

# Behavioral Risk Factor Surveillance System

## Improving Survey Methodology



The proportion of cell phone-only U.S. households is rising steadily. To maintain representativeness, coverage, and validity, telephone surveys, including the Centers for Disease Control and Prevention (CDC)'s Behavioral Risk Factor Surveillance System (BRFSS), have had to add cellular telephones to their samples.

Research shows that people who have only cellular phone service have a different demographic profile than those persons who have landline telephones. They tend to be younger, rent instead of own a home, are predominately Hispanic, and tend to be unmarried. There are attitudinal and behavioral differences between the two groups as well.

In 2004 an expert panel of survey methodologists recommended that BRFSS address the growing effects of cellular telephone-only households. These recommendations included adding cellular telephones in the BRFSS sample and developing improved weighting and adjustment methodologies. Since 2006, CDC has been planning and testing these changes and implemented them with the release of the 2011 BRFSS data set in July 2012.

### Raking adjusts estimates within each state by using

- telephone source,
- detailed race and ethnicity,
- regions within states,
- education level,
- marital status,
- age,
- gender, and
- homeowner status.

### New Weighting Methodology: Raking

Since the 1980s, CDC has used a statistical method called post stratification to weight BRFSS survey data to simultaneously adjust survey respondent data to known proportions of age, race and ethnicity, gender, geographic region, or other known characteristics of a population. This type of weighting is important because it makes the sample more representative of the population and adjusts for nonresponse bias. In 2006, in accordance with the recommendations of the 2004 expert panel, CDC began testing a more sophisticated weighting method called iterative proportional fitting, or raking.

### Why Incorporate Raking?

- Computer capacity has increased.
- Cell phones are becoming a larger percentage of the total number of calls.
- Declining survey response rates makes weighting more important than ever.

Raking has several advantages over post stratification. First, it allows the introduction of more demographic variables suggested by the BRFSS expert panel—such as education level, marital status, and home ownership—into the statistical weighting process than would have been possible with post stratification. This advantage reduces the potential for bias and increases the representativeness of estimates.

Second, raking allows for the incorporation of a now-crucial variable—telephone source (landline or cellular telephone)—into the BRFSS weighting methodology.

Beginning with the 2011 dataset, raking succeeded post stratification as the BRFSS statistical weighting method.





## About BRFSS

BRFSS, initiated by CDC in 1984, is a coordinated collection of state health surveys conducted by the 50 U.S. states, the District of Columbia, and three U.S. territories. Taken together, these surveys make up the largest ongoing multi-mode (mail, landline phone, and cell phone) survey in the world; more than 430,000 interviews were conducted in 2011.

With technical and methodological assistance from CDC, state health departments use in-house interviewers or contract with telephone call centers or universities to administer the BRFSS surveys continuously through the year. The states use a standardized core questionnaire, optional modules, and state-added questions.

The federal government, state governments, universities, private organizations, and researchers use BRFSS data to monitor public health. BRFSS data can help to identify and track health-related risk behaviors and chronic conditions, track health objectives, evaluate disease prevention activities, and rapidly assess emerging health problems, such as novel influenza and influenza vaccination.

---

*The Behavioral Risk Factor Surveillance System is the largest ongoing multi-mode (mail, landline phone, and cell phone) survey in the world; more than 430,000 interviews were conducted in 2011.*

---

BRFSS is a state-based system that is administered by the Division of Behavioral Surveillance in CDC's Public Health Surveillance and Informatics Program Office; Office of Surveillance, Epidemiology, and Laboratory Services.

### CONTACT US

Centers for Disease Control and Prevention  
Public Health Surveillance and Informatics Program Office  
1600 Clifton Road NE, Mailstop E-97 Atlanta, GA 30333  
Phone: 800-CDC-INFO (800-232-4636)/TTY: 888-232-6348  
8AM-8PM ET, Monday-Friday; Closed Holidays  
E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov) Web: [www.cdc.gov](http://www.cdc.gov)