February 5, 2014

MEMORANDUM FOR Jay Ryan

Chief, Division of Consumer Expenditure Surveys

Office of Prices and Living Conditions

Bureau of Labor Statistics

Through: Carolyn Pickering

Survey Director, Consumer Expenditure Survey

U.S. Census Bureau

From: Ruth Ann Killion

Chief, Demographic Statistical Methods Division

U.S. Census Bureau

Prepared by: Jacob Enriquez

Demographic Statistical Methods Division

U.S. Census Bureau

Subject: Consumer Expenditure Surveys Sample Allocation for the 2010 Census-Based Sample Design

**Introduction**

This memorandum gives the sample sizes for the 91 primary sampling units (PSU) in the Consumer Expenditure Survey’s (CE) upcoming 2010 Census-based sample design. They are scheduled to be used starting in 2015. The CE program budget allows for the selection of 12,000 addresses per year for the Interview survey and 12,000 addresses per year for the Diary survey. This sample size is expected to yield 6,900 interviewed households per quarter for the Interview survey and 6,900 interviewed households per year for the Diary survey. This memorandum describes the allocation of 12,000 addresses to the 91 individual PSUs for both the Interview and Diary surveys. The 12,000 addresses are from the unit frame only, as the sampling for the group quarters frame will be handled separately. Much of this memorandum is fromSwanson (2013).

**Background**

Research by Consumer Expenditure Statistical Methods Division (CESMD) and Demographic Statistical Methods Division (DSMD) in recent years showed that allocating the nationwide sample of households to PSUs directly proportional to the populations they represent (i.e. their stratum populations) is a simple and effective way of producing expenditure estimates with small variances at the nationwide level. It is how CE’s sample has always been allocated, and the research confirmed its appropriateness (Swanson 2009a, Swanson 2009b, and Killion 2012). This allocation process is formalized in the language of mathematics by expressing the process as a constrained optimization problem.

One subtle change in the upcoming sample design is that *addresses* will be allocated instead of *usable interviews*. In the past the nationwide target number of usable interviews was allocated to individual PSUs in a two-step process – by first allocating them to CPI index areas[[1]](#footnote-1), and then sub-allocating them to individual PSUs. Then a nonresponse adjustment was made to inflate the number of usable interviews up to the number of addresses that needed to be selected. This time the allocation process will be done in a similar manner, except that *addresses* will be allocated instead of *usable interviews*. This change will move the nonresponse adjustment to an earlier step in the process (Johnson-Herring 2001, Swanson 2002, and Johnson-Herring, Krieger, Swanson 2005).

**A Mathematical Description of the Allocation Process**

Here is a mathematical description of the allocation process for the upcoming 2010 Census-based sample design. Let

|  |  |  |
| --- | --- | --- |
| *pi* | = | population of the *i*-th index area, |
| *ri* | = | participation rate of the *i*-th index area (0 ≤ *ri* ≤ 1), and |
| *ni* | = | number of addresses allocated to the *i*-th index area. |

We assume the *pi*’s and *ri*’s are given, and we want to find the *ni*’s that minimize CE’s nationwide variance. The *ni*’s add up to 12,000. As mentioned above, the CESMD/DSMD research showed that allocating the nationwide sample to individual PSUs directly proportional to the populations they represent (their stratum populations) is a simple and effective way of producing expenditure estimates with small variances at the nationwide level. This suggests solving the following constrained least squares problem:

|  |  |  |
| --- | --- | --- |
| Given values of *pi* and *ri* for every index area *i*, find the values of *ni* that… | | |
| Minimize |  |  |
| Subject to: |  |  |
|  | *niri* ≥ 80 | for all *i* ∈ *urban* index areas |
|  | *niri* ≥ 40 | for all *i* ∈ *rural* index areas |

Here  is the total U.S. population; *niri* is the expected number of interviewed households in the *i*-th index area; and  is the expected number of interviewed households nationwide. The ratio *pi*/*p* is the *i*-th index area’s proportion of the total population, and the ratio *niri*/*NR* is the *i*-th index area’s proportion of the total number of interviewed households. Minimizing the sum of squared differences produces an allocation as close to population proportionality as possible.

The minimum required sample size for rural index areas is smaller than the rest of the index areas in order to avoid over allocating to these index areas as well as have their sample sizes more in-line with their populations.

**Computing the participation rates**

Participation rates (0 ≤ *ri* ≤ 1) are required in the optimization problem in order to determine the expected number of interviewed households in the *i*-th index area (*niri*). The participation rate is the eligibility rate times the response rate. It is the percent of sample addresses from which usable interviews are collected.

**Computing the response rates**

The response rate is the number of interviews divided by the number of eligible cases,

where Eligible cases = Interviews + Type A non-interviews.

DSMD computed the response rates for each index area using interview outcomes of the past five years (2008 – 2012), and selecting unit frame cases located in the counties for the 2010 sample design. The Interview survey response rates include interviews one to five. The Diary survey response rate is per household unit and not per interview since *addresses* are allocated instead of *usable interviews*. Since response rates have been decreasing over time, the 5-year historical response rates are reduced by 5 percentage points in order to account for this downward trend.

Some counties in sample for the 2010 design do not have historical data, this is because some of the counties selected are new for the 2010 sample design and are not in the current sample design. For such instances, the response rate is computed using data from counties within the same index area, and are also in the current sample design. For example, the 2010 sample design includes only Addison County, Vermont for the index area R110. This county is not in the current sample design and therefore has no historical data. However, Somerset County, Maine is in the same index area and is in the current sample design. Hence, the response rate for index area R110 uses historical data from Somerset County, Maine.

Attachment C shows the 5-year historical response rates per index area, without the reduction of 5 percentage points.

**Computing the eligibility rates**

The eligibility rate is the percent of addresses with occupied housing units,

where Eligible cases = Interviews + Type A non-interviews.

For the 2010 sample redesign, CE will be using a frame based on the Census Bureau’s Master Address File (MAF); hence, the eligibility rates reflect the MAF and not historical CE interviews. As a result, DSMD computed the eligibility rates from the American Community Survey (ACS) sample, which uses the MAF as its frame. The computation is based on five years of ACS control files (2008-2012), and applies ACS base weights and CAPI sub sampling factors. The eligibility rate per index area is the weighted average of the PSU eligibility rates.

**The Sub-Allocation Process**

After allocating the nationwide sample of 12,000 addresses to the 41 index areas, the next step is sub-allocating to the individual PSUs in the index area. It is done directly proportional to each PSU’s share of the index area’s population. For example, index area N120 represents 15,036,701 people and Pittsburgh represents 27.04% of the index area’s population so it is given 27.04% of its sample. Likewise, Buffalo represents 23.16% of N120’s population so it is given 23.16% of its sample, Rochester is given 26.10% of its sample, and Reading is given 23.69% of its sample.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Index** | **PSU** |  | **Stratum** | **Percent** |
| **Area** | **Code** | **PSU Name** | **Population** | **of Total** |
| N120 | N12C | Pittsburgh, PA | 4,065,877 | 27.04% |
| N120 | N12D | Buffalo-Cheektowaga-Niagara Falls, NY | 3,483,174 | 23.16% |
| N120 | N12E | Rochester, NY | 3,925,318 | 26.10% |
| N120 | N12F | Reading, PA | 3,562,332 | 23.69% |
| **N120** | **––** | **Total** | **15,036,701** | **100.00%** |

Attachment B shows the results of the sub-allocation.

**Number of addresses that need to be sampled**

DSMD draws a single sample of addresses for both surveys, with the even-numbered addresses going to the Interview survey and the odd-numbered addresses going to the Diary survey. The number of addresses that need to be sampled is the larger of the two sample sizes. For example, the allocation results in Attachment B show that the Boston PSU (S11A) needs 171 addresses for the Interview survey and 161 addresses for the Diary survey. DSMD draws the larger of the two sample sizes, which is the Interview survey’s 171 addresses, for both surveys. Then a sample reduction process removes ten random addresses from the Diary survey.

The expected number of usable interviews is the number of sampled addresses times the eligibility rate, times the response rate (after the five percentage point reduction).

The take-every is the total household units in the MAF divided by the number of addresses that need to be sampled.

**Results**

Attachments A and B show the allocation results of this memo. Attachment A shows the number of addresses and the expected number of usable interviews in the 41 *index areas*, and Attachment B shows the same numbers for the 91 *PSUs*. Attachment C shows the participation rates.

**References**

Johnson-Herring, S. (2001). Bureau of Labor Statistics memorandum, “CE Minimum Within-PSU Sample Size,” from Sylvia Johnson-Herring to David Swanson, dated December 14, 2001.

Johnson-Herring, S., Krieger, S., and Swanson, D. (2005). “Determining Area Sample Sizes for the Consumer Expenditure Survey,” Consumer Expenditure Survey Anthology, 2005.

Killion, R.A. (2012). U.S. Census Bureau memorandum, “Sample Allocation Research for the Consumer Expenditures Interview Survey,” from Ruth Ann Killion to Jay Ryan, dated March 20, 2012.

Ryan, J. (2012). Bureau of Labor Statistics Memorandum “PSUs for the Consumer Expenditure Survey’s 2010 Census-Based Sample Design” from Jay Ryan to Richard Schwartz, dated December 19, 2012.

Swanson, D. (2001). Bureau of Labor Statistics memorandum, “Automating the CE Sample Allocation Process,” from David Swanson to SMD Files, dated January 10, 2001

Swanson, D. (2002). “Determining Within-PSU Sample Sizes for the Consumer Expenditure Survey,” Proceedings of the Section on Government Statistics, American Statistical Association, 2002.

Swanson, D. (2009a). Bureau of Labor Statistics memorandum, “Allocating CE’s Nationwide Sample to Individual PSUs,” from David Swanson to Jay Ryan, dated September 15, 2009.

Swanson, D. (2009b). Bureau of Labor Statistics memorandum, “Allocating CE’s Nationwide Sample to Individual PSUs,” from David Swanson to Jay Ryan, dated December 17, 2009.

Swanson, D. (2013). Bureau of Labor Statistics memorandum, “Allocating CE’s Nationwide Sample to Individual PSUs,” dated July 19, 2013.

Attachments

cc:

|  |  |
| --- | --- |
| D. Castelo | (DSMD) |
| S. Ash |  |
| J. Farber |  |
| S. Bechtle |  |
| C. Pickering | (ADDP) |
| R. Schwartz |  |
| C. Seamands |  |
| D. Swanson | (BLS) |
| S. Paben |  |
| T. Olson |  |

**Number of Sample Addresses and**

**Expected Number of Usable Interviews in the 41 Index Areas**

This is the nationwide sample of 12,000 addresses allocated to the

41 index areas along with the expected number of usable interviews.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Index** |  | **# Addresses** | | **# Usable Interviews** | |
|  | **Area** | **Population** | **Interview** | **Diary** | **Interview** | **Diary** |
| 1. | N110 | 9,239,719 | 318.79 | 284.73 | 193.44 | 192.90 |
| 2. | N120 | 15,036,701 | 547.82 | 548.02 | 314.49 | 316.01 |
| 3. | N230 | 28,676,810 | 1,062.20 | 1,071.07 | 647.83 | 696.45 |
| 4. | N240 | 12,053,008 | 445.41 | 434.97 | 244.21 | 254.72 |
| 5. | N350 | 33,959,783 | 1,256.04 | 1,249.31 | 742.70 | 725.20 |
| 6. | N360 | 15,382,945 | 560.48 | 553.92 | 322.22 | 338.03 |
| 7. | N370 | 21,047,585 | 765.99 | 754.20 | 409.25 | 367.93 |
| 8. | N480 | 13,999,691 | 511.35 | 512.59 | 289.59 | 288.92 |
| 9. | N490 | 19,359,051 | 700.29 | 699.69 | 450.69 | 460.41 |
| 10. | R110 | 652,744 | 69.65 | 71.73 | 40.00 | 40.00 |
| 11. | R120 | 825,870 | 131.25 | 150.28 | 56.08 | 60.32 |
| 12. | R230 | 2,957,143 | 146.64 | 140.06 | 74.30 | 72.79 |
| 13. | R240 | 3,385,874 | 137.69 | 147.88 | 74.84 | 78.47 |
| 14. | R350 | 3,396,724 | 72.09 | 101.68 | 46.18 | 61.08 |
| 15. | R360 | 2,974,706 | 207.86 | 187.85 | 83.93 | 83.15 |
| 16. | R370 | 2,903,346 | 64.04 | 103.21 | 40.00 | 59.02 |
| 17. | R480 | 1,328,391 | 92.20 | 158.52 | 46.63 | 65.15 |
| 18. | R490 | 714,395 | 101.75 | 80.57 | 47.27 | 40.00 |
| 19. | S11A | 4,552,402 | 171.73 | 161.92 | 95.50 | 93.08 |
| 20. | S12A | 19,567,410 | 714.41 | 714.35 | 387.89 | 391.80 |
| 21. | S12B | 5,965,343 | 233.67 | 229.30 | 125.32 | 125.48 |
| 22. | S23A | 9,461,105 | 323.62 | 310.72 | 198.85 | 200.24 |
| 23. | S23B | 4,296,250 | 156.49 | 144.88 | 88.51 | 85.00 |
| 24. | S24A | 3,348,859 | 119.03 | 116.31 | 80.00 | 80.00 |
| 25. | S24B | 2,787,701 | 147.78 | 129.38 | 80.00 | 80.00 |
| 26. | S35A | 5,636,232 | 199.28 | 195.39 | 114.86 | 114.48 |
| 27. | S35B | 5,564,635 | 183.45 | 169.22 | 109.78 | 105.69 |
| 28. | S35C | 5,286,728 | 174.02 | 150.93 | 103.83 | 96.04 |
| 29. | S35D | 2,783,243 | 142.00 | 127.31 | 80.00 | 80.00 |
| 30. | S35E | 2,710,489 | 154.90 | 202.57 | 80.00 | 92.61 |
| 31. | S37A | 6,426,214 | 221.28 | 240.72 | 130.41 | 134.00 |
| 32. | S37B | 5,920,416 | 234.19 | 237.15 | 124.64 | 125.53 |
| 33. | S48A | 4,192,887 | 180.48 | 183.13 | 94.00 | 95.08 |
| 34. | S48B | 2,543,482 | 131.52 | 118.56 | 80.00 | 80.00 |
| 35. | S49A | 12,828,837 | 467.90 | 470.51 | 265.98 | 264.28 |
| 36. | S49B | 4,335,391 | 169.42 | 167.19 | 106.18 | 92.56 |
| 37. | S49C | 4,224,851 | 175.48 | 162.48 | 93.17 | 90.16 |
| 38. | S49D | 3,439,809 | 117.98 | 115.95 | 80.00 | 80.00 |
| 39. | S49E | 3,095,313 | 127.49 | 128.72 | 80.00 | 80.00 |
| 40. | S49F | 1,360,301 | 127.31 | 134.08 | 80.00 | 80.00 |
| 41. | S49G | 523,154 | 135.02 | 138.95 | 80.00 | 80.00 |
|  | **Total** | **308,745,538** | **12,000.00** | **12,000.00** | **6,882.57** | **6,946.58** |

**Number of Sample Addresses and**

**Expected Number of Usable Interviews in the 91 PSUs**

This is the nationwide sample of 12,000 addresses allocated to the

91 PSUs along with the expected number of usable interviews.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Index** | **PSU** |  |  | **# Addresses** | | **# Usable Interviews** | | **MAF** | **Take** |
|  | **Area** | **Code** | **PSU Name** | **Population** | **Interview** | **Diary** | **Interview** | **Diary** | **HU counts** | **Every\*** |
| 1 | N110 | N11B | Hartford-West Hartford-East Hartford, CT | 5,005,793 | 172.71 | 154.26 | 104.80 | 104.51 | 515,994 | 2,987.58 |
| 2 | N110 | N11C | Springfield, MA | 4,233,926 | 146.08 | 130.47 | 88.64 | 88.39 | 258,410 | 1,768.94 |
| 3 | N120 | N12C | Pittsburgh, PA | 4,065,877 | 148.13 | 148.18 | 85.04 | 85.45 | 1,128,340 | 7,614.44 |
| 4 | N120 | N12D | Buffalo-Cheektowaga-Niagara Falls, NY | 3,483,174 | 126.90 | 126.95 | 72.85 | 73.20 | 529,995 | 4,174.93 |
| 5 | N120 | N12E | Rochester, NY | 3,925,318 | 143.01 | 143.06 | 82.10 | 82.50 | 478,996 | 3,348.18 |
| 6 | N120 | N12F | Reading, PA | 3,562,332 | 129.78 | 129.83 | 74.51 | 74.87 | 167,922 | 1,293.38 |
| 7 | N230 | N23C | Cincinnati, OH-KY-IN | 3,395,853 | 125.78 | 126.83 | 76.71 | 82.47 | 933,932 | 7,363.41 |
| 8 | N230 | N23D | Cleveland-Elyria, OH | 3,257,953 | 120.68 | 121.68 | 73.60 | 79.12 | 972,718 | 7,993.82 |
| 9 | N230 | N23E | Columbus, OH | 3,758,510 | 139.22 | 140.38 | 84.91 | 91.28 | 847,347 | 6,036.12 |
| 10 | N230 | N23F | Milwaukee-Waukesha-West Allis, WI | 3,256,494 | 120.62 | 121.63 | 73.57 | 79.09 | 682,307 | 5,609.73 |
| 11 | N230 | N23G | Dayton, OH | 3,924,320 | 145.36 | 146.57 | 88.65 | 95.31 | 373,576 | 2,548.75 |
| 12 | N230 | N23H | Flint, MI | 3,911,189 | 144.87 | 146.08 | 88.36 | 94.99 | 194,997 | 1,334.85 |
| 13 | N230 | N23I | Janesville-Beloit, WI | 3,745,126 | 138.72 | 139.88 | 84.61 | 90.96 | 69,174 | 494.53 |
| 14 | N230 | N23J | Frankfort, IN | 3,427,365 | 126.95 | 128.01 | 77.43 | 83.24 | 13,529 | 105.69 |
| 15 | N240 | N24C | Omaha-Council Bluffs, NE-IA | 2,974,017 | 109.90 | 107.33 | 60.26 | 62.85 | 377,695 | 3,436.63 |
| 16 | N240 | N24D | Wichita, KS | 2,842,770 | 105.05 | 102.59 | 57.60 | 60.08 | 275,971 | 2,626.98 |
| 17 | N240 | N24E | Lincoln, NE | 3,288,318 | 121.52 | 118.67 | 66.63 | 69.49 | 132,440 | 1,089.89 |
| 18 | N240 | N24F | Wahpeton, ND-MN | 2,947,903 | 108.94 | 106.38 | 59.73 | 62.30 | 10,798 | 99.12 |
| 19 | N350 | N35F | Charlotte-Concord-Gastonia, NC-SC | 3,035,149 | 112.26 | 111.66 | 66.38 | 64.81 | 975,700 | 8,691.57 |
| 20 | N350 | N35G | Orlando-Kissimmee-Sanford, FL | 2,642,941 | 97.75 | 97.23 | 57.80 | 56.44 | 974,388 | 9,967.96 |
| 21 | N350 | N35H | Richmond, VA | 3,027,856 | 111.99 | 111.39 | 66.22 | 64.66 | 527,383 | 4,709.26 |
| 22 | N350 | N35I | Raleigh, NC | 2,549,176 | 94.28 | 93.78 | 55.75 | 54.44 | 491,815 | 5,216.31 |
| 23 | N350 | N35J | Greenville-Anderson-Mauldin, SC | 3,094,518 | 114.45 | 113.84 | 67.68 | 66.08 | 375,761 | 3,283.07 |
| 24 | N350 | N35K | Winston-Salem, NC | 2,637,083 | 97.54 | 97.01 | 57.67 | 56.31 | 295,307 | 3,027.69 |
| 25 | N350 | N35L | Cape Coral-Fort Myers, FL | 3,091,153 | 114.33 | 113.72 | 67.60 | 66.01 | 381,948 | 3,340.76 |
| 26 | N350 | N35M | Ocala, FL | 2,568,744 | 95.01 | 94.50 | 56.18 | 54.85 | 169,498 | 1,784.04 |
| 27 | N350 | N35N | Gainesville, FL | 2,913,140 | 107.75 | 107.17 | 63.71 | 62.21 | 123,267 | 1,144.06 |
| 28 | N350 | N35O | Wilmington, NC | 2,736,321 | 101.21 | 100.66 | 59.84 | 58.43 | 132,731 | 1,311.50 |
| 29 | N350 | N35P | Jacksonville, NC | 3,100,604 | 114.68 | 114.06 | 67.81 | 66.21 | 79,571 | 693.86 |
| 30 | N350 | N35Q | Big Stone Gap, VA | 2,563,098 | 94.80 | 94.29 | 56.05 | 54.73 | 28,745 | 303.22 |
| 31 | N360 | N36A | Louisville/Jefferson County, KY-IN | 2,529,624 | 92.17 | 91.09 | 52.99 | 55.59 | 555,975 | 6,032.19 |
| 32 | N360 | N36B | Birmingham-Hoover, AL | 2,483,606 | 90.49 | 89.43 | 52.02 | 54.58 | 524,219 | 5,793.03 |
| 33 | N360 | N36C | Chattanooga, TN-GA | 2,620,595 | 95.48 | 94.36 | 54.89 | 57.59 | 242,424 | 2,538.93 |
| 34 | N360 | N36D | Huntsville, AL | 2,801,399 | 102.07 | 100.87 | 58.68 | 61.56 | 195,582 | 1,916.15 |
| 35 | N360 | N36E | Florence-Muscle Shoals, AL | 2,550,408 | 92.93 | 91.84 | 53.42 | 56.04 | 72,916 | 784.67 |
| 36 | N360 | N36F | Meridian, MS | 2,397,313 | 87.35 | 86.32 | 50.22 | 52.68 | 49,690 | 568.88 |
| 37 | N370 | N37C | San Antonio-New Braunfels, TX | 2,436,095 | 88.66 | 87.29 | 47.37 | 42.59 | 899,396 | 10,144.60 |
| 38 | N370 | N37D | Oklahoma City, OK | 2,812,948 | 102.37 | 100.80 | 54.69 | 49.17 | 573,736 | 5,604.39 |
| 39 | N370 | N37E | Baton Rouge, LA | 2,543,610 | 92.57 | 91.15 | 49.46 | 44.46 | 350,744 | 3,788.94 |
| 40 | N370 | N37F | Lafayette, LA | 2,444,837 | 88.98 | 87.61 | 47.54 | 42.74 | 210,467 | 2,365.44 |
| 41 | N370 | N37G | Brownsville-Harlingen, TX | 2,581,037 | 93.93 | 92.49 | 50.19 | 45.12 | 152,513 | 1,623.64 |
| 42 | N370 | N37H | Amarillo, TX | 2,756,117 | 100.30 | 98.76 | 53.59 | 48.18 | 107,779 | 1,074.52 |
| 43 | N370 | N37I | Russellville, AR | 2,620,998 | 95.39 | 93.92 | 50.96 | 45.82 | 36,687 | 384.61 |
| 44 | N370 | N37J | Paris, TX | 2,851,943 | 103.79 | 102.19 | 55.45 | 49.85 | 23,670 | 228.05 |
| 45 | N480 | N48C | Las Vegas-Henderson-Paradise, NV | 3,227,960 | 117.90 | 118.19 | 66.77 | 66.62 | 870,033 | 7,361.34 |
| 46 | N480 | N48D | Provo-Orem, UT | 3,724,271 | 136.03 | 136.36 | 77.04 | 76.86 | 161,723 | 1,185.99 |
| 47 | N480 | N48E | Yuma, AZ | 3,840,701 | 140.29 | 140.62 | 79.45 | 79.26 | 90,593 | 644.22 |
| 48 | N480 | N48F | St. George, UT | 3,206,759 | 117.13 | 117.41 | 66.33 | 66.18 | 61,470 | 523.54 |
| 49 | N490 | N49H | Portland-Vancouver-Hillsboro, OR-WA | 5,208,366 | 188.41 | 188.25 | 121.26 | 123.87 | 955,334 | 5,070.59 |
| 50 | N490 | N49I | Santa Rosa, CA | 5,163,670 | 186.79 | 186.63 | 120.21 | 122.81 | 207,317 | 1,109.89 |

\*The Take Everys will need to be divided by two when the final redesign file is created in order to take twice as much sample to account for both CED and CEQ being selected at the same time.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Index** | **PSU** |  |  | **# Addresses** | | **# Usable Interviews** | | **MAF** | **Take** |
|  | **Area** | **Code** | **PSU Name** | **Population** | **Interview** | **Diary** | **Interview** | **Diary** | **HU counts** | **Every\*** |
| 51 | N490 | N49J | Chico, CA | 4,623,339 | 167.24 | 167.10 | 107.64 | 109.96 | 97,357 | 582.13 |
| 52 | N490 | N49K | Moses Lake, WA | 4,363,676 | 157.85 | 157.72 | 101.59 | 103.78 | 36,615 | 231.96 |
| 53 | R110 | R11D | Addison, VT | 652,744 | 69.65 | 71.73 | 40.00 | 40.00 | 17,271 | 240.77 |
| 54 | R120 | R12G | Northeast Pennsylvania | 825,870 | 131.25 | 150.28 | 56.08 | 60.32 | 56,812 | 378.05 |
| 55 | R230 | R23K | Northern Michigan | 1,605,685 | 79.62 | 76.05 | 40.34 | 39.52 | 39,430 | 495.22 |
| 56 | R230 | R23L | Holmes, OH | 1,351,458 | 67.01 | 64.01 | 33.95 | 33.27 | 14,268 | 212.91 |
| 57 | R240 | R24G | Northern Missouri | 1,838,073 | 74.75 | 80.28 | 40.63 | 42.60 | 20,862 | 259.87 |
| 58 | R240 | R24H | Northeast Nebraska | 1,547,801 | 62.94 | 67.60 | 34.21 | 35.87 | 9,196 | 136.03 |
| 59 | R350 | R35R | Southern Virginia | 1,543,021 | 32.75 | 46.19 | 20.98 | 27.75 | 64,826 | 1,403.43 |
| 60 | R350 | R35S | Southwest West Virginia | 1,853,703 | 39.34 | 55.49 | 25.20 | 33.33 | 37,689 | 679.18 |
| 61 | R360 | R36G | Eastern Kentucky | 1,567,733 | 109.55 | 99.00 | 44.23 | 43.82 | 91,078 | 831.40 |
| 62 | R360 | R36H | Western Tennessee | 1,406,973 | 98.31 | 88.85 | 39.70 | 39.33 | 49,746 | 505.99 |
| 63 | R370 | R37K | Northeast Texas | 1,315,398 | 29.02 | 46.76 | 18.12 | 26.74 | 60,280 | 1,289.17 |
| 64 | R370 | R37L | Northern Arkansas | 1,587,948 | 35.03 | 56.45 | 21.88 | 32.28 | 45,063 | 798.32 |
| 65 | R480 | R48G | Ravalli, MT | 481,660 | 33.43 | 57.48 | 16.91 | 23.62 | 20,117 | 350.01 |
| 66 | R480 | R48H | Lincoln, NM | 399,341 | 27.72 | 47.65 | 14.02 | 19.59 | 18,341 | 384.89 |
| 67 | R480 | R48I | Gooding, ID | 447,390 | 31.05 | 53.39 | 15.70 | 21.94 | 6,230 | 116.70 |
| 68 | R490 | R49L | Tillamook, OR | 714,395 | 101.75 | 80.57 | 47.27 | 40.00 | 21,220 | 208.56 |
| 69 | S11A | S11A | Boston-Cambridge-Newton, MA-NH | 4,552,402 | 171.73 | 161.92 | 95.50 | 93.08 | 1,927,112 | 11,221.55 |
| 70 | S12A | S12A | New York-Newark-Jersey City, NY-NJ-PA | 19,567,410 | 714.41 | 714.35 | 387.89 | 391.80 | 7,971,063 | 11,157.47 |
| 71 | S12B | S12B | Philadelphia-Camden-Wilmington, PA-NJ-DE-MD | 5,965,343 | 233.67 | 229.30 | 125.32 | 125.48 | 2,497,308 | 10,687.38 |
| 72 | S23A | S23A | Chicago-Naperville-Elgin, IL-IN-WI | 9,461,105 | 323.62 | 310.72 | 198.85 | 200.24 | 3,865,594 | 11,944.90 |
| 73 | S23B | S23B | Detroit-Warren-Dearborn, MI | 4,296,250 | 156.49 | 144.88 | 88.51 | 85.00 | 1,922,500 | 12,285.44 |
| 74 | S24A | S24A | Minneapolis-St. Paul-Bloomington, MN-WI | 3,348,859 | 119.03 | 116.31 | 80.00 | 80.00 | 1,417,433 | 11,907.84 |
| 75 | S24B | S24B | St. Louis, MO-IL | 2,787,701 | 147.78 | 129.38 | 80.00 | 80.00 | 1,258,027 | 8,512.92 |
| 76 | S35A | S35A | Washington-Arlington-Alexandria, DC-VA-MD-WV | 5,636,232 | 199.28 | 195.39 | 114.86 | 114.48 | 2,311,536 | 11,599.64 |
| 77 | S35B | S35B | Miami-Fort Lauderdale-West Palm Beach, FL | 5,564,635 | 183.45 | 169.22 | 109.78 | 105.69 | 2,507,138 | 13,666.62 |
| 78 | S35C | S35C | Atlanta-Sandy Springs-Roswell, GA | 5,286,728 | 174.02 | 150.93 | 103.83 | 96.04 | 2,233,637 | 12,835.58 |
| 79 | S35D | S35D | Tampa-St. Petersburg-Clearwater, FL | 2,783,243 | 142.00 | 127.31 | 80.00 | 80.00 | 1,393,748 | 9,815.32 |
| 80 | S35E | S35E | Baltimore-Columbia-Towson, MD | 2,710,489 | 154.90 | 202.57 | 80.00 | 92.61 | 1,170,658 | 5,779.16 |
| 81 | S37A | S37A | Dallas-Fort Worth-Arlington, TX | 6,426,214 | 221.28 | 240.72 | 130.41 | 134.00 | 2,652,201 | 11,017.64 |
| 82 | S37B | S37B | Houston-The Woodlands-Sugar Land, TX | 5,920,416 | 234.19 | 237.15 | 124.64 | 125.53 | 2,437,679 | 10,279.24 |
| 83 | S48A | S48A | Phoenix-Mesa-Scottsdale, AZ | 4,192,887 | 180.48 | 183.13 | 94.00 | 95.08 | 1,846,989 | 10,085.41 |
| 84 | S48B | S48B | Denver-Aurora-Lakewood, CO | 2,543,482 | 131.52 | 118.56 | 80.00 | 80.00 | 1,110,175 | 8,441.29 |
| 85 | S49A | S49A | Los Angeles-Long Beach-Anaheim, CA | 12,828,837 | 467.90 | 470.51 | 265.98 | 264.28 | 4,548,636 | 9,667.52 |
| 86 | S49B | S49B | San Francisco-Oakland-Hayward, CA | 4,335,391 | 169.42 | 167.19 | 106.18 | 92.56 | 1,765,482 | 10,420.81 |
| 87 | S49C | S49C | Riverside-San Bernardino-Ontario, CA | 4,224,851 | 175.48 | 162.48 | 93.17 | 90.16 | 1,533,663 | 8,740.01 |
| 88 | S49D | S49D | Seattle-Tacoma-Bellevue, WA | 3,439,809 | 117.98 | 115.95 | 80.00 | 80.00 | 1,513,679 | 12,829.90 |
| 89 | S49E | S49E | San Diego-Carlsbad, CA | 3,095,313 | 127.49 | 128.72 | 80.00 | 80.00 | 1,182,963 | 9,190.01 |
| 90 | S49F | S49F | Honolulu, HI | 1,360,301 | 127.31 | 134.08 | 80.00 | 80.00 | 346,031 | 2,580.76 |
| 91 | S49G | S49G | Anchorage, AK | 523,154 | 135.02 | 138.95 | 80.00 | 80.00 | 159,502 | 1,147.91 |
|  |  |  | **Total** | **308,745,538** | **12,000.00** | **12,000.00** | **6,882.57** | **6,946.58** | **69,141,678** | **-** |

\*The Take Everys will need to be divided by two when the final redesign file is created in order to take twice as much sample to account for both CED and CEQ being selected at the same time.

**Response Rates and Eligibility Rates**

The table below shows response rates and eligibility rates from the 5-year period 2008-2012 by index area. They range from 56.6% to 93.2% in the Interview survey, and from 56.9% to 89.1% in the Diary survey. Response rates have been decreasing over time, so the response rates used are the ones shown below minus 5 percentage points.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **2008-2012 Interview Survey** | | | **2008-2012 Diary Survey** | | | **ACS** | |
|  | Index Area | Interviews | Type A | Response Rate | Interviews | Type A | Response Rate | Eligibility rate | # HU |
| 1 | N110 | 1,165 | 465 | 71.5 | 263 | 69 | 79.2 | 91.3 | 76,950 |
| 2 | N120 | 4,001 | 1,699 | 70.2 | 800 | 335 | 70.5 | 88.1 | 272,268 |
| 3 | N230 | 4,643 | 1,518 | 75.4 | 1,029 | 257 | 80.0 | 86.7 | 438,235 |
| 4 | N240 | 1,064 | 508 | 67.7 | 236 | 92 | 72.0 | 87.5 | 96,109 |
| 5 | N350 | 4,406 | 1,227 | 78.2 | 911 | 274 | 76.9 | 80.8 | 412,396 |
| 6 | N360 | 2,528 | 874 | 74.3 | 594 | 162 | 78.6 | 82.9 | 173,888 |
| 7 | N370 | 3,082 | 1,311 | 70.2 | 594 | 327 | 64.5 | 82.0 | 243,644 |
| 8 | N480 | 3,165 | 996 | 76.1 | 624 | 200 | 75.7 | 79.7 | 117,182 |
| 9 | N490 | 1,888 | 514 | 78.6 | 382 | 94 | 80.3 | 87.4 | 126,049 |
| 10 | R110 | 74 | 25 | 74.7 | 16 | 6 | 72.7 | 82.3 | 4,512 |
| 11 | R120 | 445 | 169 | 72.5 | 93 | 43 | 68.4 | 63.3 | 14,560 |
| 12 | R230 | 437 | 126 | 77.6 | 93 | 24 | 79.5 | 69.8 | 12,610 |
| 13 | R240 | 830 | 247 | 77.1 | 159 | 52 | 75.4 | 75.4 | 8,886 |
| 14 | R350 | 221 | 16 | 93.2 | 43 | 6 | 87.8 | 72.6 | 13,611 |
| 15 | R360 | 43 | 33 | 56.6 | 8 | 5 | 61.5 | 78.3 | 17,335 |
| 16 | R370 | 97 | 8 | 92.4 | 17 | 3 | 85.0 | 71.5 | 13,414 |
| 17 | R480 | 173 | 59 | 74.6 | 40 | 25 | 61.5 | 72.7 | 5,530 |
| 18 | R490 | 175 | 34 | 83.7 | 41 | 5 | 89.1 | 59.0 | 3,125 |
| 19 | S11A | 2,457 | 1,277 | 65.8 | 517 | 245 | 67.8 | 91.5 | 181,283 |
| 20 | S12A | 11,164 | 5,660 | 66.4 | 2,410 | 1,188 | 67.0 | 88.5 | 834,325 |
| 21 | S12B | 3,738 | 1,991 | 65.2 | 811 | 409 | 66.5 | 89.0 | 262,437 |
| 22 | S23A | 5,985 | 1,966 | 75.3 | 1,467 | 397 | 78.7 | 87.4 | 393,158 |
| 23 | S23B | 2,619 | 1,018 | 72.0 | 567 | 194 | 74.5 | 84.4 | 219,506 |
| 24 | S24A | 1,918 | 532 | 78.3 | 380 | 95 | 80.0 | 91.7 | 166,076 |
| 25 | S24B | 1,586 | 744 | 68.1 | 359 | 107 | 77.0 | 85.8 | 131,695 |
| 26 | S35A | 2,923 | 1,351 | 68.4 | 618 | 272 | 69.4 | 90.9 | 217,131 |
| 27 | S35B | 2,028 | 512 | 79.8 | 497 | 101 | 83.1 | 80.0 | 227,780 |
| 28 | S35C | 2,254 | 668 | 77.1 | 490 | 108 | 81.9 | 82.7 | 201,859 |
| 29 | S35D | 1,576 | 510 | 75.6 | 390 | 76 | 83.7 | 79.9 | 129,324 |
| 30 | S35E | 1,547 | 883 | 63.7 | 345 | 261 | 56.9 | 88.0 | 114,813 |
| 31 | S37A | 2,686 | 1,010 | 72.7 | 530 | 239 | 68.9 | 87.1 | 255,908 |
| 32 | S37B | 2,228 | 1,043 | 68.1 | 450 | 214 | 67.8 | 84.3 | 224,457 |
| 33 | S48A | 1,532 | 689 | 69.0 | 326 | 148 | 68.8 | 81.4 | 171,109 |
| 34 | S48B | 1,366 | 526 | 72.2 | 311 | 80 | 79.5 | 90.5 | 108,468 |
| 35 | S49A | 7,163 | 3,581 | 66.7 | 1,473 | 761 | 65.9 | 92.2 | 475,848 |
| 36 | S49B | 2,553 | 922 | 73.5 | 459 | 242 | 65.5 | 91.5 | 167,526 |
| 37 | S49C | 1,805 | 809 | 69.1 | 382 | 149 | 71.9 | 82.9 | 157,668 |
| 38 | S49D | 1,898 | 489 | 79.5 | 396 | 94 | 80.8 | 91.0 | 143,358 |
| 39 | S49E | 2,007 | 687 | 74.5 | 395 | 140 | 73.8 | 90.3 | 115,373 |
| 40 | S49F | 1,938 | 587 | 76.8 | 362 | 133 | 73.1 | 87.6 | 39,384 |
| 41 | S49G | 1,482 | 517 | 74.1 | 301 | 116 | 72.2 | 85.7 | 18,608 |
|  | **Total** | **94,890** | **37,801** | **71.5%** | **20,179** | **7,748** | **72.3%** | **86.7** | **7,007,398** |

1. The 41 index areas consist of the 23 self-representing PSUs plus the 18 non-self-representing division-size classes (9 Census divisions x 2 size classes). The 2010 sample design brought about a change in the geographic areas used to stratify PSUs (from four Census regions to nine Census divisions) and the number of size classes (from four to three). The first three characters of a PSU code (the size class, the Census region, and the Census division) identify the index area. For example, the PSU codes N12C, N12D, N12E, and N12F all have the same first three characters and hence belong to the same index area, N120. In the 2000 design, only the first two characters are required to identify the index area. For more information on the differences in the PSU codes in the 2000 and 2010 design, refer to Ryan (2012). [↑](#footnote-ref-1)