

## **2008 SMART BRFSS MMSA Methodology**

### **2008 Selected Metropolitan/Micropolitan Area Risk Trends from the BRFSS Creation of Metropolitan-level weights methodology**

The Behavioral Risk Factor Surveillance System (BRFSS) Selected Metropolitan/Micropolitan Area Risk Trends (SMART) is a documented and verified subset of the 2008 BRFSS, which has been produced to provide some local area estimates. These local areas are identified as metropolitan or micropolitan statistical areas (MMSA) as defined by the Office of Management and Budget (OMB). The data set was produced by adding new analysis weights designed to correspond to the 2008 population estimates for each eligible MMSA. The additional weights were post-stratified to the MMSA-level. The process by which these new weights were obtained is detailed in Appendix C, "Weight Class Collapsing Rules."

#### **Selected Areas**

Typically, BRFSS data are used to produce state-level estimates. However, for the SMART project, BRFSS data were used to produce small area-level estimates for MMSAs as defined by the Bureau of the Census. On June 6, 2003, the OMB issued new definitions for metropolitan statistical areas, micropolitan statistical areas, and metropolitan divisions. OMB periodically updates the list of MMSAs. The list of areas used for this analysis can be found at [http://www.whitehouse.gov/omb/bulletins/fy05/b05-02\\_appendix.pdf](http://www.whitehouse.gov/omb/bulletins/fy05/b05-02_appendix.pdf). For more information about MMSAs, please visit <http://www.census.gov/population/www/estimates/metroarea.html>. A respondent was associated with a particular MMSA on the basis of their county code. Missing county codes were imputed from a value included in the purchased telephone sample that represents the county most likely associated with the telephone number. MMSA-level estimates have been produced from the BRFSS data for 177 MMSAs that have met the weighting criteria (Appendix C) for the 2008 data year.

## Appendix A: List of Variables added to the 2008 Data

### Data Documentation for the Nine Variables Added to the 2008 BRFSS Data

<b>ADJMMSA</b>	MMSA-level post-stratification weight. This factor is multiplied by the design weight (_WT2) to get the final MMSA-level weight (_MMSAWT).
<b>AGE_MMSA</b>	Age categories used to set up the initial weighting classes for the MMSA-level weights. 1 – 18–24 2 – 25–34 3 – 35–44 4 – 45–54 5 – 55–64 6 – 65+
<b>AGE_M_F</b>	Age categories used in the final weighting classes for the MMSA-level weights. 1 – 18–24 2 – 25–34 3 – 35–44 4 – 45–54 5 – 55–64 6 – 65+ 7 – 18–34 8 – 35–54 9 – 55+ 10 – 18–44 11 – 45+ 12 – 18–54 19 – 35+
<b>RACE_MMS</b>	Race categories used to set up the initial weighting classes for the MMSA-level weights. 0 – Race not used 1 – White, non-Hispanic 2 – Nonwhite or Hispanic
<b>RACE_M_F</b>	Race categories used in the final weighting classes for the MMSA-level weights. 0 – Race not used 1 – White, non-Hispanic 2 – Nonwhite or Hispanic
<b>SEX_MMSA</b>	Sex categories used to set up the initial and final weighting classes for the MMSA-level weights (weight classes are never collapsed across sex). 1 – Male 2 – Female
<b>_MMSA</b>	MMSA code of the metropolitan, micropolitan statistical area, or metropolitan division if appropriate, where the respondent lives. Metropolitan and micropolitan statistical areas and metropolitan divisions are defined by OMB in Bulletin No. 03-04 ( <a href="http://www.whitehouse.gov/omb/bulletins/b03-04_attach.pdf">http://www.whitehouse.gov/omb/bulletins/b03-04_attach.pdf</a> ).
<b>_MMSANAM</b>	MMSA name of the metropolitan/micropolitan statistical area, or metropolitan division if appropriate, where the respondent lives. Metropolitan/micropolitan

statistical areas and metropolitan divisions are defined by OMB in Bulletin No. 03-04 ([http://www.whitehouse.gov/omb/bulletins/b03-04\\_attach.pdf](http://www.whitehouse.gov/omb/bulletins/b03-04_attach.pdf)).

**\_MMSAWT**

The new MMSA-level weight. This is the weight to use when generating MMSA-level estimates (metropolitan or micropolitan statistical areas or metropolitan divisions) for questions that were asked of the whole sample.

**Appendix B: List of the 177 MMSAs that have MMSA-level Weights in 2008  
BRFSS Data**

**Metropolitan/Micropolitan Statistical Area or Metropolitan Division Codes  
and Names**

MMSA Number	MMSA Name
10420	Akron, OH Metropolitan Statistical Area
10740	Albuquerque, NM Metropolitan Statistical Area
10900	Allentown-Bethlehem-Easton, PA-NJ Metropolitan Statistical Area
11100	Amarillo, TX Metropolitan Statistical Area
11260	Anchorage, AK Metropolitan Statistical Area
11700	Asheville, NC Metropolitan Statistical Area
12060	Atlanta-Sandy Springs-Marietta, GA Metropolitan Statistical Area
12100	Atlantic City-Hammonton, NJ Metropolitan Statistical Area
12260	Augusta-Richmond County, GA-SC Metropolitan Statistical Area
12300	Augusta-Waterville, ME Micropolitan Statistical Area
12420	Austin-Round Rock, TX Metropolitan Statistical Area
12580	Baltimore-Towson, MD Metropolitan Statistical Area
12620	Bangor, ME Metropolitan Statistical Area
12700	Barnstable Town, MA Metropolitan Statistical Area
12740	Barre, VT Micropolitan Statistical Area
12940	Baton Rouge, LA Metropolitan Statistical Area
13620	Berlin, NH-VT Micropolitan Statistical Area
13644	Bethesda-Frederick-Gaithersburg, MD
13740	Billings, MT Metropolitan Statistical Area
13820	Birmingham-Hoover, AL Metropolitan Statistical Area
13900	Bismarck, ND Metropolitan Statistical Area
14260	Boise City-Nampa, ID Metropolitan Statistical Area
14484	Boston-Quincy, MA
14500	Boulder, CO Metropolitan Statistical Area
14580	Bozeman, MT Micropolitan Statistical Area

MMSA Number	MMSA Name
14740	Bremerton-Silverdale, WA Metropolitan Statistical Area
14860	Bridgeport-Stamford-Norwalk, CT Metropolitan Statistical Area
15380	Buffalo-Niagara Falls, NY Metropolitan Statistical Area
15540	Burlington-South Burlington, VT Metropolitan Statistical Area
15580	Butte-Silver Bow, MT Micropolitan Statistical Area
15764	Cambridge-Newton-Framingham, MA
15804	Camden, NJ
15940	Canton-Massillon, OH Metropolitan Statistical Area
16220	Casper, WY Metropolitan Statistical Area
16300	Cedar Rapids, IA Metropolitan Statistical Area
16620	Charleston, WV Metropolitan Statistical Area
16700	Charleston-North Charleston-Summerville, SC Metropolitan Statistical Area
16740	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area
16940	Cheyenne, WY Metropolitan Statistical Area
16980	Chicago-Naperville-Joliet, IL-IN-WI Metropolitan Statistical Area
17140	Cincinnati-Middletown, OH-KY-IN Metropolitan Statistical Area
17460	Cleveland-Elyria-Mentor, OH Metropolitan Statistical Area
17820	Colorado Springs, CO Metropolitan Statistical Area
17900	Columbia, SC Metropolitan Statistical Area
18140	Columbus, OH Metropolitan Statistical Area
18180	Concord, NH Micropolitan Statistical Area
19124	Dallas-Plano-Irving, TX
19340	Davenport-Moline-Rock Island, IA-IL Metropolitan Statistical Area
19380	Dayton, OH Metropolitan Statistical Area
19740	Denver-Aurora, CO Metropolitan Statistical Area
19780	Des Moines-West Des Moines, IA Metropolitan Statistical Area
19804	Detroit-Livonia-Dearborn, MI
20100	Dover, DE Metropolitan Statistical Area
20500	Durham, NC Metropolitan Statistical Area

MMSA Number	MMSA Name
20764	Edison-New Brunswick, NJ
21340	El Paso, TX Metropolitan Statistical Area
21820	Fairbanks, AK Metropolitan Statistical Area
22020	Fargo, ND-MN Metropolitan Statistical Area
22180	Fayetteville, NC Metropolitan Statistical Area
22220	Fayetteville-Springdale-Rogers, AR-MO Metropolitan Statistical Area
22660	Fort Collins-Loveland, CO Metropolitan Statistical Area
23104	Fort Worth-Arlington, TX
23940	Gillette, WY Micropolitan Statistical Area
24260	Grand Island, NE Micropolitan Statistical Area
24340	Grand Rapids-Wyoming, MI Metropolitan Statistical Area
24540	Greeley, CO Metropolitan Statistical Area
24660	Greensboro-High Point, NC Metropolitan Statistical Area
24860	Greenville-Mauldin-Easley, SC Metropolitan Statistical Area
25180	Hagerstown-Martinsburg, MD-WV Metropolitan Statistical Area
25540	Hartford-West Hartford-East Hartford, CT Metropolitan Statistical Area
25580	Hastings, NE Micropolitan Statistical Area
25860	Hickory-Lenoir-Morganton, NC Metropolitan Statistical Area
25900	Hilo, HI Micropolitan Statistical Area
25940	Hilton Head Island-Beaufort, SC Micropolitan Statistical Area
26180	Honolulu, HI Metropolitan Statistical Area
26420	Houston-Sugar Land-Baytown, TX Metropolitan Statistical Area
26580	Huntington-Ashland, WV-KY-OH Metropolitan Statistical Area
26900	Indianapolis-Carmel, IN Metropolitan Statistical Area
27140	Jackson, MS Metropolitan Statistical Area
27260	Jacksonville, FL Metropolitan Statistical Area
27980	Kahului-Wailuku, HI Micropolitan Statistical Area
28140	Kansas City, MO-KS Metropolitan Statistical Area
28180	Kapaa, HI Micropolitan Statistical Area

MMSA Number	MMSA Name
28420	Kennewick-Pasco-Richland, WA Metropolitan Statistical Area
29740	Las Cruces, NM Metropolitan Statistical Area
29820	Las Vegas-Paradise, NV Metropolitan Statistical Area
30100	Lebanon, NH-VT Micropolitan Statistical Area
30300	Lewiston, ID-WA Metropolitan Statistical Area
30700	Lincoln, NE Metropolitan Statistical Area
30780	Little Rock-North Little Rock-Conway, AR Metropolitan Statistical Area
31084	Los Angeles-Long Beach-Glendale, CA
31140	Louisville/Jefferson County, KY-IN Metropolitan Statistical Area
31180	Lubbock, TX Metropolitan Statistical Area
31700	Manchester-Nashua, NH Metropolitan Statistical Area
32820	Memphis, TN-MS-AR Metropolitan Statistical Area
33100	Miami-Fort Lauderdale-Pompano Beach, FL Metropolitan Statistical Area
33340	Milwaukee-Waukesha-West Allis, WI Metropolitan Statistical Area
33460	Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area
33500	Minot, ND Micropolitan Statistical Area
33660	Mobile, AL Metropolitan Statistical Area
33860	Montgomery, AL Metropolitan Statistical Area
34820	Myrtle Beach-North Myrtle Beach-Conway, SC Metropolitan Statistical Area
34980	Nashville-Davidson—Murfreesboro—Franklin, TN Metropolitan Statistical Area
35004	Nassau-Suffolk, NY
35084	Newark-Union, NJ-PA
35300	New Haven-Milford, CT Metropolitan Statistical Area
35380	New Orleans-Metairie-Kenner, LA Metropolitan Statistical Area
35644	New York-White Plains-Wayne, NY-NJ
35740	Norfolk, NE Micropolitan Statistical Area
35820	North Platte, NE Micropolitan Statistical Area
36084	Oakland-Fremont-Hayward, CA

MMSA Number	MMSA Name
36140	Ocean City, NJ Metropolitan Statistical Area
36260	Ogden-Clearfield, UT Metropolitan Statistical Area
36420	Oklahoma City, OK Metropolitan Statistical Area
36500	Olympia, WA Metropolitan Statistical Area
36540	Omaha-Council Bluffs, NE-IA Metropolitan Statistical Area
36700	Orangeburg, SC Micropolitan Statistical Area
36740	Orlando-Kissimmee, FL Metropolitan Statistical Area
37764	Peabody, MA
37964	Philadelphia, PA
38060	Phoenix-Mesa-Scottsdale, AZ Metropolitan Statistical Area
38300	Pittsburgh, PA Metropolitan Statistical Area
38860	Portland-South Portland-Biddeford, ME Metropolitan Statistical Area
38900	Portland-Vancouver-Beaverton, OR-WA Metropolitan Statistical Area
39300	Providence-New Bedford-Fall River, RI-MA Metropolitan Statistical Area
39340	Provo-Orem, UT Metropolitan Statistical Area
39580	Raleigh-Cary, NC Metropolitan Statistical Area
39660	Rapid City, SD Metropolitan Statistical Area
39900	Reno-Sparks, NV Metropolitan Statistical Area
40060	Richmond, VA Metropolitan Statistical Area
40140	Riverside-San Bernardino-Ontario, CA Metropolitan Statistical Area
40180	Riverton, WY Micropolitan Statistical Area
40380	Rochester, NY Metropolitan Statistical Area
40484	Rockingham County-Strafford County, NH
40540	Rock Springs, WY Micropolitan Statistical Area
40860	Rutland, VT Micropolitan Statistical Area
40900	Sacramento—Arden-Arcade—Roseville, CA Metropolitan Statistical Area
41180	St. Louis, MO-IL Metropolitan Statistical Area
41620	Salt Lake City, UT Metropolitan Statistical Area
41700	San Antonio, TX Metropolitan Statistical Area



MMSA Number	MMSA Name
41740	San Diego-Carlsbad-San Marcos, CA Metropolitan Statistical Area
41884	San Francisco-San Mateo-Redwood City, CA
41940	San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area
42044	Santa Ana-Anaheim-Irvine, CA
42140	Santa Fe, NM Metropolitan Statistical Area
42420	Scottsbluff, NE Micropolitan Statistical Area
42540	Scranton—Wilkes-Barre, PA Metropolitan Statistical Area
42580	Seaford, DE Micropolitan Statistical Area
42644	Seattle-Bellevue-Everett, WA
43340	Shreveport-Bossier City, LA Metropolitan Statistical Area
43420	Sierra Vista-Douglas, AZ Micropolitan Statistical Area
43580	Sioux City, IA-NE-SD Metropolitan Statistical Area
43620	Sioux Falls, SD Metropolitan Statistical Area
44060	Spokane, WA Metropolitan Statistical Area
44140	Springfield, MA Metropolitan Statistical Area
45104	Tacoma, WA
45220	Tallahassee, FL Metropolitan Statistical Area
45300	Tampa-St. Petersburg-Clearwater, FL Metropolitan Statistical Area
45780	Toledo, OH Metropolitan Statistical Area
45820	Topeka, KS Metropolitan Statistical Area
46060	Tucson, AZ Metropolitan Statistical Area
46140	Tulsa, OK Metropolitan Statistical Area
46220	Tuscaloosa, AL Metropolitan Statistical Area
46340	Tyler, TX Metropolitan Statistical Area
47260	Virginia Beach-Norfolk-Newport News, VA-NC Metropolitan Statistical Area
47644	Warren-Troy-Farmington Hills, MI
47894	Washington-Arlington-Alexandria, DC-VA-MD-WV
48300	Wenatchee, WA Metropolitan Statistical Area
48620	Wichita, KS Metropolitan Statistical Area

MMSA Number	MMSA Name
48660	Wichita Falls, TX Metropolitan Statistical Area
48864	Wilmington, DE-MD-NJ
48900	Wilmington, NC Metropolitan Statistical Area
49180	Winston-Salem, NC Metropolitan Statistical Area
49340	Worcester, MA Metropolitan Statistical Area
49420	Yakima, WA Metropolitan Statistical Area
49660	Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area
49740	Yuma, AZ Metropolitan Statistical Area

## Appendix C: Weight Class Collapsing Rules

### MMSA-level Weighting Methodology

On June 6, 2003, OMB issued new definitions for metropolitan statistical areas, micropolitan statistical areas, and metropolitan divisions. See ([http://www.whitehouse.gov/omb/bulletins/b03-04\\_attach.pdf](http://www.whitehouse.gov/omb/bulletins/b03-04_attach.pdf)). Respondents were assigned to an MMSA on the basis of their county codes. Missing county codes were imputed from a value included in the purchased telephone sample that represents the county most likely associated with the telephone number before the respondent identifies a county during data collection.

All respondents in cities were then assigned to age, race, and sex categories. If a respondent's age was missing, it was imputed by using the variable `_IMPAGE` available in the BRFSS public-use 2008 data file. If a respondent's race was missing, it was imputed by using the majority race for the MMSA in which the respondent lives. The six age categories were 18–24, 25–34, 35–44, 45–54, 55–64, and 65+. The two race categories were white, non-Hispanic, and nonwhite or Hispanic.

Within each MMSA, respondents were assigned to weighting classes on the basis of the age, race, and sex categories described above. Some states do not use race in post-stratification. For the MMSA in states that do not use race, only the age and sex groups were used to set up weighting classes. For the MMSA in states that do use race, all three groups were used to set up weighting classes. For the MMSA that cross state lines, the post-stratification variables used by the state in which the majority of the MMSA's population lives were used to set up weighting classes. Thus, MMSA that use race had 24 initial weighting classes and MMSA that do not use race had 12 initial weighting classes.

Weighting classes with fewer than 19 sample members were collapsed in accordance with the following rules:

1. For those MMSA that used race in post-stratification, the race categories within a sex category collapse if at least 80% of the age categories in that race /sex cross-classification (i.e., 5 out of 6 of the age categories) have fewer than 19 members. In MMSA that used race to create the initial weighting classes, the number of weighting classes was thus reduced from 24 to 12 if race was collapsed for both sexes and from 24 to 18 if race was collapsed for only one sex.
2. Collapse the two youngest age categories in any age/sex or age/sex/race weighing class if either contains fewer than 19 members. Do the same for the two middle and the two oldest age categories in each remaining weighting class.
3. If either of the age/sex or age/sex/race categories have fewer than 19 members, then the age categories were collapsed until there were 19 members in some combination of the age categories listed in the variable `AGE_M_F`.
4. Do not collapse weighting classes across sex.
5. Do not include an MMSA in the reweighting that still has weighting classes with fewer than 19 sample members after all collapsing rules have been applied. These MMSAs will be excluded from the 2008 SMART BRFSS.

There were 177 MMSA that had at least 500 respondents in the 2008 BRFSS and at least 19 sample members in all final weighting classes. See Appendix B in the Data Documentation for a list of these MMSA. Only the respondents in these MMSA were given a MMSA-level weight. To calculate the new MMSA-level weight, we applied a post-stratification adjustment factor to the

design weight (\_WT2) and created the adjustment factor by taking the ratio of the total population over the sum of the design weights for each weighting class within each MMSA. The new MMSA-level weight (\_MMSAWT) should be used to generate estimates in these 177 MMSA.

**Example SUDAAN Code:**

For example, suppose we want an estimate for the Atlanta-Sandy Springs-Marietta, GA Metropolitan Statistical Area (MMSA code = 12060). Here's SAS/SUDAAN code that could be used to do this:

```
proc sort data=xxxx;  
by _STSTR _SEQNO;  
run;
```

```
proc descript data=xxxx filetype=sas design=wr;  
nest _STSTR _SEQNO / missunit;  
weight _MMSAWT;  
subpopn _MMSA=12060 / name=" Atlanta-Sandy Springs-Marietta, GA";  
var (your analysis variable);  
catlevel (the level of your analysis variable for which you want an estimate);  
run;
```