

Behavioral Risk Factor Surveillance of Aged Medicare Beneficiaries, 1995

David R. Arday, M.D., M.P.H., Susan L. Arday, M.H.S., C.H.E.S., Julie Bolen, Ph.D.,
Luann Rhodes, M.P.A., M.P.H., Joseph Chin, M.D., M.S., and Patrick Minor, M.S.P.H.

The Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing State-based telephone survey of adults, administered through State health departments. The survey estimates health status and the prevalence of various risk factors among respondents, who include both fee-for-service and managed care Medicare beneficiaries. In this article the authors present an overview of the BRFSS and report 1995 regional results among respondents who were 65 years of age or over and who had health insurance. The advantages and disadvantages of using the BRFSS as a tool to monitor beneficiary health status and risk factors are also discussed.

INTRODUCTION

The health status and health-related behaviors of Medicare beneficiaries are of continuing interest to policymakers. Health planners at the Health Care Financing Administration (HCFA) and the 53 peer review organizations (PROs) are faced with the ongoing task of identifying appropriate strategies and implementing new interventions to improve beneficiary health. These efforts are undertaken as part of HCFA's Health Care Quality Improvement Program (Jencks, 1992), which consists of numerous cooperative projects involving both HCFA and the PROs (Chin, Ellerbeck, and

Jencks, 1995). Currently the Centers for Disease Control and Prevention's (CDC's) BRFSS is the only nationwide source of State-based data on health behaviors and preventive services utilization (Frazier, Franks, and Sanderson, 1992). It is designed to yield data useful for planning, implementing, and monitoring public health programs and interventions.

The behavioral risk factors chosen for surveillance are selected because of their relationship with many leading causes of disability and premature death, including injuries and chronic diseases. Major causes of morbidity and mortality in the United States include heart diseases, malignant neoplasms, injuries, cerebrovascular diseases, chronic obstructive pulmonary diseases, pneumonia and influenza, and diabetes mellitus (Taylor et al., 1993). Most of these diseases have significant behavioral contributing factors, such as smoking (Tolsma and Koplan, 1992). Therefore BRFSS questions are included on safety belt use, smoking status, cholesterol screening and awareness, alcohol use, blood pressure screening and treatment, obesity, sedentary lifestyle, and preventive health practices, among others. Routine demographic information (e.g., age, race, sex, Hispanic ethnicity, educational level) and information on health care coverage are also collected. Many of the questions used have been taken from prior national health surveys, such as the National Health Interview Survey (Remington et al., 1988).

David R. Arday, Susan L. Arday, and Joseph Chin are with the Health Care Financing Administration (HCFA); Julie Bolen is with the Centers for Disease Control and Prevention (CDC); Luann Rhodes is with the Klemm Analysis Group, Inc.; and Patrick Minor is with TRW. All views and opinions are those of the authors and do not necessarily reflect the views of HCFA, CDC, Klemm Analysis Group, Inc., or TRW.

Preventing and ameliorating the effects of chronic diseases in the elderly is a promising area of intervention. By analyzing existing BRFSS data and developing BRFSS-type special surveys to study the health status and risk factors among Medicare beneficiary populations, HCFA and CDC hope to identify opportunities to reduce high-risk health behaviors among the elderly, improve care, and monitor intervention results. To facilitate these efforts, in December 1996, HCFA's Health Standards and Quality Bureau (now the Office of Clinical Standards and Quality) and CDC's National Center for Chronic Disease Prevention and Health Promotion signed an inter-agency agreement with an overall purpose of improving chronic disease prevention and control in the elderly.

In this article we examine 1995 BRFSS data for several measures of health status and behavioral risk factors of particular concern to the elderly. Data are grouped by the four HCFA PRO regions and stratified by sex and race/ethnicity. The advantages and disadvantages of using the BRFSS as a tool to better understand and prevent risk behaviors that lead to increased morbidity and mortality are discussed.

BRFSS Methodology

The BRFSS is an ongoing telephone survey of adults, concerning their health practices and behaviors, that is conducted at the State¹ level. Since 1984 a steadily increasing number of State health departments have participated in the BRFSS (Frazier, Franks, and Sanderson, 1992). The BRFSS system gives State health agencies the funding, training, and consultation necessary to permit them to rou-

tinely collect behavioral risk-factor information on an annual basis. As of 1995 all 50 States were participating in the BRFSS, as well as the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands, although not all jurisdictions were conducting surveillance on an annual basis. Funding for the BRFSS is provided jointly by the CDC, State health departments, and other sources (1995-1996 BRFSS State Working Group, 1997).

The BRFSS is complex in both its design and implementation. Detailed methodology for the BRFSS has been previously reported (Remington et al., 1988; Siegel et al., 1991; Frazier, Franks, and Sanderson, 1992), but will be summarized here.

States participating in the BRFSS use similar methods to collect data, thereby ensuring comparability from State to State and from year to year (Remington et al., 1988). The majority of States collect data throughout the year, using a Waksberg multi-stage cluster-sampling design (Waksberg, 1978). The remaining States use simple random or stratified sample designs (Siegel et al., 1991). No matter what sampling method is used, each State's respondents are an independently drawn, weighted probability sample from a non-overlapping, but essentially identically defined, population. Most States use computer-assisted telephone interviewing, which permits electronic entry of data during the interview. Survey respondents must answer for themselves; the BRFSS does not allow proxy responses.

Each month a participating State conducts telephone surveys of its non-institutionalized, adult population, 18 years of age and over, resulting in approximately 1,200-4,800 interviews per year. An estimated 100-400 interviews are conducted monthly throughout the year, both to provide temporal information and to prevent the temporal distortion found in systems employing

¹ In this article, we use "State" to refer to all jurisdictions that have participated in the BRFSS, including the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands.

sporadic interviewing. Upon completing each monthly interviewing cycle, the data are edited and then forwarded to the CDC for further editing, weighting, and analysis. The data are weighted to the age, race, and sex distribution for each State, based on the most recent census data. After prevalence estimates are calculated, reports are provided back to the States (Frazier, Franks, and Sanderson, 1992). Figure 1 presents a schematic representation of BRFSS operations within a typical State.

The BRFSS survey instrument consists of three parts: a fixed and a rotating core set of questions, standard optional modules of questions, and State-added questions (Frazier, Franks, and Sanderson, 1992). The fixed core questions are asked every year, and the rotating core questions are asked every other year. The core survey questions focus on demographic information and current behaviors associated with the leading U.S. causes of death (Marks et al., 1985). Flexibility is provided, in that States may opt to include modules developed by the CDC and modules developed by the States specific to their health interests.

1995 BRFSS Survey

In 1995, 50 States conducted BRFSS interviewing throughout the year. In addition, Guam, Puerto Rico, and the Virgin Islands performed point-in-time surveys that were not included in this analysis. Among the 50 States conducting full-year surveillance, total sample sizes ranged from 1,193 (Montana) to 4,046 (California), with a median sample size of 2,028 (Centers for Disease Control and Prevention, 1996). Response rates, calculated using the Council of American Survey Research Organization method (White, 1983), ranged between 48.6 percent and 84.5 percent among the 50 States conducting full-year

surveillance, with a median response rate of 68.4 percent.

Each respondent was asked, "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs [health maintenance organizations], or government plans, such as Medicare?" To assess health status, respondents were asked to rate their "general health" as either "excellent, very good, good, fair, or poor" and to report how many days during the past 30 days their "physical health [was] not good," their "mental health [was] not good," and their usual activities were limited as a result of poor physical or mental health.

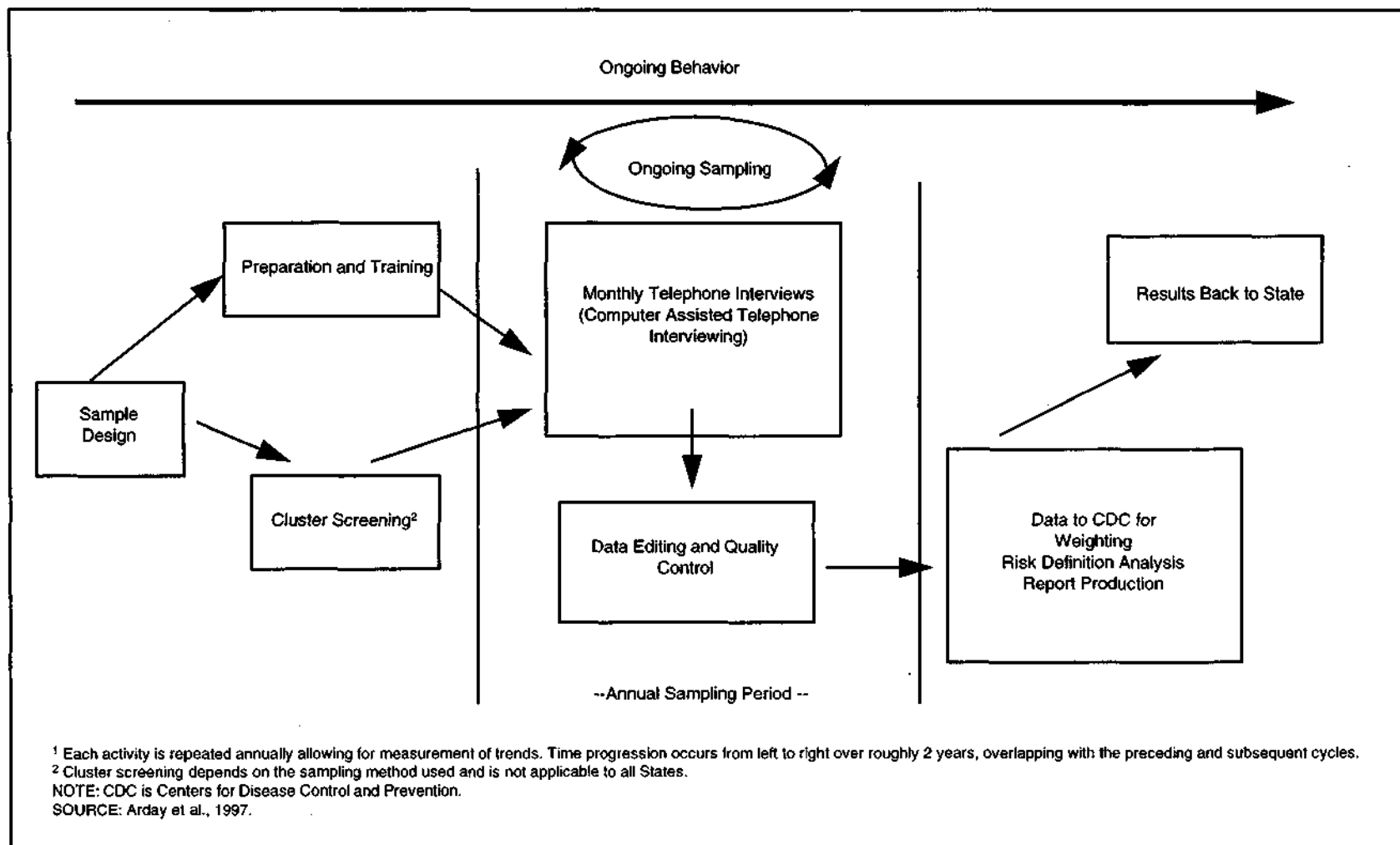
Some of the risk factors assessed for all respondents included whether or not they had ever been told by a doctor that they had diabetes or hypertension, whether they had ever smoked 100 or more cigarettes in their lifetime, whether they currently smoked cigarettes, if they had had "a flu shot" within the past 12 months, whether they had ever had "a pneumonia vaccination," whether they had had a digital rectal examination in the past year, and how often they used safety belts when driving or riding in a car. Women were asked if they had ever had a mammogram and how long it had been since their last mammogram. Respondents were also asked for their height and weight, as well as sex and race/ethnicity.

ANALYSES

Data from the 50 participating States were grouped into four geographic regions, corresponding to the four HCFA regions with oversight of State PROs (Figure 2). The States within each region were as follows: Northeast Region (Boston Regional Office) included Connecticut, Delaware, Maine, Maryland, Massachusetts, New York, New Hampshire, New Jersey, Pennsylvania,

Figure 1

Schematic Representation of Behavioral Risk Factor Surveillance System Operations in a Typical State for a Typical Interviewing Cycle¹



Rhode Island, Vermont, Virginia, and West Virginia; Southeast Region (Dallas Regional Office) included Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas; North Central Region (Kansas City Regional Office) included Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; West Region (Seattle Regional Office) included Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. These regions were the smallest geographic levels at which prevalence estimates could reasonably be calculated by race/ethnicity.

The median sample size for respondents 65 years of age and over was 423, with a range of 131 (Alaska) to 881 (Maryland). Data were weighted at the State level for population age 65 and over before grouping them into the four regions. Respondents who reported that they had no health insurance coverage were excluded from the prevalence estimates, so that the sample would more closely approximate the Medicare beneficiary population. (Nationally only 1.6 percent of BRFSS respondents 65 years or over did not have health insurance, although this rate was higher for black [5.9 percent] and Hispanic [6.3 percent] BRFSS respondents.)

Analyses were performed using SAS (SAS Institute, 1990) and SUDAAN (Shah, 1993). SUDAAN was used to calculate the standard errors based on the complex survey sample design. Obesity was assessed by calculating the respondent's body mass index, using the responses to questions on height and weight. Body mass index was calculated as follows: weight (kg)/ height (m)². Respondents were placed into categories of body mass index based on the sex-

specific National Health and Nutrition Examination Survey II reference population (Najjar and Rowland, 1987). A body mass index greater than or equal to 27.8 for males or 27.3 for females was considered obese. All rates were calculated with "don't know," "refused," and missing responses excluded from the denominators. Data from California had to be excluded from the calculation of the mammography prevalence in the West Region and U.S. totals, because the question was worded differently in California than in the other States.

RESULTS

In the 1995 BRFSS, there was a total of 22,849 respondents age 65 years or over, of whom 22,500 reported having some form of health insurance, including Medicare. Figure 2 shows the total number of respondents with health insurance in each region.

Self-reported health status results, by region, are presented in Table 1. Nationally 29.4 percent of respondents classified their health as only fair or poor. Respondents in the Southeast were more likely to report fair or poor health than those in the other three regions. Compared with white people in each region, black and Hispanic people more often reported fair or poor health, especially those in the Northeast and Southeast. Black persons in the Southeast had the highest prevalence of fair or poor health of all respondents (Table 1).

Overall women reported a higher mean number of days out of the past 30 when their health was not good than did men, a pattern that was repeated among the regions (Table 1). Women also reported a greater mean number of days when mental health was not good than did men. Black and Hispanic people reported higher mean numbers of days when their physical health was not good than did white people. This pattern was also consistent across

Figure 2
States Within Each Peer Review Organization (PRO) Region: Total Respondents 65 Years of Age or Over With Health Insurance

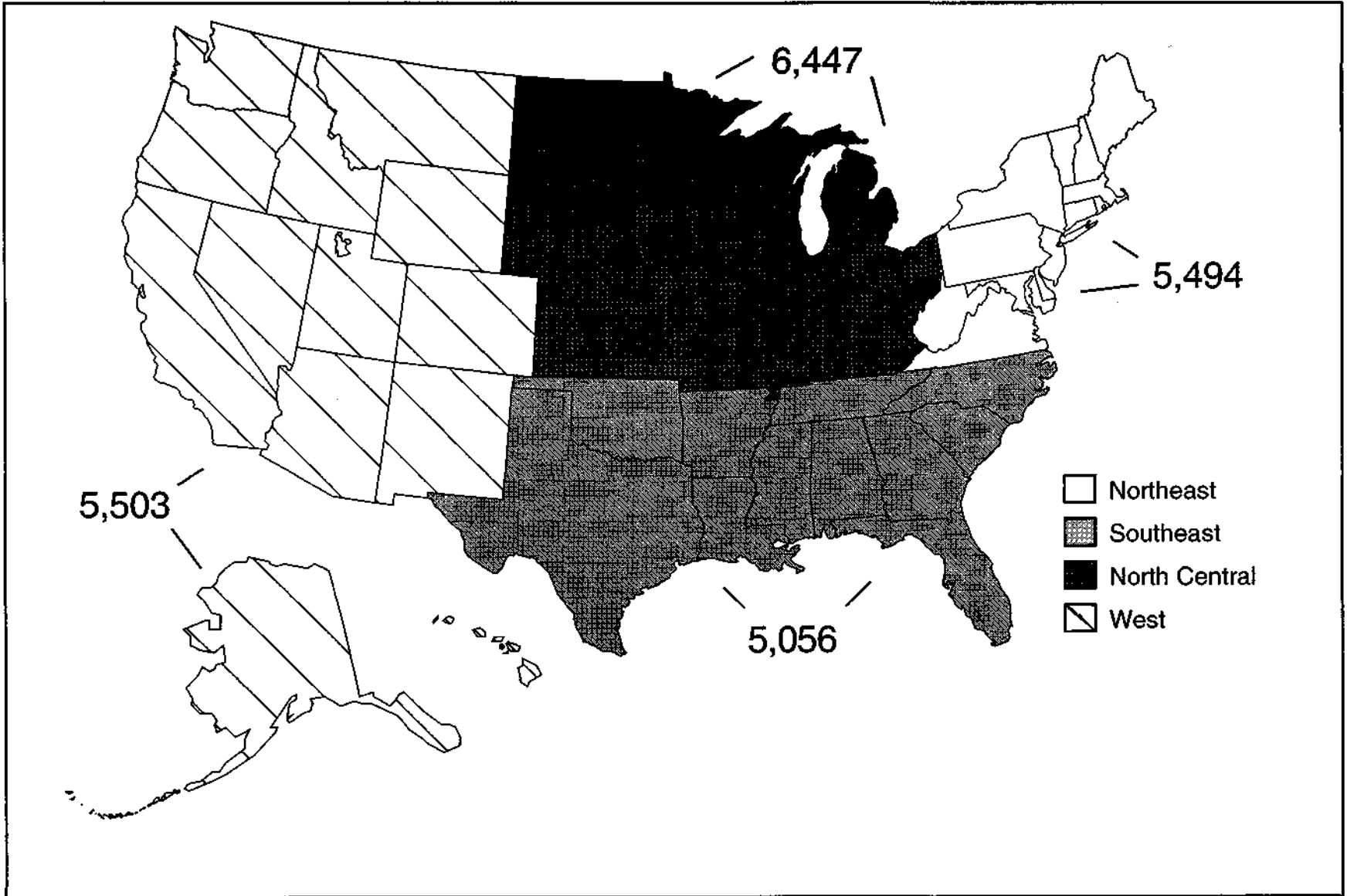


Table 1
Estimated Prevalences of Four Health-Status Indicators Among Behavioral Risk
Factor Surveillance System Respondents with Health Insurance Who Were 65 Years of
Age or Over, by Region¹, Sex, and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Reporting Fair or Poor Health	95-Percent Confidence Interval	Mean Number of Days Physical Health Not Good in Past 30 Days	95-Percent Confidence Interval	Mean Number of Days Mental Health Not Good in Past 30 Days	95-Percent Confidence Interval	Mean Number of Days Activities Were Limited in Past 30 Days	95-Percent Confidence Interval
United States Total	29.4	28.4, 30.4	5.2	5.0, 5.4	2.1	1.9, 2.3	2.6	2.4, 2.8
Male	28.0	26.4, 29.6	4.5	4.1, 4.9	1.7	1.5, 1.9	2.4	2.2, 2.6
Female	30.4	29.2, 31.6	5.7	5.5, 5.9	2.3	2.1, 2.5	2.8	2.6, 3.0
White, not Hispanic	27.8	26.8, 28.8	5.0	4.8, 5.2	2.0	1.8, 2.2	2.5	2.3, 2.7
Black, not Hispanic	43.1	39.2, 47.0	6.3	5.5, 7.1	2.9	2.3, 3.5	3.9	3.1, 4.7
Hispanic	39.1	33.2, 45.0	7.3	5.9, 8.7	2.5	1.5, 3.5	3.2	2.2, 4.2
Other	33.5	22.1, 44.9	4.6	2.6, 6.6	2.0	0.8, 3.2	3.1	1.1, 5.1
Northeast	26.5	24.5, 28.5	4.8	4.4, 5.2	2.1	1.9, 2.3	2.4	2.0, 2.8
Male	25.7	22.6, 28.8	4.1	3.5, 4.7	1.8	1.4, 2.2	2.4	1.8, 3.0
Female	27.1	24.7, 29.5	5.2	4.6, 5.8	2.3	1.9, 2.7	2.4	2.0, 2.8
White, not Hispanic	25.6	23.6, 27.6	4.6	4.2, 5.0	2.0	1.8, 2.2	2.3	1.9, 2.7
Black, not Hispanic	36.8	28.4, 45.2	6.2	4.4, 8.0	3.0	1.8, 4.2	3.8	2.2, 5.4
Hispanic ²	42.3	24.5, 60.1	7.5	4.0, 11.0	0.4	0.0, 0.8	1.1	0.1, 2.1
Other ²	11.5	0.9, 22.1	3.1	0.0, 6.6	1.7	0.0, 4.2	1.8	0.0, 4.3
Southeast	34.0	32.2, 35.8	5.7	5.3, 6.1	2.3	2.1, 2.5	3.0	2.6, 3.4
Male	31.7	28.6, 34.8	4.9	4.3, 5.5	1.8	1.4, 2.2	2.7	2.3, 3.1
Female	35.5	33.1, 37.9	6.2	5.6, 6.8	2.7	2.3, 3.1	3.2	2.8, 3.6
White, not Hispanic	31.1	29.1, 33.1	5.4	5.0, 5.8	2.2	2.0, 2.4	2.8	2.4, 3.2
Black, not Hispanic	53.0	48.3, 57.7	7.2	6.0, 8.4	2.9	1.9, 3.9	4.5	3.3, 5.7
Hispanic	40.3	29.7, 50.9	7.2	4.8, 9.6	2.9	1.3, 4.5	4.0	2.0, 6.0
Other ²	39.1	18.9, 59.3	5.8	2.9, 8.7	1.6	0.0, 3.4	2.1	0.1, 4.1

See Notes at end of table.

Table 1—Continued
Estimated Prevalences of Four Health-Status Indicators Among Behavioral Risk
Factor Surveillance System Respondents with Health Insurance Who Were 65 Years of
Age or Over, by Region¹, Sex, and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Reporting Fair or Poor Health	95-Percent Confidence Interval	Mean Number of Days Physical Health Not Good in Past 30 Days	95-Percent Confidence Interval	Mean Number of Days Mental Health Not Good in Past 30 Days	95-Percent Confidence Interval	Mean Number of Days Activities Were Limited in Past 30 Days	95-Percent Confidence Interval
North Central	30.0	28.4, 31.6	4.9	4.5, 5.3	1.9	1.7, 2.1	2.5	2.3, 2.7
Male	28.3	25.6, 31.0	4.4	3.8, 5.0	1.7	1.3, 2.1	2.4	2.0, 2.8
Female	31.2	29.0, 33.4	5.3	4.9, 5.7	2.1	1.9, 2.3	2.5	2.3, 2.7
White, not Hispanic	29.7	27.9, 31.5	4.9	4.5, 5.3	2.0	1.8, 2.2	2.5	2.1, 2.9
Black, not Hispanic	32.5	24.7, 40.3	4.5	2.9, 6.1	1.8	1.0, 2.6	2.4	1.0, 3.8
Hispanic	32.8	22.4, 43.2	5.6	3.2, 8.0	0.9	0.1, 1.7	2.6	0.8, 4.4
Other ²	39.1	18.5, 59.7	4.5	1.0, 8.0	2.2	0.2, 4.2	3.6	0.9, 6.3
West	25.8	23.4, 28.2	5.4	4.8, 6.0	2.0	1.6, 2.4	2.6	2.2, 3.0
Male	25.2	20.9, 29.5	4.3	3.5, 5.1	1.7	1.1, 2.3	2.3	1.5, 3.1
Female	26.2	23.3, 29.1	6.3	5.5, 7.1	2.2	1.8, 2.6	2.8	2.2, 3.4
White, not Hispanic	23.3	20.9, 25.7	5.2	4.6, 5.8	1.7	1.5, 1.9	2.4	2.0, 2.8
Black, not Hispanic ²	35.5	16.9, 54.1	6.3	3.2, 9.4	4.6	2.1, 7.1	4.6	1.7, 7.5
Hispanic ²	40.3	29.9, 50.7	8.2	5.5, 10.9	3.7	1.5, 5.9	3.6	1.6, 5.6
Other ²	37.1	20.4, 53.8	4.8	1.7, 7.9	2.1	0.3, 3.9	3.5	0.4, 6.6

¹ See text for listing of States included in each region.

² Estimates based on fewer than 100 respondents.

SOURCE: Arday et al., 1997.

most regions (Table 1). Compared with white persons, black and Hispanic persons also tended to report a greater mean number of days on which mental health was not good and days on which activities were limited.

Among all respondents 40.9 percent reported that they did not receive an influenza immunization in the prior 12 months. The percentage of persons reporting not receiving this immunization was lower in the West and higher in the Northeast and Southeast (Table 2). Black and Hispanic people, as well as other minority populations in both the Northeast and Southeast reported higher percentages of not receiving influenza immunizations than did white people. A similar pattern was seen for lack of pneumococcal vaccination, although the reported rates of not receiving a pneumococcal vaccination were uniformly higher than those for influenza (Table 2).

Among all women respondents 65 years of age and over, 32.1 percent reported not having received a mammogram in the prior 2 years. Respondents in the West Region were somewhat less likely to report that they had not had a mammogram than those in the other regions (Table 2). Black women in the Northeast and Southeast appeared less likely to receive a mammogram than black women in the North Central and West Regions.

Overall 49.6 percent of respondents reported that they did not receive a digital rectal examination in the past year. Women failed to receive this examination more often than men. Failure to receive was somewhat higher in the North Central Region, compared with other regions, and among black and Hispanic persons and other minority persons.

There was somewhat less regional variation among the reported prevalences of three chronic disease risk factors (Table 3). Obesity was slightly more prevalent in the North Central Region than in the

Southeast or West. Women were more likely to be obese than men, with prevalence estimates exceeding 30 percent in all regions except the West. However, in all regions black people were more likely than white people or the overall population to report being obese or hypertensive. Black persons were also more likely to report having been told they were diabetic than was the total population overall, though Hispanic people and others in the West Region reported the highest rates of diabetes awareness.

Overall 48.7 percent of respondents reported they were ever smokers and 10.9 percent were currently smoking (Table 4). Men had a much higher rate of ever smoking than women, but current smoking rates were similar for both sexes. Last, reported lack of safety belt use was lower in the West than all other regions. Nationally and across all regions, elderly men were more likely to report not using safety belts compared with elderly women.

DISCUSSION

Some of the findings of this study include regional and racial/ethnic differences in self-reported health status and risk-factor prevalence among BRFSS respondents 65 years of age and over who had Medicare or other health insurance coverage. For example, our findings indicate that more than one-half of the elderly black populations in the Southeast and Northeast had not been immunized against influenza in the prior year. These findings support the need for the current Horizons pilot project, led by the Dallas Regional Office. This project is directed at increasing the level of influenza immunization among elderly black Medicare beneficiaries in eight Southeastern States. Based on our findings, however, Hispanic persons in the Southeast and both black and Hispanic per-

Table 2

**Estimated Prevalences of Failure to Receive Selected Preventive Care Services
Among Behavioral Risk Factor Surveillance System Respondents with Health Insurance
Who Were 65 Years of Age or Over, by Region¹, Sex, and Race/Ethnicity: United States, 1995**

Region and Characteristic	Percent Not Receiving an Influenza Immunization in Past 12 Months	95-Percent Confidence Interval	Percent Never Receiving a Pneumonia Vaccination	95-Percent Confidence Interval	Percent Not Receiving a Mammogram in Past 2 Years ²	95-Percent Confidence Interval	Percent Not Receiving a Digital Rectal Examination in Past Year	95-Percent Confidence Interval
United States Total	40.9	39.9, 41.9	62.7	61.7, 63.7	--	--	49.6	48.4, 50.8
Male	40.4	38.6, 42.2	63.6	61.8, 65.4	--	--	41.2	39.4, 43.0
Female	41.2	39.8, 42.6	62.1	60.7, 63.5	32.1	30.9, 33.3	55.5	54.1, 56.9
White, not Hispanic	39.1	37.9, 40.3	61.0	59.8, 62.2	32.0	30.6, 33.4	48.9	47.7, 50.1
Black, not Hispanic	59.4	55.5, 63.3	78.9	75.6, 82.2	36.4	31.7, 41.1	53.1	49.0, 57.2
Hispanic	47.2	40.7, 53.7	72.8	66.9, 78.7	25.9	19.4, 32.4	56.5	50.0, 63.0
Other	41.6	31.4, 51.8	63.6	53.0, 74.2	23.0	14.6, 31.4	59.7	49.1, 70.3
Northeast	43.1	40.9, 45.3	68.4	66.2, 70.6	--	--	46.9	44.7, 49.1
Male	40.5	36.8, 44.2	70.3	66.8, 73.8	--	--	38.0	34.5, 41.5
Female	44.8	42.1, 47.5	67.2	64.7, 69.7	33.9	31.4, 36.4	52.9	50.4, 55.4
White, not Hispanic	40.5	38.3, 42.7	67.1	64.9, 69.3	33.4	30.7, 36.1	46.3	43.9, 48.7
Black, not Hispanic	64.4	56.6, 72.2	80.3	73.8, 86.8	41.7	31.1, 52.3	50.0	41.0, 59.0
Hispanic ³	55.2	38.1, 72.3	72.5	58.6, 86.4	19.0	7.2, 30.8	50.7	32.9, 68.5
Other ³	79.8	66.1, 93.5	95.9	90.4, 100.0	30.6	0.0, 61.4	79.3	59.9, 98.7
Southeast	42.7	40.7, 44.7	62.4	60.4, 64.4	--	--	51.6	49.6, 53.6
Male	44.0	40.7, 47.3	63.3	59.8, 66.8	--	--	43.4	39.9, 46.9
Female	41.9	39.5, 44.3	61.7	59.3, 64.1	31.4	29.2, 33.6	57.3	54.9, 59.7
White, not Hispanic	39.5	37.3, 41.7	59.1	56.9, 61.3	30.9	28.5, 33.3	50.6	48.4, 52.8
Black, not Hispanic	62.5	58.0, 67.0	82.3	78.8, 85.8	38.8	32.9, 44.7	57.2	52.5, 61.9
Hispanic	53.9	42.5, 65.3	75.3	63.9, 86.7	³ 24.1	13.7, 34.5	56.9	45.1, 68.7
Other ³	56.6	38.8, 74.4	64.5	47.4, 81.6	14.3	0.0, 29.8	62.1	43.7, 80.5

See Notes at end of table.

Table 2—Continued
Estimated Prevalences of Failure to Receive Selected Preventive Care Services
Among Behavioral Risk Factor Surveillance System Respondents with Health Insurance
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Region and Characteristic	Percent Not Receiving an Influenza Immunization in Past 12 Months	95-Percent Confidence Interval	Percent Never Receiving a Pneumonia Vaccination	95-Percent Confidence Interval	Percent Not Receiving a Mammogram in Past 2 Years ²	95-Percent Confidence Interval	Percent Not Receiving a Digital Rectal Examination in Past Year	95-Percent Confidence Interval
North Central	39.6	37.6, 41.6	63.3	61.3, 65.3	--	--	53.3	51.3, 55.3
Male	39.9	36.8, 43.0	64.4	61.3, 67.5	--	--	45.2	42.1, 48.3
Female	39.3	36.9, 41.7	62.5	60.1, 64.9	32.5	30.5, 34.5	59.0	56.6, 61.4
White, not Hispanic	38.9	36.9, 40.9	62.6	60.6, 64.6	33.3	31.1, 35.5	53.5	51.5, 55.5
Black, not Hispanic	50.9	41.3, 60.5	74.5	65.9, 83.1	22.3	13.7, 30.9	48.6	39.0, 58.2
Hispanic ³	39.9	26.0, 53.8	69.8	56.5, 83.1	30.6	17.7, 43.5	60.6	46.7, 74.5
Other ³	47.9	25.9, 69.9	57.2	35.4, 79.0	14.7	2.0, 27.4	53.8	31.8, 75.8
West	36.8	34.1, 39.5	55.0	52.3, 57.7	--	--	45.8	43.1, 48.5
Male	36.2	31.5, 40.9	54.8	50.1, 59.5	--	--	37.8	33.3, 42.3
Female	37.3	34.2, 40.4	55.2	51.9, 58.5	27.6	25.4, 29.8	51.9	48.6, 55.2
White, not Hispanic	36.6	33.9, 39.3	53.1	50.2, 56.0	27.5	25.1, 29.9	43.9	41.2, 46.6
Black, not Hispanic ³	44.8	26.4, 63.2	65.1	47.3, 82.9	25.6	3.3, 47.9	50.4	32.2, 68.6
Hispanic	41.3	30.5, 52.1	71.8	62.6, 81.0	30.5	19.3, 41.7	56.9	46.3, 67.5
Other	28.5	16.0, 41.0	57.2	41.5, 72.9	28.2	20.8, 35.6	55.4	39.7, 71.1

¹ See text for listing of States included in each region.

² California data excluded from West Region (see text).

³ Estimates based on fewer than 100 respondents. For Hispanic persons in the Southeast, however, only the mammography question had fewer than 100 respondents.

SOURCE: Arday et al., 1997.

Table 3

Estimated Prevalences of Selected Chronic Disease Risk Factors Among Behavioral Risk Factor Surveillance System Respondents with Health Insurance Who Were 65 Years of Age or over, by Region¹, Sex and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Aware They Had Diabetes	95-Percent Confidence Interval	Percent Told They Had Hypertension	95-Percent Confidence Interval	Percent Overweight by Body Mass Index	95-Percent Confidence Interval
United States Total	11.2	10.6, 11.8	45.1	43.9, 46.3	29.9	28.9, 30.9
Male	11.1	9.9, 12.3	41.9	40.1, 43.7	27.6	26.0, 29.2
Female	11.2	10.4, 12.0	47.3	45.9, 48.7	31.5	30.3, 32.7
White, not Hispanic	10.1	9.5, 10.7	44.3	43.1, 45.5	28.7	27.7, 29.7
Black, not Hispanic	18.7	15.8, 21.6	58.9	55.0, 62.8	47.3	43.2, 51.4
Hispanic	18.0	13.3, 22.7	36.5	30.6, 42.4	32.6	26.5, 38.7
Other	18.2	8.4, 28.0	46.9	35.7, 58.1	21.1	13.5, 28.7
Northeast	10.4	9.0, 11.8	44.9	42.7, 47.1	30.2	28.2, 32.2
Male	9.5	7.5, 11.5	42.7	39.0, 46.4	29.1	25.8, 32.4
Female	11.0	9.4, 12.6	46.4	43.9, 48.9	31.0	28.5, 33.5
White, not Hispanic	10.0	8.6, 11.4	44.4	42.2, 46.6	29.7	27.5, 31.9
Black, not Hispanic	17.1	10.2, 24.0	58.9	50.1, 67.7	43.4	34.4, 52.4
Hispanic ²	6.1	0.8, 11.4	21.3	7.6, 35.0	20.9	6.2, 35.6
Other ²	6.2	0.0, 15.0	41.4	20.4, 62.4	17.0	1.7, 32.3
Southeast	11.4	10.2, 12.6	44.2	42.2, 46.2	28.3	26.5, 30.1
Male	11.1	9.1, 13.1	39.0	35.7, 42.3	25.1	22.4, 27.8
Female	11.7	10.1, 13.3	47.8	45.4, 50.2	30.6	28.4, 32.8
White, not Hispanic	9.9	8.5, 11.3	42.5	40.3, 44.7	25.8	23.8, 27.8
Black, not Hispanic	20.1	16.6, 23.2	60.3	55.6, 65.0	45.4	40.7, 50.1
Hispanic	18.2	9.6, 26.8	36.9	26.9, 46.9	35.2	24.0, 46.4
Other ²	6.7	0.0, 13.6	48.4	29.4, 67.4	39.7	19.3, 60.1

See Notes at end of table.

Table 3—Continued
Estimated Prevalences of Selected Chronic Disease Risk Factors Among Behavioral
Risk Factor Surveillance System Respondents with Health Insurance Who Were
65 Years of Age or over, by Region¹, Sex and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Aware They Had Diabetes	95-Percent Confidence Interval	Percent Told They Had Hypertension	95-Percent Confidence Interval	Percent Overweight by Body Mass Index	95-Percent Confidence Interval
North Central	11.2	10.0, 12.4	45.6	43.6, 47.6	32.7	30.9, 34.5
Male	11.5	9.5, 13.5	42.3	39.2, 45.4	30.5	27.6, 33.4
Female	11.0	9.6, 12.4	47.8	45.4, 50.2	34.2	31.8, 36.6
White, not Hispanic	10.8	9.6, 12.0	45.3	43.3, 47.3	32.3	30.3, 34.3
Black, not Hispanic	15.9	9.6, 22.2	56.0	46.4, 65.6	46.0	37.2, 54.8
Hispanic	14.3	5.9, 22.7	² 32.9	20.2, 45.6	23.0	12.8, 33.2
Other ²	17.0	3.5, 30.5	55.4	34.0, 76.8	23.1	6.0, 40.2
West	11.8	9.8, 13.8	45.8	43.1, 48.5	28.0	25.6, 30.4
Male	12.8	9.5, 16.1	44.5	39.6, 49.4	25.6	21.7, 29.5
Female	11.1	8.9, 13.3	46.8	43.5, 50.1	29.9	27.0, 32.8
White, not Hispanic	9.5	7.7, 11.3	45.5	42.6, 48.4	26.1	23.7, 28.5
Black, not Hispanic ²	21.9	7.2, 36.6	57.2	39.6, 74.8	67.8	52.5, 83.1
Hispanic	23.8	14.8, 32.8	42.7	32.1, 53.3	40.5	29.5, 51.5
Other	23.6	8.9, 38.3	46.7	30.6, 62.8	18.2	8.6, 27.8

¹ See text for listing of states included in each region.

² Estimates based on fewer than 100 respondents. For Hispanic persons in the North Central Region, however, only the question on hypertension had fewer than 100 respondents.

SOURCE: Arday et al., 1997.

Table 4

Estimated Prevalences of Selected Behavioral Risk Factors Among Behavioral Risk Factor Surveillance System Respondents with Health Insurance Who Were 65 Years of Age or Over, by Region¹, Sex, and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Ever Smokers ²	95-Percent Confidence Interval	Percent Current Smokers	95-Percent Confidence Interval	Percent Not Always Wearing a Safety Belt	95-Percent Confidence Interval
United States Total	48.7	47.7, 49.7	10.9	10.3, 11.5	23.7	22.9, 24.5
Male	64.4	62.6, 66.2	11.2	10.0, 12.4	28.9	27.3, 30.5
Female	37.9	36.5, 39.3	10.7	9.9, 11.5	20.1	19.1, 21.1
White, not Hispanic	50.0	48.8, 51.2	10.9	10.1, 11.7	23.9	22.9, 24.9
Black, not Hispanic	41.5	37.6, 45.4	12.7	10.2, 15.2	26.9	23.2, 30.6
Hispanic	38.6	32.7, 44.5	10.0	6.1, 13.9	16.9	12.2, 21.6
Other	40.0	28.8, 51.2	8.9	4.4, 13.4	14.7	9.2, 20.2
Northeast	49.3	47.1, 51.5	10.5	9.1, 11.9	27.0	25.0, 29.0
Male	62.4	58.7, 66.1	10.1	7.7, 12.5	31.8	28.5, 35.1
Female	40.6	38.1, 43.1	10.8	9.2, 12.4	23.8	21.6, 26.0
White, not Hispanic	50.7	48.3, 53.1	10.6	9.2, 12.0	27.2	25.2, 29.2
Black, not Hispanic	41.2	32.8, 49.6	10.2	4.7, 15.7	26.9	18.9, 34.9
Hispanic ³	39.4	22.3, 56.5	10.8	0.0, 23.3	23.3	8.8, 37.8
Other ³	13.7	3.1, 24.3	10.2	0.6, 19.8	17.9	0.0, 36.9
Southeast	46.7	44.7, 48.7	12.1	10.7, 13.5	21.8	20.2, 23.4
Male	62.6	59.3, 65.9	13.0	10.6, 15.4	26.8	23.9, 29.7
Female	35.8	33.4, 38.2	11.5	9.7, 13.3	18.4	16.6, 20.2
White, not Hispanic	48.3	46.1, 50.5	12.0	10.4, 13.6	21.6	19.8, 23.4
Black, not Hispanic	36.9	32.2, 41.6	12.6	9.3, 15.9	25.8	21.9, 29.7
Hispanic	39.1	27.9, 50.3	12.7	3.3, 22.1	15.6	8.0, 23.2
Other ³	57.0	38.6, 75.4	15.6	4.0, 27.2	27.6	11.3, 43.9

See Notes at end of table.

Table 4—Continued
Estimated Prevalences of Selected Behavioral Risk Factors Among Behavioral Risk Factor
Surveillance System Respondents with Health Insurance Who Were 65 Years
of Age or Over, by Region¹, Sex, and Race/Ethnicity: United States, 1995

Region and Characteristic	Percent Ever Smokers ²	95-Percent Confidence Interval	Percent Current Smokers	95-Percent Confidence Interval	Percent Not Always Wearing a Safety Belt	95-Percent Confidence Interval
North Central	46.8	45.0, 48.6	10.3	9.3, 11.3	29.0	27.4, 30.6
Male	66.0	63.1, 68.9	10.6	8.8, 12.4	35.8	32.9, 38.7
Female	33.9	31.5, 36.3	10.1	8.7, 11.5	24.3	22.3, 26.3
White, not Hispanic	47.4	45.4, 49.4	9.8	8.8, 10.8	28.9	27.1, 30.7
Black, not Hispanic	47.2	38.6, 55.8	18.8	12.1, 25.5	35.7	26.3, 45.1
Hispanic	30.2	19.6, 40.8	11.7	4.8, 18.6	² 9.4	3.9, 14.9
Other ³	48.8	27.6, 70.0	8.6	0.0, 20.8	41.4	20.0, 62.8
West	53.4	50.7, 56.1	10.4	8.8, 12.0	15.5	13.7, 17.3
Male	67.6	62.9, 72.3	10.8	8.1, 13.5	19.8	16.7, 22.9
Female	42.9	39.8, 46.0	10.1	8.5, 11.7	12.3	10.3, 14.3
White, not Hispanic	55.3	52.4, 58.2	11.0	9.4, 12.6	15.7	13.9, 17.5
Black, not Hispanic ³	52.1	33.9, 70.3	7.8	0.4, 15.2	17.6	0.0, 36.0
Hispanic	42.2	31.8, 52.6	6.6	2.9, 10.3	18.7	10.1, 27.3
Other	41.6	25.1, 58.1	7.4	1.3, 13.5	7.4	3.5, 11.3

¹ See text for listing of States included in each region.

² Estimates based on fewer than 100 respondents. For Hispanic persons in the North Central Region, however, only the question on seatbelt use had fewer than 100 respondents.

³ Smoked at least 100 cigarettes.

SOURCE: Arday et al., 1997.

sons in other regions might benefit from an expansion of the Horizons project to include additional States and Hispanic persons.

Black people were also much more likely than white people to report obesity and having been told that they were diabetic. Although our results are consistent with other reports (Tull and Roseman, 1995), these results also underscore the need for targeting programs to improve diabetes-related medical care and promote weight reduction among elderly black Medicare beneficiaries. Such programs may be especially important given the evidence for higher diabetes-associated morbidity and mortality among black persons (Tull and Roseman, 1995).

The descriptive study design we used did not assess the influence of socioeconomic status on the distribution of risk factors by race, sex, and region. If we controlled for socioeconomic status, we might find that race and sex were not as influential. Among the elderly, women are more likely than men to be poor, and minority persons are more likely than white persons to be poor (Administration on Aging and the American Association of Retired Persons, 1997). Poverty rates among those 65 years of age and over are highest in the Southeast Region (Barnett, Elmes, and Casper, 1997). And a prior study, based on 1987 BRFSS data, found lower rates of influenza immunization among elderly persons with incomes less than \$10,000 per year (Stehr-Green et al., 1990). On the other hand, the high rates of reported non-receipt of pneumococcal vaccine might partly be the result of the failure of respondents to recall having received this once-in-a-lifetime vaccine in the remote past.

We found a relatively low prevalence of current smoking among the respondents and little difference between the sexes. This was despite a much higher reported overall prevalence of ever smoking among

men compared with women. Individuals in our survey population were all born prior to 1930 and are members of birth cohorts that had peak smoking prevalences of 60-70 percent among men and 20-40 percent among women in earlier years (Giovino et al., 1995). As of 1987 these cohorts had median smoking rates of approximately 20 percent for men and 15 percent for women (Giovino et al., 1995). Our 1995 national prevalence of 10.9 percent suggests that a fair number of former smokers in our population quit in recent years, because premature mortality alone would not likely account for the all of the recent decline in smoking prevalence. It remains to be seen, however, whether the smoking prevalence in the population over age 65 will stay the same as successive cohorts age. Encouraging smoking cessation among those Medicare beneficiaries who smoke would still benefit their health (U.S. Department of Health and Human Services, 1990).

There are several limitations that must be kept in mind when interpreting these results. First, the 1995 BRFSS did not collect specific information on the type of insurance coverage, therefore we were unable to limit the analysis to Medicare beneficiaries alone. Although the vast majority of the U.S. population over age 65 has Medicare coverage, a small percentage, most of whom are retired government employees, have other forms of health insurance. Because their numbers are relatively small, in comparison to the total, it is unlikely that their inclusion changed our results.

Although the four regions were the smallest geographic levels at which prevalence estimates could reasonably be calculated for minority respondents, the regional estimates for certain race/ethnicity categories are still based on a small number of respondents (fewer than 100) and should be interpreted with caution. Specifically estimates for Hispanic persons in the

Northeast Region, black persons in the West Region, and other minority persons in the Northeast, Southeast, and North Central Regions were based on fewer than 100 respondents each. And for Hispanics in the North Central and Southeast Regions, there were fewer than 100 respondents to some questions (see footnotes for Tables 2 through 4).

Another limitation of the BRFSS is the exclusion of households without telephones from the sampling frame. Although nationally 95 percent of households have telephones, telephone coverage is lower in certain geographic areas (Bureau of the Census, 1994). The BRFSS also excludes institutionalized individuals. (According to Bureau of the Census data, about 5 percent of persons 65 years of age and over in the resident U.S. population were institutionalized in 1994) (Bureau of the Census, 1997). The BRFSS is administered in Spanish as well as English in many of the States that have large Hispanic populations; however, people who speak only other languages are excluded. And because the survey does not accept proxy responses, non-institutionalized disabled individuals who are unable to respond to a telephone interviewer are also excluded.

There may also be some limitations on the reliability and validity of self-reported disease risk factors and diagnoses obtained using telephone surveys. At least three studies have specifically looked at this issue in the BRFSS with respect to cardiovascular disease risk factors. In a study of urban white people and people of races other than white, Shea et al. (1991) found significant differences across racial and ethnic groups in the consistency of some responses on repeat telephone interviewing, though self-reported smoking history, height, and weight were found to be consistently reliable (Shea, 1991). Another study comparing the BRFSS with face-to-

face interviews found the two methods produced comparable estimates for measures of current smoking, hypertension awareness, and mean total cholesterol, but differed for mean body mass index, rates of obesity, and rates of controlled hypertension (Jackson, Jatulis, and Fortmann, 1992). In a two-part study of rural white persons, Bowlin reported on both the reliability and validity of certain questions, using repeat interviews in a clinical setting and a physical examination. The reliability of self-reported cardiovascular disease risk factors—including smoking, diabetes awareness, hypertension awareness, high cholesterol awareness, height, and weight—was generally high, except for hypertension-control status among those with hypertension (Bowlin et al., 1996). Prevalence was underreported for hypertension, hypercholesterolemia, obesity, and smoking (Bowlin et al., 1993).

The 1996 BRFSS survey collected more detailed information on insurance coverage, and specific questions asked whether or not a respondent is covered by Medicare or Medicaid. This will allow more accurate estimation of risk-factor prevalences among all beneficiaries. Inclusion of questions differentiating type of health insurance will enable reporting of health-risk estimates for the various insurance subgroups, including managed care beneficiaries who are currently not a part of Medicare claims data. In December 1996 overall enrollment in managed care organizations among all Medicare beneficiaries, regardless of age, was 12.6 percent and rising, but there were significant geographic variations. In California for example, 37.2 percent of eligible Medicare beneficiaries were enrolled in managed care, but in Alaska, only 0.5 percent were (Health Care Financing Administration, 1997). In areas where managed care penetration is high, BRFSS-type surveys may be a method of

monitoring the prevalence of risk behaviors among Medicare or Medicaid beneficiaries, as well as the quality of care they receive. A recent study in Colorado found that the BRFSS was as reliable as the Health Plan Employer Data and Information Set (HEDIS) for the assessment of the health status of managed care plan members (Garrett et al., 1995).

Pooling and combining data from separate State surveys has some potential limitations. Combining the differently sampled State-level data into regional and national estimates using appropriate weighting factors does not affect the expected values of the estimates; however, it often increases the standard error of those estimates making actual differences harder to detect. And in 1995 the State of California altered several questions in the standard BRFSS questionnaire to serve local purposes. Such data are therefore non-comparable and must be excluded from any regional or national estimates. In our case the only variable we examined for which California's data were different (and therefore had to be excluded) was the prevalence of receiving a mammogram in the past 2 years. It is recognized, however, that if one or more States continue to deviate from the standard BRFSS survey instrument, the BRFSS will be proportionately less useful for HCFA's purposes.

In summary the BRFSS is an instrument that can be used to identify self-reported health status and behaviors of individuals 65 years of age and over, at the State and regional level. It offers HCFA several means for furthering its health care quality improvement initiatives. It can assess the beneficiary population's risk for chronic diseases and receipt of clinical preventive services. It can measure progress toward achieving State and national health objectives, such as the Healthy People 2000 objectives, among beneficiaries. It has the ca-

capacity and flexibility to serve emerging public health needs and new systems of health care delivery. And BRFSS-type surveys may be of assistance in measuring the effectiveness of PRO interventions at the State level. Once risk factors are identified, further initiatives can be recommended, developed, and implemented to improve the quality of life among Medicare beneficiaries.

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Reprint Requests: David R. Arday, M.D., M.P.H., Office of Clinical Stands and Quality, Health Care Financing Administration, 7500 Security Blvd., S2-11-07, Baltimore, MD, 21244-1850, e-mail: darday@hcfa.gov