At a Glance: Conducting the 2011 Behavioral Risk Factor Surveillance System (BRFSS)

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Measuring Health Risks among Adults

The Behavioral Risk Factor Surveillance System (BRFSS) was established in 1984 by the Centers for Disease Control and Prevention (CDC) and is the world's largest ongoing telephone survey. The BRFSS helps state and territorial health departments gather information about adult residents, regarding chronic diseases and conditions, health-risk behaviors, emerging health problems, and the use of preventive health services. This information helps leaders, policymakers, the CDC, and other federal agencies identify and address health risks, monitor changes in health-risk behaviors and diseases, evaluate public health programs, and implement prevention strategies at local and state levels.

A Unique State-based Surveillance System

The BRFSS is a cross-sectional, random-digit-dialed, state-based system that collects data each year by completing interviews with more than 400,000 adults aged 18 years and older. With help from the CDC, BRFSS data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands. For many states, BRFSS is the only timely source of data available for assessing local health conditions and health risk behaviors and accurately tracking progress of health promotion programs and strategies.

CDC public health advisors, epidemiologists, and statisticians work with states to ensure the data quality of the BRFSS by helping with survey methodology, data analysis, and other technical issues. To ensure survey data quality, the BRFSS produces monthly and annual data quality reports and provides online training for state BRFSS coordinators. These support measures help state and local health departments to:

- determine emerging health issues and identify populations at risk for certain diseases by analyzing data by respondents' demographics;

- develop strategic plans and targeted prevention activities and programs;

- examine trends in behaviors over time to monitor the progress in meeting Healthy People 2020 objectives; and

- support local community policies and programs to promote health and address health risk behaviors and diseases.

The BRFSS is also used as a flexible and timely data source to identify and monitor emerging health problems, such as the seasonal influenza vaccine shortage of 2004 and 2005; post-disaster response to Hurricanes Katrina and Rita in 2005; and H1N1 flu vaccinations among adults, children and health care workers in 2009. Recently, using the same infrastructure of BRFSS, CDC conducted a separate 12-month survey designed to assess health status in the population affected by the Deepwater Horizon oil spill in the Gulf of Mexico on April 20, 2010.

2011 Survey Structure

The BRFSS questionnaire consists of three parts:

1. **Core questions**—The core questions include demographic information, health status, health-related quality of life, health care access, hypertension awareness, cholesterol awareness, chronic health conditions, tobacco use, consumption of fruits and vegetables, physical activity, disability (limited activity, use of special equipment), arthritis burden, seatbelt use, immunization (seasonal influenza and pneumococcal vaccination), alcohol consumption, and issues regarding human immunodeficiency virus/acquired immunodeficiency syndrome (HIV and AIDS).

2. **Optional modules**—The optional modules are proposed by CDC Programs and other agencies (such as SAMHSA and Veteran's Affairs) and include information on topics such as diabetes, visual impairment and access to eye care, inadequate sleep, secondhand smoke, anxiety and depression, and access to preventive cancer screenings. A state may add some, all, or none of these modules to its survey, according to need. If selected by a state or grantee, optional modules are implemented with a standardized protocol.

3. **State-added questions**— State-added questions address state-specific health issues or track a state's health objectives.

The details of the 2011 BRFSS data questionnaire can be obtained at http://www.cdc.gov/brfss/questionnaires/pdf-ques/2011brfss.pdf

BRFSS Fact: Australia, Brazil, Canada, China, Egypt, Italy, Jordan, Mexico, South Korea, nations in the Caribbean, Vietnam, and Thailand receive technical assistance from CDC in order to develop their own behavioral risk health surveillance systems.

Adoption of New Methodology in 2011

The number of U.S. households using cell phones as their only telephone-based communication (cell phone-only homes) has been increasing each year. To maintain the representativeness, coverage, and the validity of the BRFSS data, survey organizers added cell phone interviews to the BRFSS data in 2011. Also new in 2011 was the introduction of a new weighting methodology called raking (iterative proportional fitting), which replaced the post stratification weighting method that had been used with previous BRFSS datasets. Raking allows for the incorporation of cell phone survey data, and, in addition to age, gender, and race/ethnicity, raking permits more demographic variables to be included in weighting such as education attainment, marital status, tenure (property ownership), and telephone ownership. Including new variables in the weighting process can reduce the potential for selection bias while increasing representation. Since the methods for weighting and sampling changed in 2011, estimates from the 2011 BRFSS may not be comparable to estimates created in previous years.

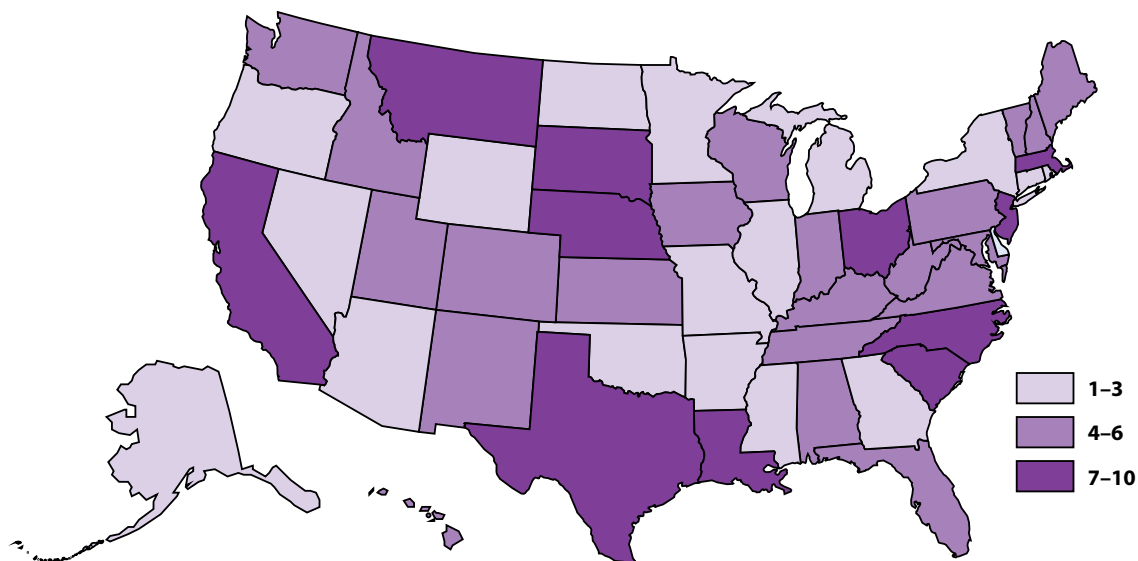## Selected Metropolitan/Micropolitan Area Risk Trends (SMART)

Since 2002, BRFSS has facilitated analysis of prevalence estimates from selected metropolitan and micropolitan statistical areas (MMSAs), metropolitan divisions, and counties with sufficient sample sizes. The Selected Metropolitan/Micropolitan Area Risk Trends (SMART) is an ongoing project that uses BRFSS data to produce some local area estimates. Counties and MMSAs were selected for SMART if there were 500 respondents or more in the 2011 BRFSS combined landline and cell phone data. Nationwide, there are 198 MMSAs and 224 counties eligible for 2011 SMART BRFSS. The coverage of the SMART MMSA sites in each U.S. state can be seen on the map where the categories of the number of the sites are shown. In 2011, states including California, Louisiana, Massachusetts, Montana, Nebraska, New Jersey, North Carolina, Ohio, South Carolina, South Dakota, and Texas had 7 to 10 BRFSS MMSA sites. Users can obtain the prevalence of high-risk behaviors or diseases through the Web link http://apps.nccd.cdc.gov/BRFSS-SMART/index. asp, where SMART area estimation is produced. SMART expands the usefulness of a highly functional surveillance system and provides state and local health departments and health policy makers an important data source for public health planning.

Some of the local estimates of the SMART risk behaviors in 2011 are highlighted below.

- The prevalence of adults aged 18 years or older who were current smokers ranged from 8.4 (6.4–10.5) in the Provo-Orem Utah metropolitan statistical area, to 30.6 (25.9–35.2) and 30.6 (24.3–36.9) in the Casper, Wyoming metropolitan statistical area and in the Monroe, Louisiana metropolitan statistical area, respectively.

2011 SMART* BRFSS Sites

1–3
4–6
7–10

* Metropolitan/Micropolitan Areas (MMSAs) selected according to the number of respondents

- The prevalence of adults aged 18 years or older who were binge drinkers ranged from 7.0 (4.2–9.9) in the Tyler, Texas metropolitan statistical area to 32.5 (14.6–50.4) in the Midland, Texas metropolitan statistical area.

- The prevalence of adults aged 18 years or older who did not participate in any physical activities during the past month ranged from 11.1 (7.9–14.3) in the Fort Collins-Loveland, Colorado metropolitan statistical area to 40.8 (31.7–49.8) in the Kingsport-Bristol, Tennessee-Virginia metropolitan statistical area.

- The prevalence of adults aged 18 years or older who were overweight ranged from 27.5 (23.7–31.3) in the Tacoma, Washington metropolitan division, to 46.3 (36.2–56.4) in the Tyler, Texas metropolitan statistical area. The prevalence of adults aged 18 years or older who were obese ranged from 15.1 (10.6–19.6) in the Boulder, Colorado metropolitan statistical area, to 37.2 (31.3–43.2) in the Huntington-Ashland, West Virginia-Kentucky-Ohio metropolitan statistical area.

- The prevalence of adults aged 65 years or older who did not receive a flu shot within the past year ranged from 20.0 (13.5–26.5) in the Sioux City, Iowa-Nebraska-South Dakota metropolitan statistical area, to 58.0 (48.3–67.7) in the Havre, Montana micropolitan statistical area.

All prevalence estimates above are within the 95% confidence intervals.

BRFSS in Action

In 2011, more than 506,000 interviews were conducted, compared with the more than 451,000 interviews conducted in 2010. This increase allows states to use split modules in order to cover a wider range of topics each year. Also in 2011, a new optional module of sugar-sweetened beverages and menu labeling was added. Additional questions were included in Childhood Asthma Prevalence and the Child Immunization modules to provide measures for asthma prevalence and influenza immunization for children aged 17 years or younger.

Several tools are available at http://www.cdc.gov/brfss for use with BRFSS data:

- **BRFSS Maps** generates U.S. maps based on the prevalence estimates. The graphic tool enhances the visualization of the geographic variation of the estimates.

- **A Web-Enabled Analysis Tool (WEAT)** allows users to conduct data analysis using crosstab and logistic regression models based on their research questions.

- **Chronic Disease Indicators** permit comparisons between one or more states and the U.S. on chronic disease conditions and risk behaviors including cancer, tobacco, and alcohol, and are sourced, in part, from the BRFSS.

Future Directions

CDC has been working diligently with state and federal partners to address the challenges associated with engaging participants and collecting high-quality data that will continue to support good health and informed decision-making. To achieve these goals, BRFSS and its partners are:

- working together to keep abreast with new telecommunication technology;

- piloting and testing new modes of data collection, including Web, mail and internet panel surveys;

- exploring new methods of interviewing hard-to-reach respondents to increase representation of all demographics;

- providing prevalence estimates for all counties in the United States by adopting new statistical methods such as small area estimation;

- expanding the use of the BRFSS to surveys that address emerging health problems such as the Gulf States Population Survey (GSPS) and the Asthma Call-back Survey.

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