

METHODOLOGIC STUDIES OF THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM (BRFSS)

<u>Author and Year</u>	<u>Location</u>	<u>Number of Respondents</u>	<u>Summary of Findings</u>
General Methodologic Studies (see also Bowlin (1996) under Cardiovascular Disease)			
Shea (1991)	New York	145	<p><i>Description:</i> 1989 Study of reliability for demographic and risk factors among Blacks, Whites, and Hispanics in New York City.</p> <p><i>Findings:</i> Prevalence estimates were highly consistent at both time periods. Individual level test-retest reliability measures were high (Kappa >0.60) for 19 demographic and risk factors, intermediate for food consumption measures (0.40-0.76), lowest for routine checkup and BP check in past two years (Kappa = 0.54 and 0.23). Consistent reliability across all three ethnic groups.</p>
Stein (1993)	Massachusetts	210	<p><i>Description:</i> 1992 reliability study of multiple BRFSS questions from a statewide sample and an oversample of Blacks and Hispanics.</p> <p><i>Findings:</i> No statistically significant differences for prevalence estimates for any demographic or risk factors. Individual level reliability for demographics slightly lower among minorities than among whites but still high (>0.60), but >0.70 for nearly all risk factors in all populations. Lowest individual level (but not group level) reliability for drinking and driving, 60+ drinks per month, and when last had BP checked.</p>
Brownson (1994)	Missouri	222	<p><i>Description:</i> 1993 study of reliability of multiple BRFSS questions from a statewide sample.</p> <p><i>Findings:</i> Individual level reliability estimates for demographics, chronic conditions, and risk factors were high (Kappa values 0.82-1.00). Addressed core BRFSS subjects of HTN, Diabetes, BMI, smoking status, mammography, pap tests, mammography, and digital rectal examination.</p>

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Stein (1995)	Massachusetts	448	<p><i>Description:</i> 1992 study of reliability of 7 demographic and 19 risk factors from a statewide sample.</p> <p><i>Findings:</i> Median discordance in individual level risk estimates was 7.8% (range: 1.2%-21.8%), but was symmetrical, i.e., some estimates at second interviews were lower and some higher. Median Kappa value across all questions was 0.75 (range: 0.38-0.90). Lowest individual concordances were recency of BP examination (Kappa = 0.54), heavy alcohol consumption (Kappa = 0.31), and drinking and driving (0.30).</p>
Stein (1996)	Massachusetts	270	<p><i>Description:</i> 1992 study of reliability of women's health questions from a statewide sample.</p> <p><i>Findings:</i> This study examined the reliability of BRFSS questions on mammography, clinical breast exam, pap tests, hysterectomy, and pregnancy status. Based on Kappa statistics, concordance exceeded 80% for all areas (range: 81% for time interval since last mammogram to 97% for ever had a pap test).</p>
Pearson (1994)	Montana	410	<p><i>Description:</i> 1987-1989 personal interviews of American Indians aged 18-49 living on or near 3 Montana reservations to examine characteristics of respondents with and without telephones.</p> <p><i>Findings:</i> Persons without phones were more likely to report not having cholesterol check in past year (odds ratio (OR)=2.1), chronic drinking (OR = 2.1), and binge drinking (OR=1.9) even after adjusting for demographic factors. Estimates based on telephone interviews underestimate prevalence for this population.</p>

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Gentry (1985)	29 states	22,236	<p><i>Description:</i> Comparison of pooled BRFSS estimates on alcohol, smoking, overweight, hypertension, and seatbelt use with national estimates from 1979 NIAAA study on alcohol, 1979 NHLBI survey, 1979 Nat'l survey of Personal Health Practices and Consequences, 1980 NHIS.</p> <p><i>Findings:</i> BRFSS estimates very close to national estimates for all of these risk factors (within 1-2 percentage points) except for safety belt nonuse (7 percentage point difference).</p>
Alcohol (including drinking and driving)			
Anda (1989) [see also under Smoking]	Michigan	1,492 phone interviews 2,802 in-person interviews	<p><i>Description:</i> 1982 and 1983 surveys in Michigan comparing BRFSS estimates with personal interviews for binge drinking (5+ drinks on one or more occasions).</p> <p><i>Findings:</i> Estimates of binge drinking were 0.4 percentage points lower for men and 1.0 percentage points higher for women in the BRFSS.</p>
Smith (1990)	21 states	Median: 1,177 Range: 628-2386	<p><i>Description:</i> Correlation of state self-reported alcohol prevalence with state alcohol consumption data for 1985.</p> <p><i>Findings:</i> Correlation coefficients between BRFSS and alcohol consumption data were generally high (0.81 for per capita alcohol consumption, 0.74 for chronic drinking [60+ drinks/month], 0.51 for drinking and driving).</p>

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Robertson (1992) [see also under Safety Belts]	13 states	Not reported	<p><i>Description:</i> Comparison of 1988 BRFSS estimates for drinking and driving with percentage of fatally injured drivers from the Fatal Accident Reporting System (FARS) with any blood alcohol or illegal levels of blood alcohol.</p> <p><i>Findings:</i> Low correlation between BRFSS estimates for drinking and driving with FARS data ($r^2 = 0.20$ for illegal alcohol levels and 0.16 for any blood alcohol).</p>
Serdula (in press)	33 states	213,842	<p><i>Description:</i> Comparison of 1987-88 BRFSS with 1989-90 alcohol questions. 1987-88 alcohol questions included beverage-specific estimates (e.g., separate questions on beer, wine, liquor), while the 1989-90 questions included only grouped questions on alcohol consumption.</p> <p><i>Findings:</i> The mean number of drinks per month consumed per month among drinkers was substantially lower for the grouped alcohol beverage estimates compared to the beverage-specific estimates (37.0 vs. 29.6 for men, 17.0 vs. 13.9 for women). Prevalence of heavy drinking (>2 drinks per day for men, >1 drink per day for women) was also lower using the grouped questions (17.9% vs. 10.8% for men, 15.0% vs. 10.3% for women).</p>

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Cardiovascular Disease (includes obesity, cholesterol level, HTN, diabetes, obesity)			
Jackson (1992)	California	1,588 BRFSS respondents 1,512 Stanford study respondents	<p><i>Description:</i> Comparison of 1987 BRFSS survey with 1986 Stanford Five-City in-person study (personal interviews and physiological measures).</p> <p><i>Findings:</i> BRFSS estimates were similar to Stanford study for smoking prevalence, number of cigarettes per day, self-reported cholesterol level, ever told BP high, having been prescribed medication for BP, and compliance with taking BP medications. BRFSS estimates were 30 percentage points higher for hypertensives reporting BP under control and BRFSS estimates were 1.0-2.2 points lower for body mass index.</p>
Bowlin (1993)	New York	626	<p><i>Description:</i> 1989-90 study of BRFSS male and female respondents in upstate New York who had physiologic measurements taken for smoking, obesity, HTN, diabetes, and elevated cholesterol.</p> <p><i>Findings:</i> Compared with physiologic measures, BRFSS smoking estimates were 6-10 percentage points lower, obesity estimates 10 percentage points lower, HTN prevalence (told on >1 occasion had HTN) was 14-16 percentage points lower. Diabetes prevalence was similar. Among persons reporting hypertension, BRFSS estimates were 38-50 percentage points lower for uncontrolled hypertension. BRFSS estimates were 32-33 percentage points lower than physiologic measures for elevated cholesterol levels.</p>

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Sharlin (1993)	South Dakota	418	<p><i>Description:</i> 1986 BRFSS survey estimates for hypertension (obtained via in-person interviews) compared with physiologic measures for American Indians living on a South Dakota Reservation.</p> <p><i>Findings:</i> BRFSS survey definition was “ever told” had hypertension; physiologic definition was BP of 140/90. Prevalence of hypertension was 11% from the survey and 18% from measurements. Overall sensitivity was low (50%) but specificity was 92%; positive predictive value: 43%.</p>
Giles (1995)	South Carolina	2,714	<p><i>Description:</i> 1987 survey comparing BRFSS estimates with physiologic measures from the same population for hypertension.</p> <p><i>Findings:</i> Definition was “ever told” had HTN. Overall sensitivity and specificity for BRFSS was high among black and white males and females (sensitivity: 79%-82%; specificity: 88%-91%), but was sensitivity was lower among persons <40 (range: 42%-68%).</p>

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Bowlin (1996)	New York	626	<p><i>Description:</i> Reliability and validity study using 1989-90 BRFSS male and female respondents in upstate New York for CVD risk factors (see previous Bowlin citation).</p> <p><i>Findings:</i> Reliability of estimates was high (Kappa >0.60) for ever told BP high, current smoking, number of cigarettes/day, diabetes, ever had cholesterol checked, trying to lose weight, weight, height, and time since last checkup. Reliability was lower (Kappa <0.50) for hypertension under control and numeric values for blood pressure. Sensitivity and specificity for BRFSS estimates were high for smoking, obesity, and diabetes (range: 75% to 99%) but much lower for hypertension and elevated cholesterol level (range: 47% to 82%).</p>

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Mammography			
Degnan (1992)	North Carolina	973	<p><i>Description:</i> Compared BRFSS question on receipt of a mammogram in the past year with estimates based on records from institutions doing mammography in New Hanover county, NC in 1987 and 1989 (note: this was a special study).</p> <p><i>Findings:</i> Telephone estimates were higher than facilities' records by 15 percentage points in 1987 and by 19 percentage points in 1989. Among 164 telephone respondents whose mammograms were confirmed, telescoping (remembering that mammography occurred more recently than it did) accounted for much of this.</p>
Nutrition			
Serdula (1993)	Arizona Georgia Illinois Wisconsin	1,052	<p><i>Description:</i> Study conducted in four locations between 1985-1991 compared 6 fruit and vegetable items on BRFSS with data from food frequency questionnaires and diet recalls/multiple diet records.</p> <p><i>Findings:</i> Spearman correlation coefficients between BRFSS questions and food frequency questionnaires were generally high (range: 0.47-0.57), but slightly lower when compared to diet recalls/records (range: 0.29-0.54).</p>
Smith-Warner (1997)	Minnesota	101	<p><i>Description:</i> 1991-1994 study was a three-way comparison between BRFSS fruit/vegetable questions, food frequency surveys, and diet records.</p> <p><i>Findings:</i> BRFSS underestimated average daily fruit/vegetable consumption compared to the other methods (average for BRFSS = 3.8, food frequency questionnaire = 6.5, diet recall = 6.3). Correlation between BRFSS and food frequency questionnaire was 0.63 and between BRFSS and diet records was 0.56.</p>

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Shea (1991)	New York	145	<p><i>Description:</i> Unpublished data in this article reports on correlation between BRFSS dietary fat/cholesterol consumption and Willett food frequency questionnaire.</p> <p><i>Findings:</i> Correlation coefficients were very high between the two methods, ranging from 0.82 to 0.97.</p>
Coates (1995)	Arizona Georgia Illinois Wisconsin	1,052	<p><i>Description:</i> Study conducted in four locations between 1985-1991 compared dietary fat items on BRFSS with data from food frequency questionnaires and diet recalls/multiple diet records.</p> <p><i>Findings:</i> Spearman correlation coefficients between BRFSS questions with food frequency questionnaires and diet recalls were moderate (range: 0.33-0.60). Correlations were lower for the percentage of energy intake derived from dietary fat (range: 0.26-0.42).</p>
Serdula (1995)	21 states	231,852	<p><i>Description:</i> Study examined the effects of changing the order of questions on self-reported weight and trying to lose weight using 1985-1992 BRFSS data.</p> <p><i>Findings:</i> The prevalence of women reporting that they were trying to lose weight increased from 41% to 48%, while for men, it increased from 26% to 29% when the self-reported weight question proceeded the “trying to lose weight” question.</p>

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Quality of Life			
Verbrugge (1995)	49 states	20,029	<p><i>Description:</i> Compared self-rated health with persons having one or more disability days in the past 30 days.</p> <p><i>Findings:</i> Respondents with lower levels of self-reported health were more likely to report having had 1+ disability days, even after demographic and other characteristics were controlled for. (Odds ratios ranged from 1.3 for those with “very good” health to 4.9 for those reporting “poor” health.</p>
Hennessey (1994)	6 states	2,961	<p><i>Description:</i> Compared self-reported health status with the number of poor physical or mental health days using 1993 data from 6 states.</p> <p><i>Findings:</i> Persons with 1+ poor physical or mental health days were much more likely to have lower levels of self-reported health</p>
Newschaeffer (1997)	Missouri	401	<p><i>Description:</i> Compared individual level data for BRFSS questions with the Medical Outcomes Short Form 36 (SF-36) in 1996.</p> <p><i>Findings:</i> BRFSS questions, especially those on self-reported health status and poor physical health days, correlate very strongly with SF-36 score.</p>
Beatty (in press)	Maryland	18	<p><i>Description:</i> Cognitive testing of the 4 BRFSS core instrument Quality of Life questions.</p> <p><i>Findings:</i> Nearly all subjects had difficulty providing a “number of days” poor physical or mental health response. Generally, they described how they felt without quantification. It is likely that responses to these questions is highly dependent upon prompting by interviewers.</p>

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Safety Belt Use			
CDC (1988)	15 states	Not reported	<p><i>Description:</i> Comparison between self-reported BRFSS data with state observation data for 15 states in 1987.</p> <p><i>Findings:</i> Median BRFSS estimates were 8 percentage points higher than observation study estimates when safety belt use was defined as “always use” and 21.5 percentage points higher when defined as “always or nearly always use” seat belts.</p>
Robertson (1992) [see also under Alcohol]	13 states	Not reported	<p><i>Description:</i> Comparison of 1988 BRFSS estimates for safety belt use with observational studies conducted in cities within 13 states.</p> <p><i>Findings:</i> Median BRFSS estimates were 21.5 percentage points higher when defined as “always or nearly always use” seat belts.</p>
Nelson (1996)	49 states in 1992 50 states in 1993	Median sample size: 2008	<p><i>Description:</i> Comparison between 1992 and 1993 BRFSS estimates with state observational surveys of safety belt use.</p> <p><i>Findings:</i> Median BRFSS estimates (based on “always use” definition) were 5% higher in 1992 and 2% higher in 1993 than observational estimates of safety belt use. Correlation between self-reported and observational data were high ($r^2 = 0.59$ in 1992 and 0.67 in 1993)</p>
Smoking			
Anda (1989) [see also under Alcohol]	Michigan	1,492 phone interviews 2,802 in-person interviews	<p><i>Description:</i> 1982 and 1983 surveys in Michigan comparing personal interviews with BRFSS estimates on current smoking.</p> <p><i>Findings:</i> Estimates of current smoking prevalence were 2.1 percentage points lower for men and 1.3 percentage points lower for women in the BRFSS.</p>

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Arday (in press)	22 states in 1985	<i>1985</i> BRFSS: 25,192	<p><i>Description:</i> Comparison of BRFSS state estimates for current smoking with estimates from the Census Bureau's Current Population Surveys (these surveys are conducted by phone and in-person).</p> <p><i>Findings:</i> Overall BRFSS median estimates were slightly lower than CPS estimates (range across years: 0.7 to 2.0 percentage points lower), and this was greater for males than females. CPS and BRFSS estimates were very similar for Blacks (range for median estimates: 1.1 to 2.9 percentage points lower) and Hispanics (range for median estimates: 0.5 to 1.4 percentage points higher).</p>
	40 states in 1989	CPS: 51,368	
	49 states in 1992-93	<i>1989</i> BRFSS: 66,719 CPS: 97,534	
		<i>1992-93</i> BRFSS: 195,227 CPS: 269,750	

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