

## Redesign of the Sample for the Current Population Survey

In accordance with usual practice, the sample for the Current Population Survey (CPS) has been redesigned based on information from Census 2010. The sample redesign is expected to have a negligible effect on published estimates.

The CPS—also known as the household survey—is a monthly survey of households that provides information on the labor force status, demographics, and other characteristics of the nation's civilian noninstitutional population age 16 and over. Historically, the CPS sample has been redesigned after each decennial census. The last sample redesign occurred in 2004 and introduced a [sample based on Census 2000](#).

The introduction of the new CPS sample began in April 2014 and will be completed in July 2015. Households in the new sample will be phased into the survey by using the normal “rotation” group pattern in the survey’s design, with one rotation group per month. Households interviewed in the survey are divided into eight approximately equal panels, called rotation groups. A rotation group is interviewed for 4 consecutive months, temporarily leaves the sample for 8 months, and then returns for 4 more consecutive months before retiring permanently from the CPS (after a total of eight interviews). Each month, one-eighth of the sample is being interviewed for the first time, one-eighth for the second time, and so on. This rotation scheme has been in use since July 1953 and strengthens the reliability of estimates of month-to-month change as well as estimates of year-to-year change.

The CPS is conducted in approximately 60,000 eligible housing units throughout the United States. (“Eligible” refers to an occupied housing unit having at least one person in the civilian noninstitutional population.) This sample includes 10,000 eligible housing units from the monthly supplementary sample to improve state-level estimates of health insurance coverage for low-income children, also known as the CHIP expansion. The supplementary sample has been part of the official CPS since July 2001. Thirty-two states plus the District of Columbia have this supplementary sample each month.

The CPS sample is a probability sample based on a stratified two-stage sampling scheme: selection of sample primary sampling units (PSUs) and selection of sample housing units within those PSUs. In general, the CPS sample is selected from lists of addresses obtained from the Master Address File with updates from the United States Postal Service twice a year. The Master Address File is the Census Bureau’s permanent list of addresses, including their

geographic locations, for individual living quarters. It is continuously maintained through partnerships with the United States Postal Service; with Federal, State, regional, and local agencies; and with the private sector; and it is used as a sample frame by many Census Bureau demographic surveys. The CHIP sample selection methodology is similar to that used for the CPS.

### **State-based design**

In the first stage of sampling, PSUs are selected. These PSUs consist of counties or groups of contiguous counties in the United States, and are grouped into strata. The CPS is a state-based design. Therefore, all PSUs and strata are defined within state boundaries and the sample is allocated among the states to produce state and national estimates with the required reliability, while keeping total sample size to a minimum. The specified coefficient of variation (CV) requirement for the monthly unemployment level for the nation, given a 6 percent unemployment rate, is 1.9 percent or less. (The CV of an estimate is the estimate itself divided by its standard error, usually expressed as a percent.) This CV is based on the requirement that a difference of 0.2 percentage points in the unemployment rate between 2 consecutive months be statistically significant at the 90 percent level of confidence. Additionally, the required CV on the annual average unemployment level for each state and the District of Columbia, given a 6 percent unemployment rate, is 8 percent or less. For New York and California, the state reliability requirement applies to the following substate areas: New York City (five boroughs only), the balance of New York State, Los Angeles County, and the balance of California.

### **First stage of the sample design: PSU stratification and selection**

The variables chosen for grouping PSUs in each state into strata reflect the primary interest of the CPS in maximizing the reliability of estimates of labor force characteristics. The same set of stratification variables from Census 2010 and the American Community Survey (ACS) are used for each state: unemployment statistics by gender; the number of families maintained by women; and the proportion of occupied housing units with three or more people. In addition, the number of persons employed in selected industries and the average monthly wage for selected industries are used as stratification variables in some states. The industry-specific data are averages over the period 2000 through 2008 and are obtained from the BLS Quarterly Census of Employment and Wages (QCEW) program.

Each stratum consists of one or more PSUs. Within each stratum, a single PSU is chosen for the sample, with probability proportional to its population as of the 2010 Census. Some strata have only one PSU, and each is included in the sample as a self-representing PSU; these strata generally include the most populous counties within each state. The remaining PSUs are grouped into non-self-representing strata within state boundaries. In each of these strata, one PSU is selected to represent all of the PSUs in that stratum.

The PSUs, strata, and sample PSUs are the same for CPS and CHIP. This differs from the 2000 sample design, which had three states with different designs. In total, 852 PSUs (1,385

counties) from a total of 1,987 PSUs (3,143 counties) in the United States are in sample for either just the basic CPS or for both the basic CPS and the CHIP expansion.

### **Second stage of the sample design: selection of housing units**

The 2010 sample design comprises three frames: unit, coverage improvement, and group quarters. The unit frame consists of housing units in census blocks that contain a very high proportion of complete addresses. It covers most of the population and accounts for approximately 95 percent of the CPS sample. It is updated every 6 months with new growth records and will be sampled from annually. The coverage improvement frame (in 13 targeted states) is intended to improve the coverage of the unit frame. The coverage improvement frame is updated annually with information from July Master Address File extracts. There is a single group quarters frame in the 2010 sample design and its sample is selected in a 3-year cycle.

Within these sampling frames, housing units are sorted based on characteristics from the American Community Survey and geography. Then, from each frame, a systematic sample of addresses within the sample PSUs is obtained. Most of the sample addresses are selected in a single stage of sampling within the selected PSUs; for a relatively small proportion, an additional stage of selection within the PSU is necessary.

### **Major differences from the 2000 CPS sample design**

The 2010 sample design differs from that of 2000 in a variety of ways. These changes have resulted after consideration of numerous factors, including improving reliability of the estimates, minimizing costs, and maximizing comparability of estimates across time. Major changes include the following.

- 1) With the phase-in beginning in 2014, sample is now selected from the continually updated Master Address File, and American Community Survey (ACS) data is used to sort and stratify the housing units on the Master Address File. Previously, sample was selected from decennial census address lists and stratification was done using information also from the decennial census.
- 2) In the past, the CPS sample universe was distributed across four frames: unit, permit, group quarters, and area, with approximately 80 percent of the CPS sample coming from the unit frame. As mentioned previously, the 2010 sample design comprises three frames: unit (updated with new growth records), coverage improvement, and group quarters. As the result of improved flexibility and reduced complexity of block listing via the coverage improvement frame, an area frame no longer exists. Instead, the block listing process will enable a flexible workload that can change as often as annually, depending on budget resources and on the need for coverage improvement. Rather than having group quarters split between the group quarters frame and the area frame as in past designs, there is now a single group quarters frame. An additional

change is the exclusion of military group quarters from the sampling universe since research showed that they are extremely unlikely to convert to civilian group quarters.

- 3) In past designs, the CPS had selected a decade of sample housing units all at once, occurring just after the decennial census, with periodic supplementation of new construction through sampling of building permits and area listing results. The selected housing units were then parsed into monthly samples throughout the decade. This approach was the most cost effective and sensible method of sampling in the context of once-a-decade operations.

In the 2010 sample design, sampling occurs annually for the unit frame. This changes the second-stage sample selection of housing units from once-a-decade sampling to annual sampling. The benefits of selecting a fully representative sample of housing units on an annual basis include:

- Better control of survey sample size.
- More accurate addresses due to twice-a-year updates of valid/invalid status, geocoding errors, and geography changes of previously existing records that are eligible for selection.
- Ability to modify or select new samples more quickly in response to population shifts in order to meet reliability criteria.
- More flexibility in accommodating sample expansions and contractions in response to changes in budget or data requirements.
- Ability to implement methodological changes and process improvements more quickly and easily than before.
- Potential to reduce variances on annual average estimates with annual sampling; this is a potential for cost saving because less sample is needed.

Note that annual sampling does not apply to the group quarters frame, where sample is selected 3 years at a time, or to the first-stage sample selection of the PSUs. Also, a housing unit selected by any demographic survey will not be available for selection by subsequent surveys until 5 years after its last interview.