes	Yes
Income level	Income Variables	Household income	Household income
Seasonal trend	N/A	N/A	N/A
Ethnicity	Yes	Yes	Yes
Data Set	Federal censuses (1850-2000), American Community Surveys (2000-2009)	2000-2002 Six-county Los Angeles region of CA	2000-2001 CA Statewide weekday travel survey

* N/A: Data are not available.

L.3 Methodologies and Findings:

In this section, we outline the methodologies we used in each of the data sources to estimate a person's time period lived in his or her residence and the time spent in different activities each day. We also examined how different environmental factors such as socioeconomic status, age, and ethnicity affect residency duration and daily activity patterns. We conclude with a discussion of the findings of each of the data sources.

L.3.1 IPUMS-USA data

L.3.1.1 Methodology

The staff used IPUMS online analysis tool (IPUMS Tool) to analyze the residency duration data based on ACS 2006-2009 data. The results are compiled and discussed below.

There are IPUMS_USA ACS data from 2000 to 2005 as well. However, the IPUMS_USA ACS data from 2006 to 2009 are more recent and have the same sample size percentage (i.e. 1%) for each year. In addition, these data include persons in group quarters and the smallest identifiable geographic unit is the Public Use Microdata Area (PUMA) containing at least 100,000 persons (IPUMS Samples). Group quarters consist of both institutions and units housing either a primary family or a primary individual plus a given number of persons unrelated to the head (IPUMS GQ).

L.3.1.2 Findings and Discussions

L.3.1.2.1 California Statewide Residency Duration Distributions

Table L.2 presents California statewide time moved into residence distributions compiled from the analysis results of ACS 2006, 2007, 2008, 2009 single year samples and ACS 2006-2008 3-year sample using IPUMS-USA online data analyzing tool. The time moved into residence variable has 7 values in ACS data as listed in "Time Moved into Residence" column in Table L.2, including "5 to 9 years ago" and "30 years ago". The statistical data provided have the samples' household weight applied. Household weight indicates how many households in the U.S. population are represented by a given household in an IPUMS sample (IPUMS Weights). Each cell besides the row and column headers in Table L.2 contains a household percent and the number of householders presented by that percent.

In summary, IPUMS-USA ACS 2006 to 2009 data show that the percentage of the California householders with a residency period of 30 years or greater is less than 9%. In other words, over 91% of California householders had lived in their current residence location for less than 30 years. These data also show that over 63% California householders had lived at their current residence for 9 years or less.

Table L.2* California Statewide Time Moved into Residence Distribution by Year

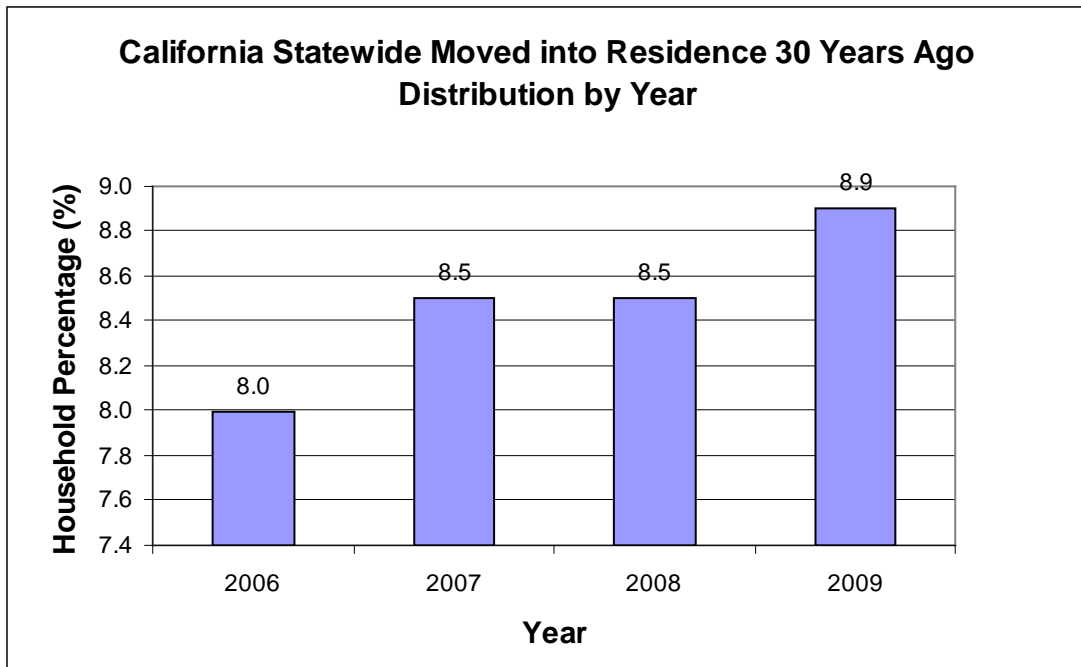
(Weighted Household Percent and Number)

Time Moved into Residence	2006	2007	2008	2006-2008 3-year Sample	2009
12 months or less	17.2 2,084,533.0	15.9 1,939,774.0	15.4 1,871,049.0	16.2 1,968,717.0	15.7 1923501
13 to 23 months ago	7.5 910,536.0	6.9 838,322.0	6.5 796,030.0	7 848,579.0	6.4 783261
2 to 4 years ago	21.9 2,665,547.0	22.9 2,795,422.0	23.3 2,834,921.0	22.7 2,768,053.0	20.3 2482340
5 to 9 years ago	19.8 2,411,057.0	20.1 2,449,371.0	20.1 2,448,160.0	20 2,434,099.0	20.9 2554979
10 to 19 years ago	17.6 2,141,482.0	17.7 2,162,519.0	18.1 2,208,805.0	17.8 2,169,353.0	18.9 2311981
20 to 29 years ago	7.9 960,926.0	8.1 982,699.0	8.0 979,208.0	8.0 974,196.0	8.7 1067833
30 years ago	8.0 977,136.0	8.5 1,032,572.0	8.5 1,038,566.0	8.3 1,014,849.0	8.9 1090992
TOTAL	100.0 12,151,217.0	100.0 12,200,679.0	100.0 12,176,739.0	100.0 12,177,846.0	100.0 12214887

* IPUMS-USA ACS 2006 to 2009 data with household weight applied. As of March 2011, there is no IPUMS-USA multi-year sample with ACS 2009 sample included yet.

Figure L.1 graphically depicts the 2006 to 2009 statewide householder percentages of Californians that moved into their current home location 30 years ago. From 2006 to 2009, this figure shows an increase in the percentage of statewide householders that moved into residence 30 years ago.

Figure L.1*

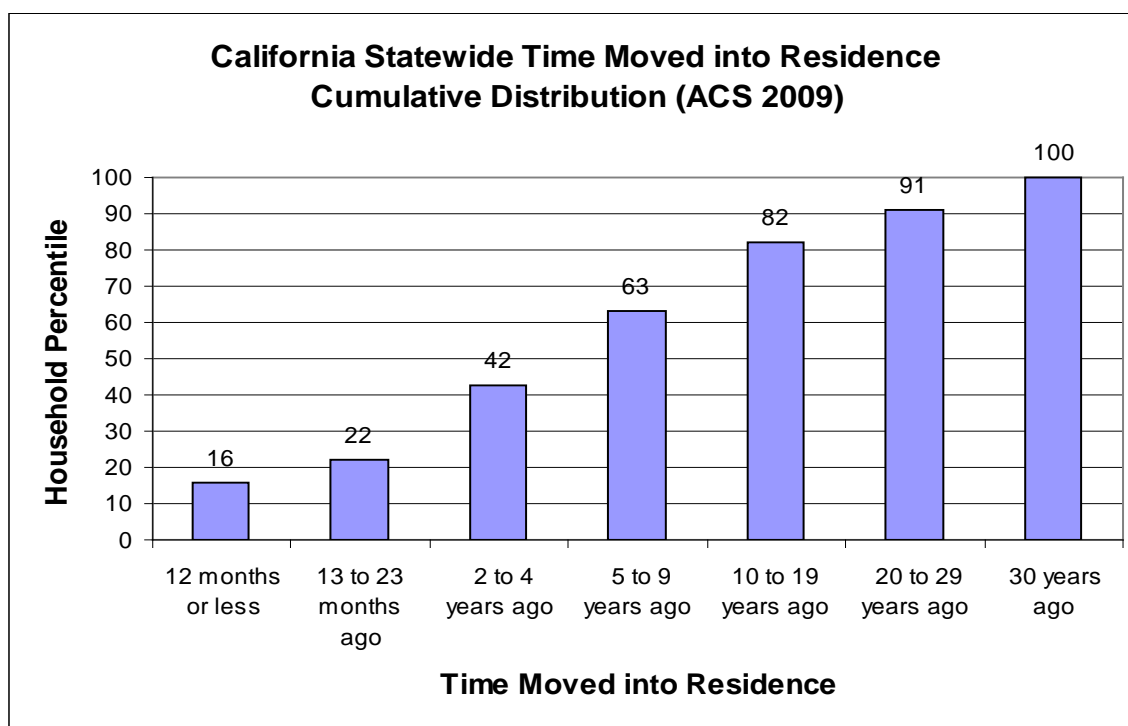


* IPUMS-USA ACS 2006, 2007, 2008, and 2009 single year samples with household weight applied.

Figure L.2 and Figure L.3, respectively, show the California statewide time moved into residence cumulative distributions using IPUMS-USA ACS 2009 sample and 2006-2008 3-year sample with household weight applied. Both of these figures show that over 90 percent of California householders had lived at their current home address for less than 30 years, and approximately 63 to 66 percent of the householders had lived at their current residency location for 9 years or less.

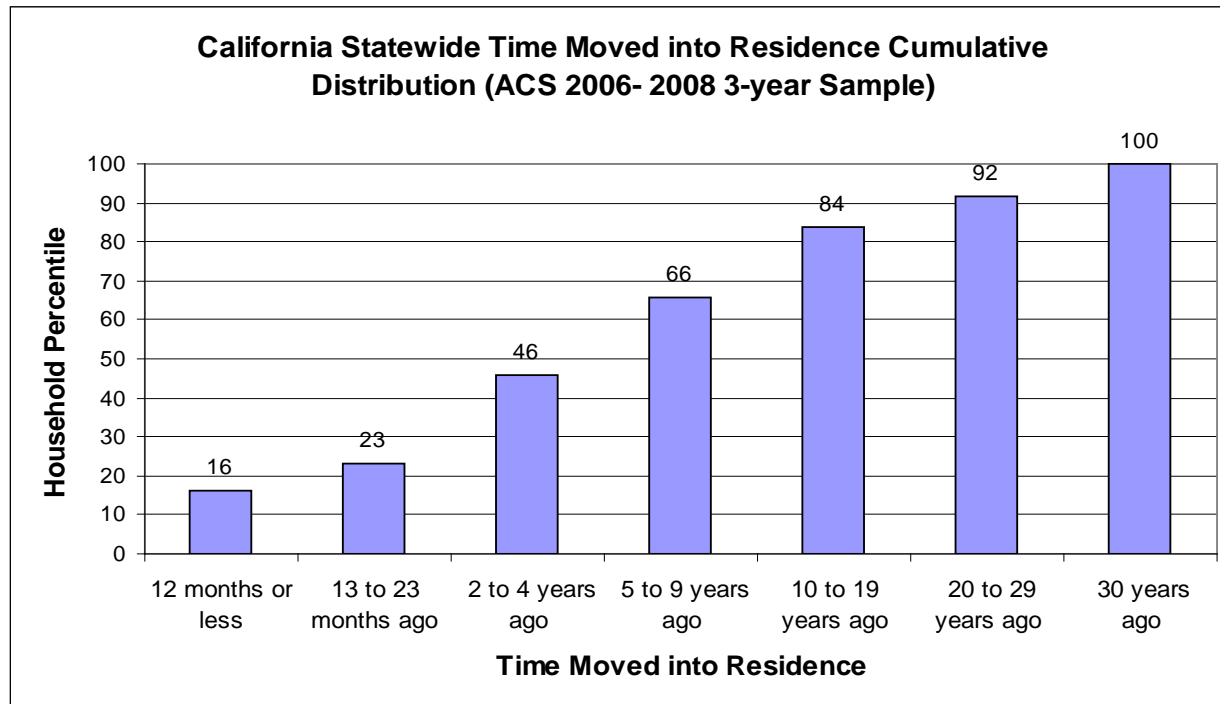
See Supplemental Information section (page 29) for additional information on time moved into residence distributions by California householder's ethnicity, age, and household income from IPUMS-USA ACS 2009 data.

Figure L.2*



* IPUMS-USA ACS 2009 data with household weight applied.

Figure L.3*



* IPUMS-USA ACS 2006-2008 3-year sample with household weight applied. As of March 2011, there is no IPUMS-USA multi-year sample with ACS 2009 sample included available yet.

L.3.1.2.2 Evaluation of Populations and Residency Duration Distributions for California Cities

Table L.3 and Figure L.4 display the populations and population changes for 8 selected California cities from IPUMS-USA ACS 2006 and ACS 2009 data with person weight applied. Person weight indicates how many persons in the U.S. population are represented by a given person in an IPUMS sample (IPUMS Weights). These 8 cities have populations over 100,000 from IPUMS-USA ACS 2006 and 2009 data, and were selected to represent the regions of California and to include an Environmental Justice community (Fresno, CA). If an area consisted of less than 100,000 persons then it was combined with another area so that the total population would be greater than 100,000 persons. The exhaustive distribution data from IPUMS-USA ACS 2006 and 2009 samples contain 41 identifiable California cities.

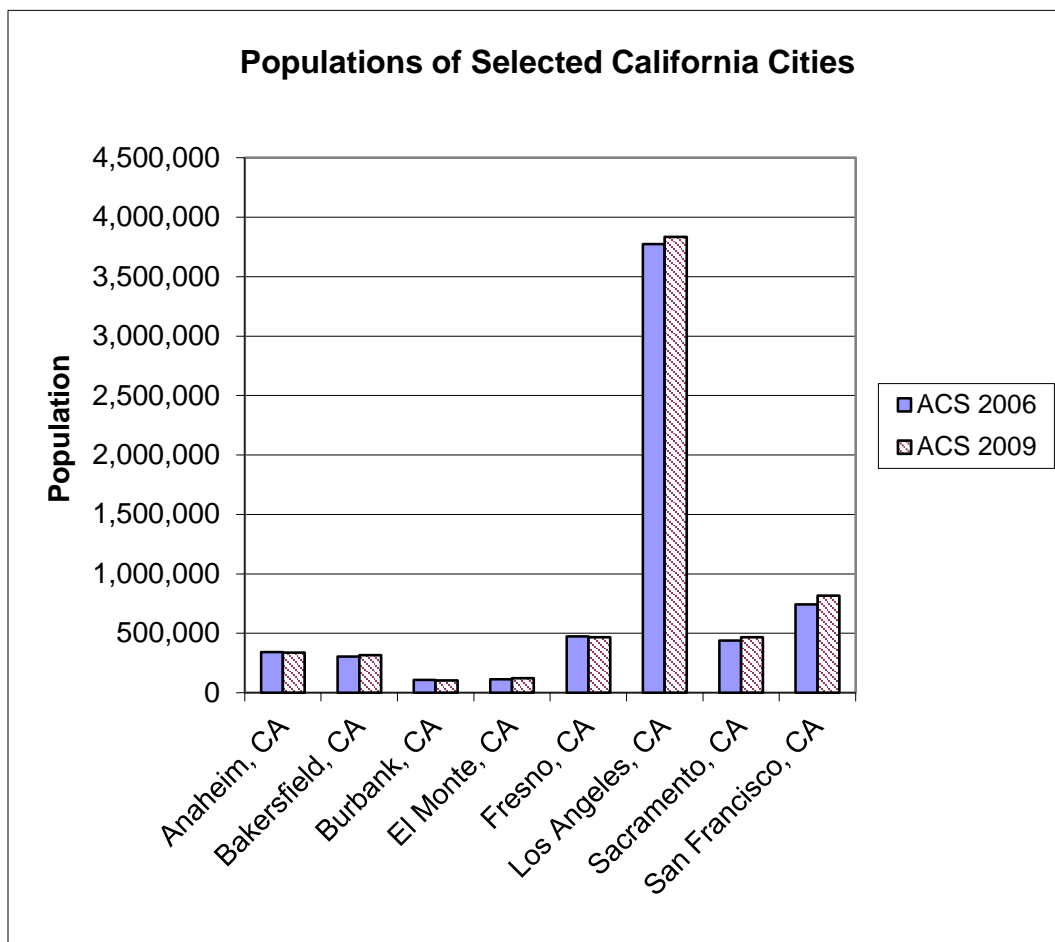
Table L.3* Comparison of Populations of Selected California Cities

(IPUMS-USA ACS 2006 and 2009)

California City	Anaheim	Bakersfield	Burbank	El Monte	Fresno	Los Angeles	Sacramento	San Francisco
2006	343,120	304,813	107,540	113,644	474,466	3,775,106	438,385	744,389
2009	337,966	316,313	103,096	121,183	466,466	3,832,554	466,492	815,575
Population Change Percent	-1.5	3.8	-4.1	6.6	-1.7	1.5	6.4	9.6

* IPUMS-USA ACS 2006 and 2009 data with person weight applied.

Figure L.4*



* IPUMS-USA ACS 2006 and 2009 data with person weight applied.

Table L.4 and L.5 display the time moved into residence distributions for the 8 selected California cities from IPUMS-USA ACS 2006 and 2009 data, respectively, with household weight applied. Both tables show that 89% to 96% of householders had moved out of their residence within 30 years. In other words, about 4% to 11% householders had lived at their current residence for 30 years or longer. The residency duration data from IPUMS-USA ACS also indicate that, for all the 41 identifiable California cities, about 1% to 15% of householders had lived at their current residence for 30 years or longer in 2006, whereas 2% to 15% of householders had lived at their current residence for 30 years or longer in 2009.

Table L.4* Time Moved into Residence Distribution for Selected California Cities Weighted Household Percent and Samples (IPUMS-USA ACS 2006)

Time Moved into Residence	Anaheim, CA	Bakersfield, CA	Burbank, CA	El Monte, CA	Fresno, CA	Los Angeles, CA	Sacramento, CA	San Francisco, CA
12 months or less	19.1 18,845	23.6 23,729	11.3 4,847	11 3,083	22 33,457	15.8 200,769	21.9 37,111	15.8 50,869
13 to 23 months ago	8.1 8,021	9.1 9,194	9.9 4,236	6.1 1,715	7.2 10,896	6.4 81,792	9.3 15,778	7.9 25,535
2 to 4 years ago	22.9 22,542	25.9 26,028	21.8 9,314	23 6,456	24.3 36,928	21.8 278,034	23.2 39,271	21 67,837
5 to 9 years ago	21.6 21,324	18.9 19,038	23.2 9,924	23.1 6,469	19.8 30,086	22.3 284,354	17.7 30,006	15.6 50,166
10 to 19 years ago	15.6 15,341	13.3 13,427	15.5 6,649	18.4 5,177	14.9 22,728	18.1 231,199	11.2 18,986	20.2 65,170
20 to 29 years ago	4.9 4,838	5.3 5,373	7.5 3,194	9.9 2,768	5.6 8,512	7.3 93,569	7.8 13,134	9 28,989
30 years ago	7.8 7,654	3.8 3,857	10.9 4,651	8.5 2,397	6.3 9,554	8.2 104,450	8.8 14,939	10.5 33,980
TOTAL	100 98,565	100 100,646	100 42,815	100 28,065	100 152,161	100 1,274,167	100 169,225	100 322,546

* IPUMS-USA ACS 2006 data with household weight applied.

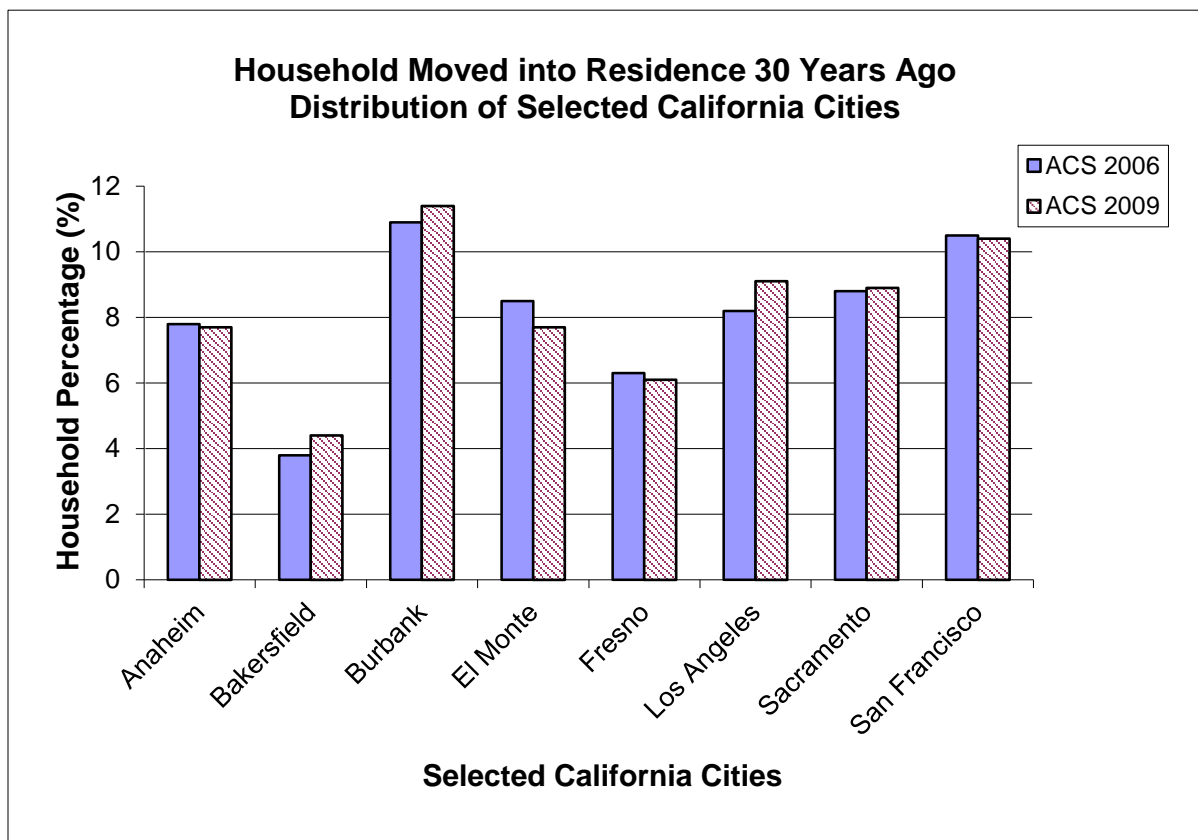
**Table L.5* Time Moved into Residence Distribution for Selected California Cities
Weighted Household Percent and Samples (IPUMS-USA ACS 2009)**

Time Moved into Residence	Anaheim, CA	Bakersfield, CA	Burbank, CA	El Monte, CA	Fresno, CA	Los Angeles, CA	Sacramento, CA	San Francisco, CA
12 months or less	15.8 15,554	21.3 21,302	17.5 6,907	11 2,995	21.3 31,605	15.5 200,860	23 40,825	14.8 48,036
13 to 23 months ago	6.5 6,428	7.9 7,875	6.3 2,475	6.9 1,888	8.8 13,032	5.7 74,089	8.4 14,879	7 22,627
2 to 4 years ago	22.7 22,405	27.1 27,146	19.2 7,580	19.7 5,388	19.8 29,474	20.3 263,922	22.3 39,562	21.9 71,210
5 to 9 years ago	21.1 20,817	20.4 20,411	21.5 8,507	26.8 7,337	20.2 29,998	21.6 279,991	17.4 30,875	18.7 60,640
10 to 19 years ago	19.2 18,951	14.6 14,640	18.7 7,391	17.2 4,692	16.9 25,153	20.2 262,938	13.2 23,382	18.6 60,314
20 to 29 years ago	7.1 6,964	4.2 4,241	5.5 2,170	10.7 2,932	6.9 10,258	7.6 98,225	6.7 11,848	8.7 28,132
30 years ago	7.7 7,591	4.4 4,443	11.4 4,504	7.7 2,094	6.1 8,989	9.1 118,599	8.9 15,830	10.4 33,631
TOTAL	100 98,710	100 100,058	100 39,534	100 27,326	100 148,509	100 1,298,624	100 177,201	100 324,590

* IPUMS-USA ACS 2009 data with household weight applied.

Figure L.5 shows the distribution of householders with residency periods of 30 years or greater for the 8 selected California cities from IPUMS-USA ACS 2006 and ACS 2009 data with household weight applied.

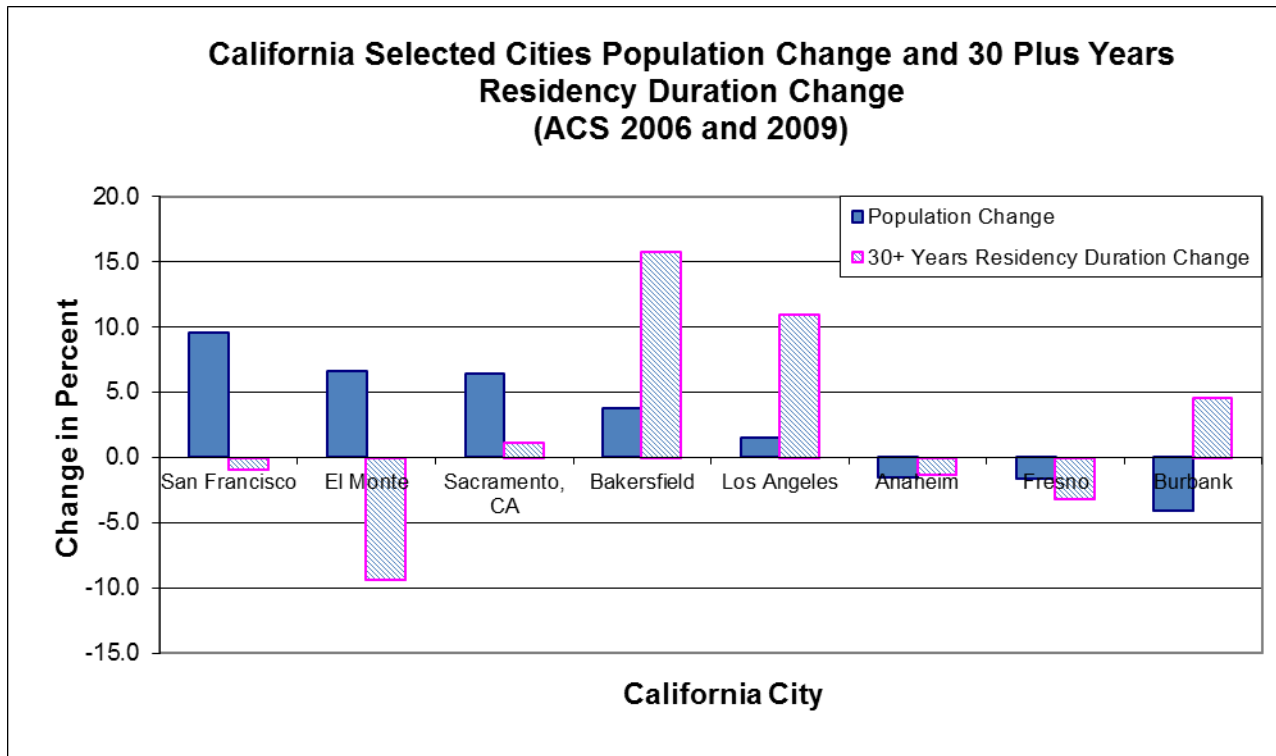
Figure L.5*



* IPUMS-USA ACS 2006 and 2009 data with household weight applied.

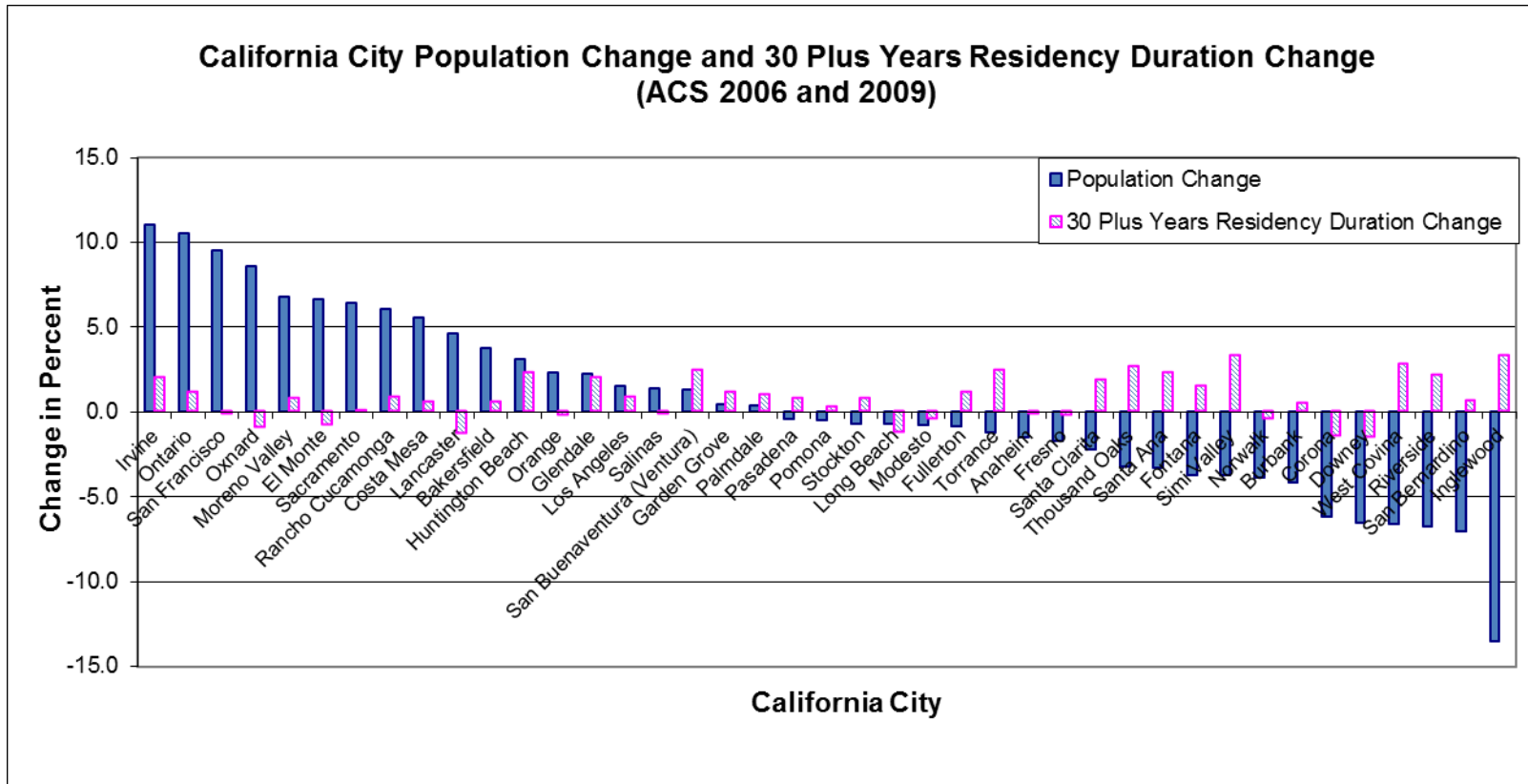
Staff also analyzed the population changes and the 30 years or greater residency duration changes for both the 8 selected cities and the 41 identifiable California cities using IPUMS-USA ACS 2006 to ACS 2009 data. The purpose of this analysis is to see if a rapidly growing city has a different pattern of residency durations. The results are illustrated in Figure L.6 and Figure L.7 respectively. There is no obvious correlation found between the population changes and the 30 years or greater residency duration changes. Figure L.7 shows that, when the population increased from 2006 and 2009, 13 cities showed an increase in 30 years or greater residency duration while 6 cities showed a decrease in 30 years or greater residency duration. And when the population decreased from 2006 to 2009, 15 cities showed an increase in 30 years or greater residency duration while 7 cities showed a decrease in 30 years or greater residency duration.

Figure L.6*



* IPUMS-USA ACS 2006 and 2009 data with household weight applied to the residency duration data, and person weight applied to population data.

Figure L.7*



* IPUMS-USA ACS 2006 and 2009 data with household weight applied to the residency duration data, and person weight applied to population data.

L.3.1.3 Limitations of the IPUMS-USA data for Our Purposes

The ideal data for our purposes would be longitudinal data on the duration of residence of individuals. The IPUMS collects information on how long the person has been in the current residence, but not previous residences. People may continue at the current residence for an indefinite period of time. Likewise people who report living in the current residence for a short period of time may have lived in the previous residence for an extended period time. This could be the case with older people who have recently moved to assisted living. Second, data on the amount of time that a person might have lived beyond thirty years were not collected. There is therefore no way of knowing the number of people who may have lived in the same residence for 40 or 50 years. Third, geographic areas with fewer than 100,000 inhabitants are not identifiable so the impact of living in a smaller community on residency time in California could not be determined. The data are binned into intervals that are as much as 9 years at the longer residency times. These data are the only California specific data that we could locate however, and are generally supportive of the nationwide data.

L.3.2 SCAG Year 2000 Post-Census Regional Household Travel Survey Data

L.3.2.1 Methodology

The survey collected demographic information about persons and households. It also captured activity and travel information for household members during a 24-hour or 48-hour timeframe. The survey coincides with 2000-2001 CHTS. According to the 2000 Census, this region had 5,386,491 households. The total number of households that participated the survey and met the criteria for a completed record was 16,939 (SCAG, 2003). In the survey report, there are some trip time and age information.

Using the SCAG survey database, a statistical analysis for the regional average time spent at home per day was performed.

L.3.2.2 Findings and Discussions

The average time at home per person per day was determined to be 17.6 hours, which is about 73% of a day. This result is based on 44,344 person day records without any weight factor applied.

The residency duration data (months lived at home location) in the database are labeled as 1 to 12, 98-unknown, and 99-refused. Label 1 to 11 represents 1 to 11 months lived at home location, whereas label 12 represents 12 plus months lived at home location. No additional data were collected on residency duration. Therefore, the residency duration data from SCAG survey are limited for long-term health risk assessment evaluations.

L.3.2.3 Limitations on the Use of SCAG Household Travel Survey Data

The limitations of SCAG travel survey data include that the time spent at home analysis does not have weight factors applied due to insufficient user information on weights for personal level analysis (SCAG Manual) and the residency duration is not further categorized for a period that is 12 months or longer, which limits the data usage for long-term health risk assessment.

L.3.3 Caltrans 2000-2001 California Statewide Household Travel Survey Data

L.3.3.1 Methodology

The Survey was “activity” based and included in-home activities and any travel to activity locations. The Survey was conducted among households in each of the 58 counties throughout the State and grouped by region to provide a snapshot of both regional and interregional travel patterns. The participating households were asked to record travel information in their diaries for a specified 24-hour or 48-hour period. The Survey produced a sample size of 17,040 randomly selected households with an overall standard error of 0.8% at the 95% confidence level with respect to household level attributes at the statewide level of analysis (CHTS, 2003).

There are statistical survey reports about income, region, trip purpose, and trip time (home-work travel time percent by five minutes intervals by region). However, no report is based on travel distance, activity duration, season, or weekend.

A statistical analysis was performed by the staff using the CHTS database for the statewide average time spent at home per person per day. The result is based on 40,696 person day respondents’ records without any population weight factor applied.

Further statistical analysis gave us the statewide time at home average by age group, income level, and ethnicity. Time at home by age group and ethnicity results are based on 40,653 person day records. Time at home by income level result is based on 40,696 person day records. These results don’t have any weight factors applied. And five percent of the person day records are weekend records.

L.3.3.2 Findings and Discussions

L.3.3.2.1 California Statewide Average Time Spent at Home and Distributions by Age, Income, and Ethnicity

The statewide average time spent at home per person per day was determined to be 17.5 hours (including weekend samples), which is 73% of a day. This statewide average time at home percentage is about the same as the SCAG's regional average time at home percentage based on its 2000 regional travel survey data.

Table L.6 and Figure L.8 demonstrate California statewide time spent at home distribution by age group. The results show that children less than 2 years old spend 85% of their time at home, which is 12% more than the statewide average of 73%. Children in the age group 2 to <16 spend 72% of their time at home, which is a little less than the statewide average time at home.

Age groups listed in Table L.6 match those used for the application of Age Specific Sensitivity Factors that are listed in OEHHA's *Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures* (May 2009).

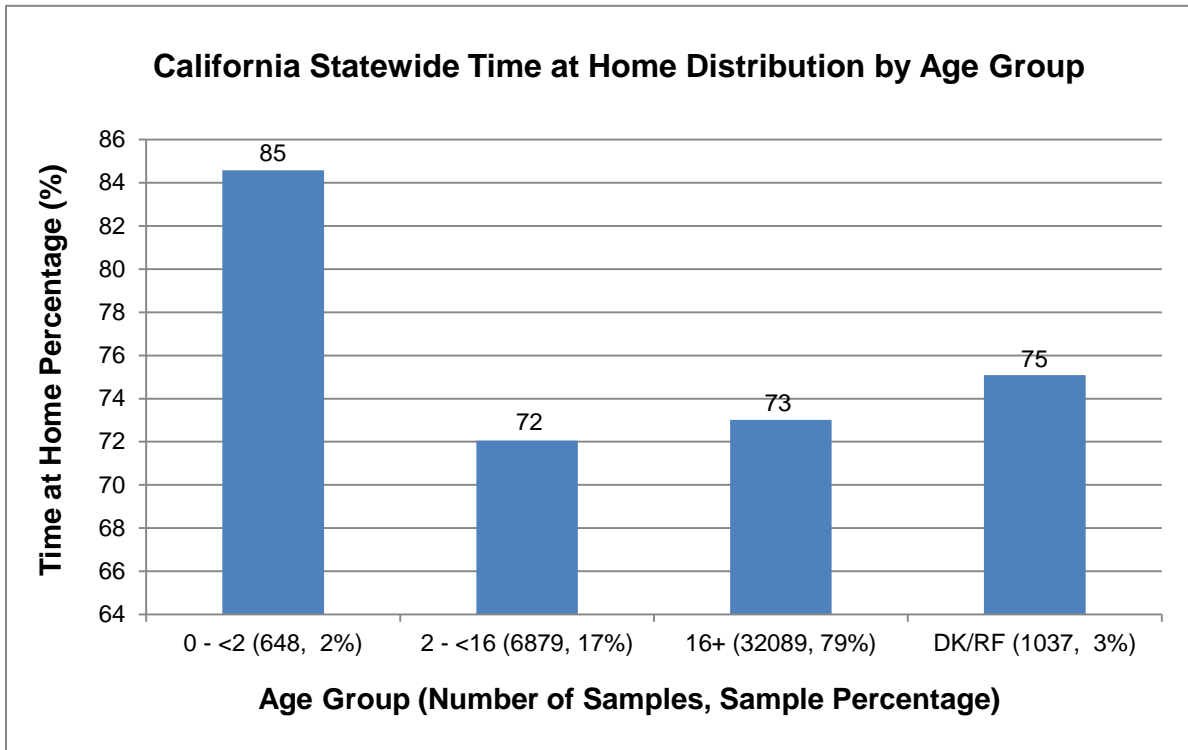
Table L.6 California Statewide Time at Home Distribution by Age Group

Age Group	Time at Home in Minute	Time at Home in Hour	Time at Home Percentage	Number of Samples	Sample Percentage
0 - <2	1218	20.3	85	648	2%
2 - <16	1037	17.3	72	6879	17%
16+	1051	17.5	73	32089	79%
DK/RF	1081	18.0	75	1037	3%
State Avg.	1052	17.5	73	40653	100%

Notes:

1. Caltrans 2000-2001 CHTS Data.
2. DK/RF means Don't Know/Refused.
3. Results don't have any weight factors applied.

Figure L.8



Notes:

1. Caltrans 2000-2001 CHTS Data.
2. DK/RF means Don't Know/Refused.
3. California statewide time at home average is 73%.
4. Total number of samples: 40,653.
5. Results don't have any weight factors applied.

Table L.7 and Figure L.9 demonstrate California statewide time spent at home distribution by household income level. They show a trend: the higher the household income is, the less time people spend at their home. The households with income level less than \$10k spend most of their time at home as 81% (19.5 hr.) whereas the households with income level more than \$100k but less than \$150k spend the least time at home as 68% (16.2hr). The households with income level more than \$35k but less than \$50k spend the state average time 73% (17.5 hr) at home.

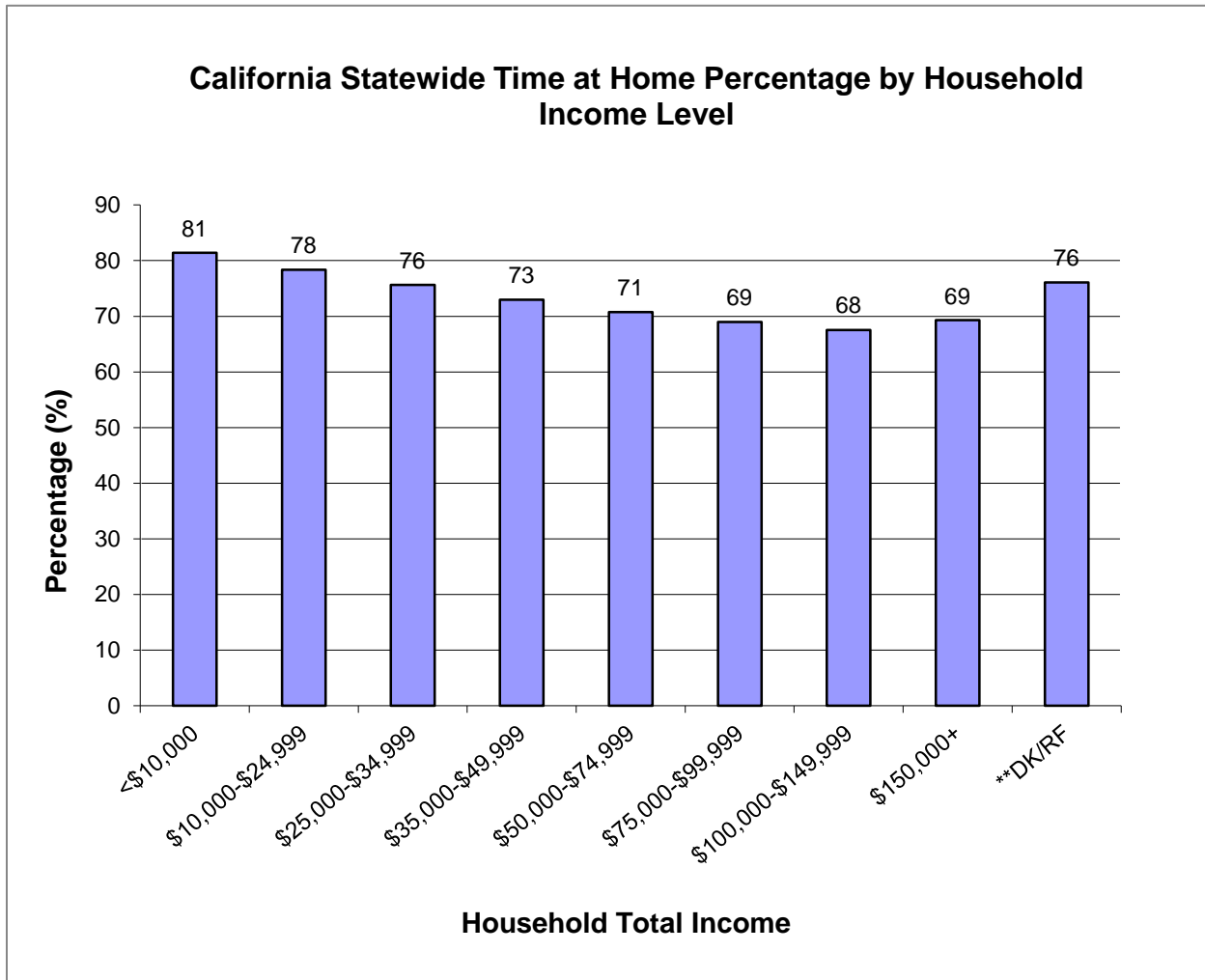
Table L.7 California Statewide Time at Home Distribution by Household Income Level

Household Total Income	Time at Home In Minute	Time at Home In Hour	Time at Home Percentage	Number of Samples	Sample Percentage
<\$10,000	1172	19.5	81	1312	3%
\$10,000-\$24,999	1128	18.8	78	5189	13%
\$25,000-\$34,999	1089	18.2	76	5265	13%
\$35,000-\$49,999	1051	17.5	73	5568	14%
\$50,000-\$74,999	1019	17.0	71	8677	21%
\$75,000-\$99,999	994	16.6	69	5077	12%
\$100,000-\$149,999	973	16.2	68	3332	8%
\$150,000+	998	16.6	69	1525	4%
DK/RF	1095	18.3	76	4751	12%
Total				40696	100%

Notes:

1. Caltrans 2000-2001 CHTS Data.
2. California statewide time at home average is 73%.
3. DK/RF means Don't Know/Refused.
4. Results don't have any weight factors applied.

Figure L.9



Notes:

1. Caltrans 2000-2001 CHTS Data.
2. California statewide time at home average is 73%.
3. DK/RF means Don't Know/Refused.
4. Total number of samples: 40,696.
5. Results don't have any weight factors applied.

Table L.8 and Figure L.10 show California statewide time spent at home distribution by ethnicity. They depict that all the ethnic groups spend 71% to 74% time at home per day. The N/A in the ethnicity group in Table L.8 means the description of the ethnicity code 6 in the database is not available. The Caltrans survey data contact person believes that the code 6 should not have existed. This was a mistake in survey reporting. The 532 person day records (1% of the total person day records) with ethnicity code 6 may exist in error.

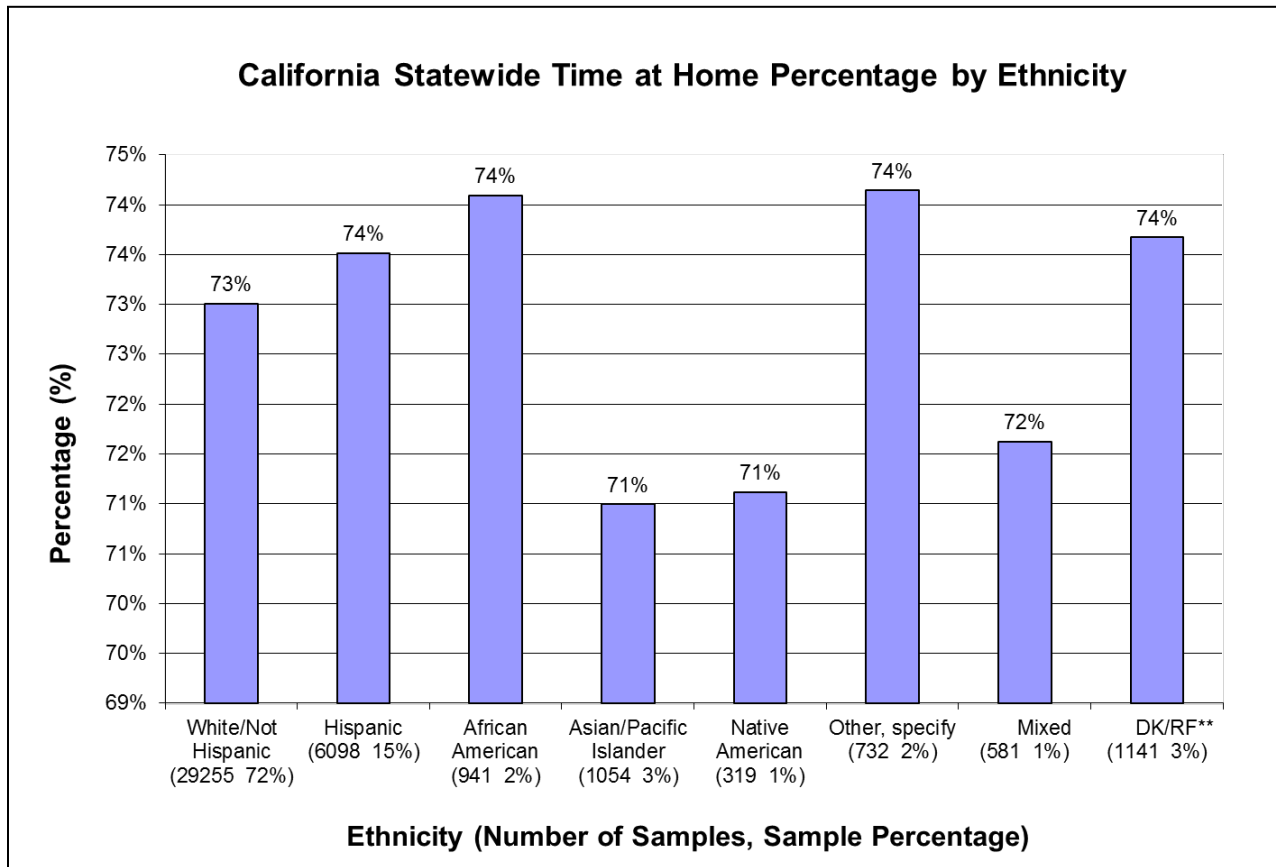
Table L.8 California Statewide Time at Home Average by Ethnicity

Ethnicity	Ethnicity Code	Time at Home In Minute	Time at Home In Hour	Time at Home Percentage	Number of Samples	Sample Percentage
White/Not Hispanic	1	1051	17.5	73%	29255	72%
Hispanic	2	1059	17.6	74%	6098	15%
African American	3	1067	17.8	74%	941	2%
Asian/Pacific Islander	4	1022	17.0	71%	1054	3%
Native American	5	1024	17.1	71%	319	1%
N/A	6	1077	17.9	75%	532	1%
Other, specify	7	1068	17.8	74%	732	2%
Mixed	8	1031	17.2	72%	581	1%
DK/RF	9	1061	17.7	74%	1141	3%
Total					40653	100%

Notes:

1. Caltrans 2000-2001 CHTS Data.
2. California statewide time at home average is 73%.
3. DK/RF means Don't Know/Refused.
4. N/A means the description of ethnicity code 6 is not available.
5. Results don't have any weight factors applied.

Figure L.10



Notes:

1. Caltrans 2000-2001 CHTS Data.
2. California statewide time at home average is 73%.
3. DK/RF means Don't Know/Refused.
4. Total number of samples: 40,653.
5. Results don't have any weight factors applied.

L.3.3.2.2 Comparison of Time at Home Results from CHTS Data with Time inside Home Results from ARB Activity Pattern Studies

Staff compared the time at home by age group statistical results from Caltrans 2000-2001 CHTS data and the time inside home results from 1987-1990 ARB activity pattern studies (ARB, 2005). Table L.9 and Figure L.11 show that, compared to the time spent inside home in 1987-1990, children under age of 12 spent similar amount of time at home in 2000-2001. However, teens (age 12 to 17) spent 6% more time at home in 2000-2001, and adults spent 11% more time at home in 2000-2001.

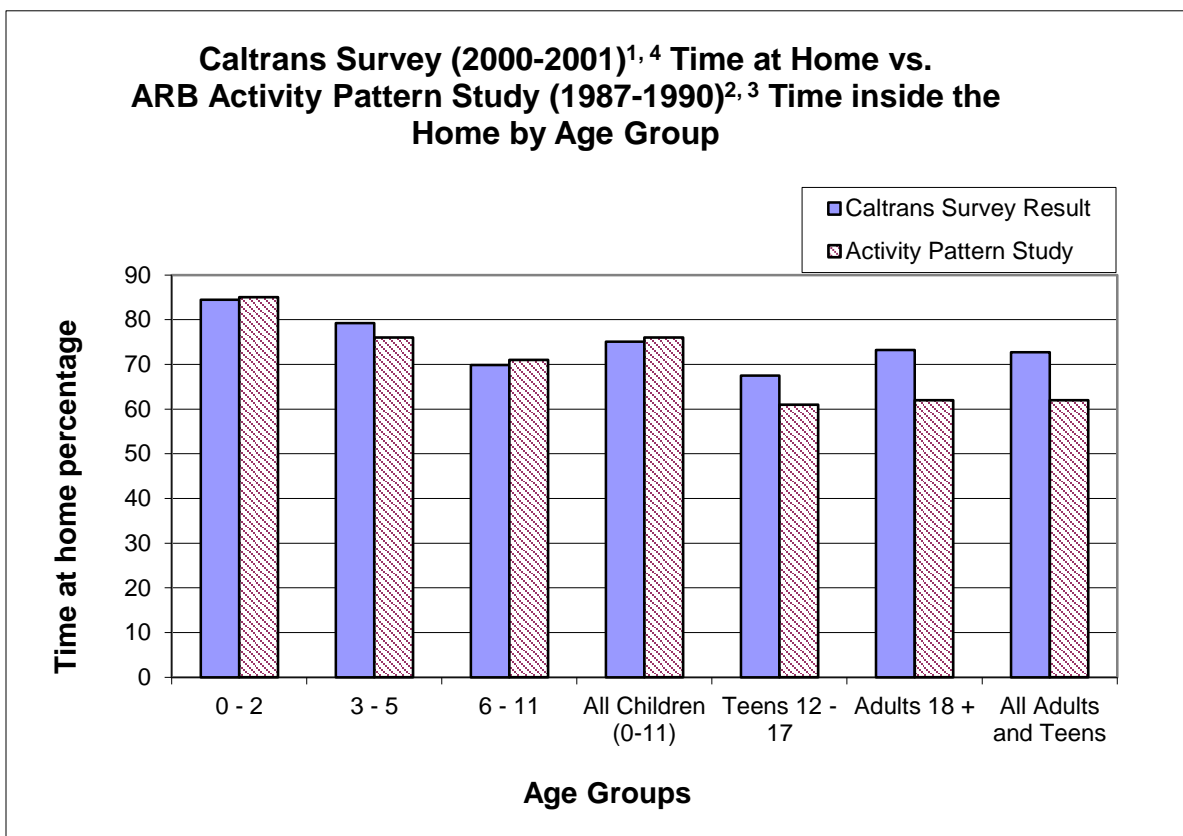
Table L.9 Caltrans Survey (2000-2001) Time at Home vs. ARB Activity Pattern Study (1987-1990) Time inside the Home by Age Group

Age Group	Caltrans ^{1,4}			ARB ^{2,3}	
	Number of Samples	Time at Home In Hour	Time at Home (%)	Number of Samples	Time Inside Home (%)
0 - 2	1086	20.3	84	313	85
3 - 5	1328	19.0	79	302	76
6 - 11	2985	16.8	70	585	71
All Children (0-11)	5399	18.0	75	1200	76
Teens 12 - 17	3180	16.2	67	183	61
Adults 18 +	31937	17.6	73	1579	62
All Adults and Teens	34217	17.4	73	1762	62

Notes:

1. The 2000 - 2001 California Statewide Household Travel Survey was conducted among households in each of the 58 counties throughout the State and grouped by region. Total person day records are 40,653.
2. The 1989 -1990 Children's Activity Pattern Study's samples are selected from households among three major areas: Southern Coast, S.F. Bay Area, and the rest of state. Total samples are 1,200 (ARB, 1991).
3. The 1987 - 1988 California Residents Activity Pattern Study's samples are selected from the same three major areas as for Children's Activity Pattern Study, with 1579 adult samples and 183 youth samples (ARB, 1992).
4. Results from Caltrans survey data don't have any weight factors applied, whereas the results from the activity pattern studies have the weight factors applied.

Figure L.11



Notes:

1. The 2000 - 2001 California Statewide Household Travel Survey was conducted among households in each of the 58 counties throughout the State and grouped by region. Total person day records are 40,653.
2. The 1989 -1990 Children's Activity Pattern Study's samples are selected from households among three major areas: Southern Coast, S.F. Bay Area, and the rest of state. Total samples are 1,200 (ARB, 1991).
3. The 1987 - 1988 California Residents Activity Pattern Study's samples are selected from the same three major areas as for Children's Activity Pattern Study, with 1579 adult samples and 183 youth samples (ARB, 1992).
4. Results from Caltrans survey data don't have any weight factors applied, whereas the results from the activity pattern studies have the weight factors applied.

L.3.3.3 Limitations on the Use of 2000-2001 CHTS data

The limitations of the use of the 2000-2001 CHTS data are that the analysis results do not have weight factors applied due to in-sufficient user information on weights for personal level analysis (CHTS Guide). And 2000-2001 CHTS does not have residence duration data.

L.4 Other Data Sources Not Used in This Report

L.4.1 The 2009 National Household Travel Survey

The 2009 NHTS updates information gathered in the 2001 NHTS and in prior Nationwide Personal Transportation Surveys. The data are collected on daily trips taken in a 24-hour period (NHTS, 2009). Although we may be able to analyze the 2009 NHTS data to get the time at home statistical results for Californians, the staff didn't use the data because the user manual was not ready at the time the staff was preparing this report.

L.4.2 National Human Activity Pattern Survey

NHAPS was sponsored by the U.S. Environmental Protection Agency. It was conducted between late September 1992 and September 1994, collected 24-hour activity diaries and answers of personal and exposure questions. The survey interviewed 9386 participants across the 48 contiguous states (Klepeis et al., 1995).

NHAPS has time in a residence data from California respondents. However, the staff didn't further analyze these data because the 2000-2001 CHTS provides much larger sample size and more recent California-specific data.

L.5 Conclusion

The staff has evaluated several data sources to identify the California statewide exposure duration and exposure frequency characteristics. Estimates on residence duration and time spent at home have been determined from available data on the California population. The data on residency time are similar to the available national data as discussed in Chapter 11. There is some variability in the residence duration and time spent at home by ethnicity, age, and income.

The IPUMS-USA census data show that, from 2006 to 2009, over 90% of California householders had lived at their current home address for less than 30 years, and over 63% householders had lived at their current residence for 9 years or less.

The 2000-2001 CHTS data show that, on average, Californians spend approximately 73% of their time at home per day. When looking at the data by age group, the time increases to 85% for children under 2 years old. Children that are 2 years or older but less than 16 years old spend 72% of their time at home; whereas Californians that are 16 years or older spend 73% of their time at home. In addition, all ethnicity groups spend 71%-74% of their time at home. The data also demonstrate a trend where the higher the total household income is, the less time the residents spend at their home.

These data are the best available on the California population for helping to establish default recommendations for the Hot Spots program.

L.6 References

(ACS) American Community Survey:

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(IPUMS-USA) Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2010. <http://usa.ipums.org/usa/index.shtml>. Last visited: January, 2011.

(IPUMS Tool) IPUMS Online Data Analysis System: <http://usa.ipums.org/usa/sda/>. Last visited: January, 2011.

(IPUMS Weights) IPUMS-USA Sample Weights:

<http://usa.ipums.org/usa/intro.shtml#weights>. Last visited: January, 2011.

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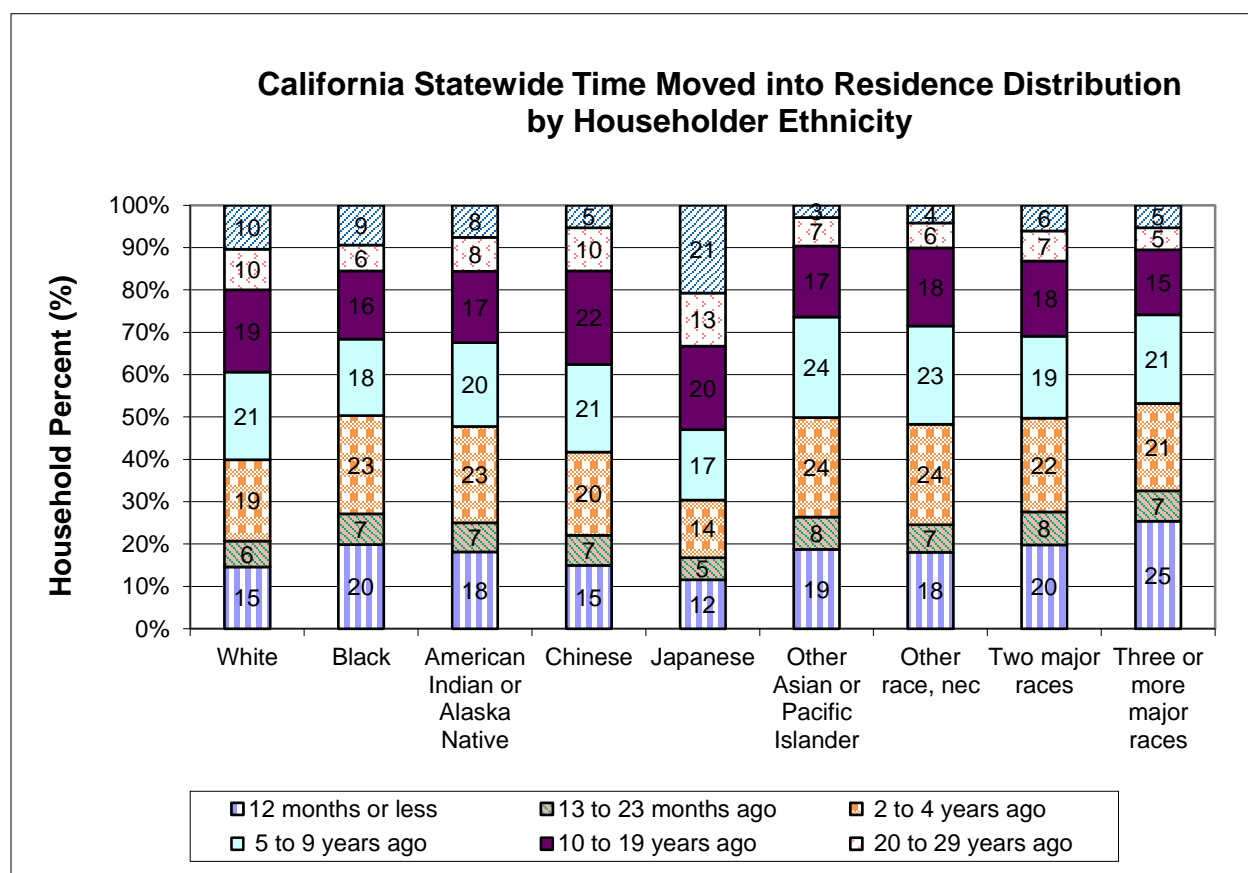
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S C, Engelmann W H. (1995) National Human Activity Pattern Survey. Klepeis et al.,
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A. Supplemental Information

The following figures graphically present the analysis results of California statewide time moved into residence distribution by householders' ethnicity, age, and household income respectively from IPUMS-USA ACS 2009 data (IPUMS-USA). The data are obtained by using IPUMS online analysis tool (IPUMS Tool). These data may be useful to the risk manager in considering population risk in different communities.

Figure A.1 shows California statewide time moved into residence distribution by householders' ethnicity. In general, the percentages of householders that moved into their residence 12 months or less ago, 2 to 4 years ago, 5 to 9 years ago, and 10 to 19 years ago are larger than the percentages of 13 to 23 months ago, 20 to 29 years ago, and 30 years ago.

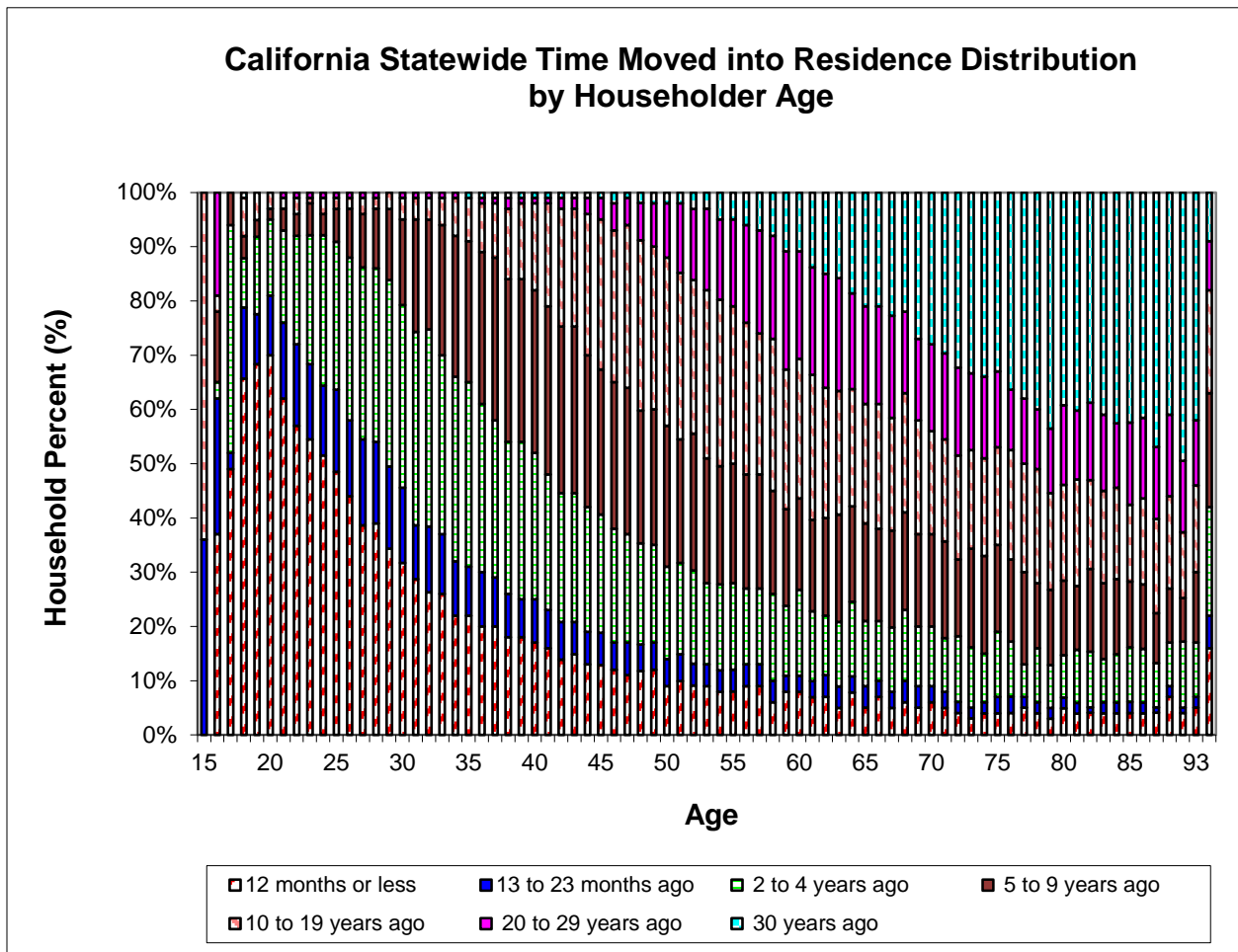
Figure A.1*



* IPUMS-USA ACS 2009 data with household weight applied (IPUMS Weights) (IPUMS Ethnicity).

Figure A.2 presents California statewide time moved into residence distribution by householders' age. It shows a general trend that the younger the householders are, the more householders moved into their residence within the last 12 months. And the older the householders are, the more householders moved into their residence 30 years ago. There are some exceptions at the both ends of the age range.

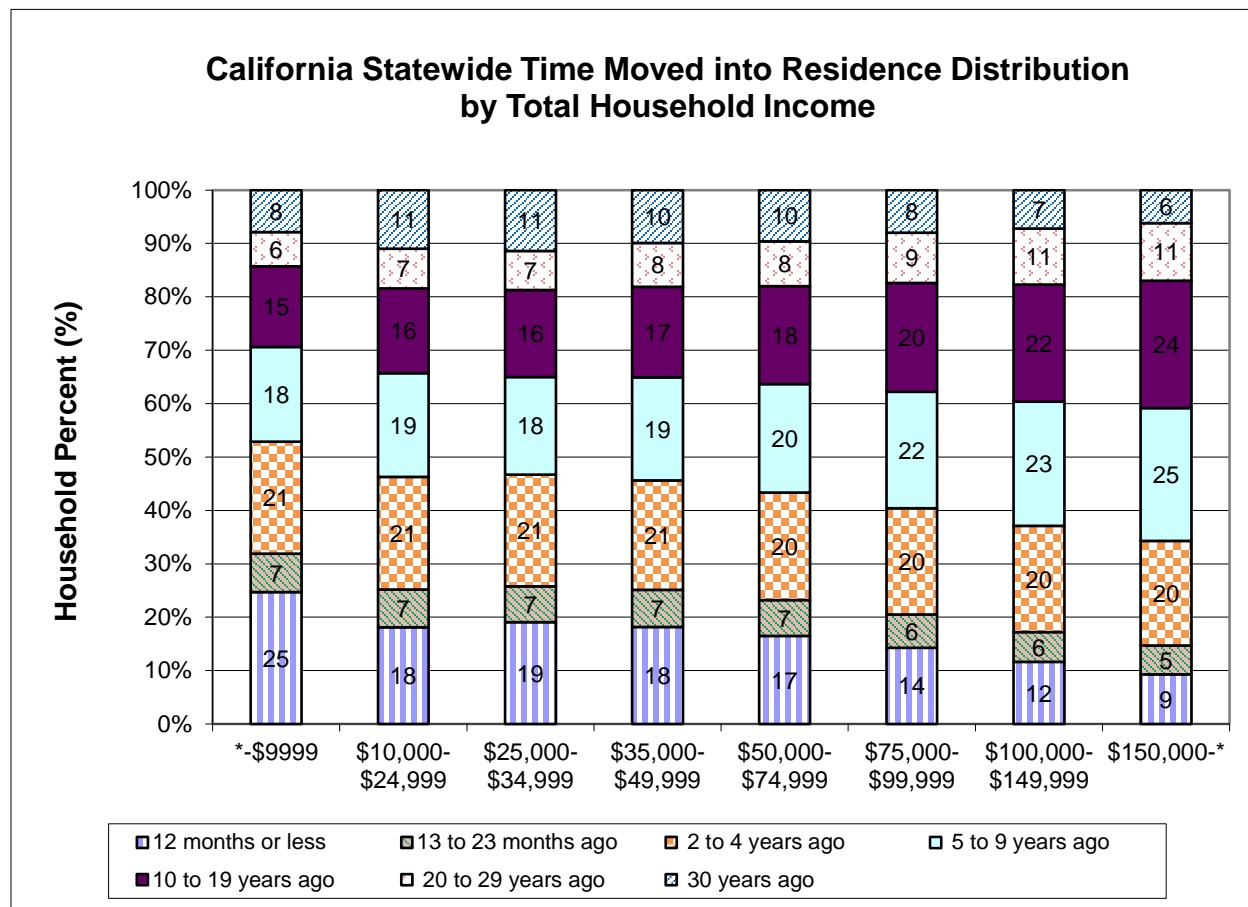
Figure A.2*



* IPUMS-USA ACS 2009 data with household weight applied (IPUMS Weights). The age categories are 15-89 and 93.

Figure A.3 shows California statewide time moved into residence distribution by total household income. It reveals a general trend that the higher the household income is, the smaller percentage of the householders moved into their residence within last the 12 months. And the households with household income of \$150,000 or above not only have the smallest percentage of householders moved into their residence within the last 12 months, but also have the smallest percentage of householders moved into their residence 30 years ago.

Figure A.3*



* IPUMS-USA ACS 2009 data with household weight applied (IPUMS Weights).

A. References

(IPUMS-USA) Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 5.0* [Machine-readable database]. Minneapolis: University of Minnesota, 2010. <http://usa.ipums.org/usa/index.shtml>. Last visited: January, 2011.

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