

Changes in Health Behaviors among Older Americans, 1990 to 2000

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SYNOPSIS

Objectives. The authors used a large population-based survey to examine changes from 1990 to 2000 in age distribution by sex and race or ethnicity, to estimate both state-specific and national trends in the proportion of older Americans, and to examine changes in risk factors and quality-of-life indicators among those Americans.

Methods. The Behavioral Risk Factor Surveillance System (BRFSS), a cross-sectional telephone survey of adults aged ≥ 18 years. BRFSS data were analyzed for the District of Columbia and all states that participated from 1990 to 2000. SAS and SUDAAN were used in the analyses to account for the complex sampling design.

Results. The percentage of Americans aged ≥ 75 years increased 23.0% from 1990 to 2000, with the magnitude of the increase varying by state. In 2000, Florida had the highest percentage of persons aged ≥ 75 (10.27%) and Alaska the lowest (3.49%). Compared with 1990, older Americans in 2000 were more likely to be obese (16.3% vs. 13.5%) or diabetic (14.3% vs. 11.0%). Older Americans in 2000 were also more likely to exercise, consume more fruits and vegetables daily, and to have recently obtained a routine medical checkup. In addition, they were less likely to smoke tobacco or drink any alcohol.

Conclusions. Increases in the population of older people will have a tremendous impact on health care in the states and will affect their future plans for serving the elderly. Although older Americans are living more healthfully than previously, there is an enormous need for targeted health promotion programs to prevent chronic diseases in this age group.

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In the coming decades, the number and the proportion of older Americans will rise dramatically.¹ As America becomes more diverse, the patterns of aging will vary by major population groups. The aging of America will have profound societal implications, as it will increase chronic disability, drive up the need for long-term care, and further raise health care costs.^{2,3} Understanding trends in health behaviors is critical because of the implications for health care costs, morbidity and mortality, resource allocation, planning, and developing possible primary and secondary prevention programs.

In this study we used the Behavioral Risk Factor Surveillance System (BRFSS), a large population-based survey, to examine changes from 1990 to 2000 in age distribution by sex and race or ethnicity and to estimate both state-specific and national trends in the proportion of older Americans. In addition, we examined changes in selected risk factors and quality-of-life indicators among older Americans. The BRFSS is the largest surveillance system among the elderly, and unlike other national surveys, it collects information on persons aged 75 years or older.

METHODS

We analyzed data from the BRFSS for all 50 states and the District of Columbia. The BRFSS is a cross-sectional telephone survey conducted by state health departments with assistance from the Centers for Disease Control and Prevention (CDC). Questions on the BRFSS questionnaire are used primarily to monitor personal behaviors that increase risk of death.

The BRFSS uses a multistage cluster design based

on random-digit dialing to select a representative sample from each state's adult noninstitutionalized civilian residents aged 18 years or older. State data are pooled to produce nationally representative estimates. Further details about the purpose, sampling method, and method of analysis of the BRFSS are available elsewhere.⁴ All BRFSS questions, reports, and data are available at <http://www.cdc.gov/brfss>.

Six states did not participate in the BRFSS in 1990 (Alaska, Arkansas, Kansas, Nevada, New Jersey, and Wyoming), but all states and the District of Columbia participated in 2000. SAS and SUDAAN were used in the analyses to account for the complex sampling design.^{5,6}

RESULTS

The age distribution for all participants in BRFSS 1990 and 2000 are presented in Table 1. During the decade, the percentage of Americans aged 75 or older increased in both sexes and in both whites and African Americans, but not in Hispanics or "other" racial/ethnic groups.

The percentage of adult Americans who were aged 75 or older increased from 5.60% in 1990 to 6.89% in 2000, a 23.0% increase in 10 years (Table 2). This increase was greater for men (25.9%) than women (21.1%).

In 2000, Florida had the highest percentage of persons aged 75 or older (10.27%) and Iowa had the second highest (9.66%); Alaska had the lowest percentage (3.49%) (Table 3 and Figure). In 1990, 11 of the 44 participating states and the District of Columbia had less than 5% of their adult population aged 75

Table 1. Age distribution of participants by sex and race, Behavioral Risk Factor Surveillance System, 1990 and 2000

Age (years)	1990				2000			
	<65 y	65–<75 y	75–<85 y	85+ y	<65 y	65–<75 y	75–<85 y	85+ y
Total (%)	83.7	10.7	4.7	0.9	82.5	10.6	5.8	1.1
Sex (%)								
Males	86.1	9.5	3.8	0.6	85.2	9.3	4.7	0.8
Females	81.5	11.8	5.6	1.1	80.1	11.8	6.7	1.4
Race (%)								
White	82.3	11.5	5.2	1.0	79.9	11.9	6.9	1.3
Black	87.3	8.6	3.6	0.5	86.6	8.8	3.7	0.8
Hispanic	90.8	6.4	2.3	0.5	91.7	5.9	2.0	0.4
Other	92.3	4.6	2.8	0.3	90.6	6.4	2.5	0.5

Table 2. Percentage of participants aged 75 or older, by year, Behavioral Risk Factor Surveillance System, 1990 to 2000

Year	Total (percent)	Men (percent)	Women (percent)
1990	5.60	4.40	6.72
1991	5.82	4.43	7.09
1992	6.02	4.42	7.50
1993	6.17	4.62	7.61
1994	6.07	4.53	7.50
1995	6.27	4.85	7.60
1996	6.61	5.06	8.03
1997	6.94	5.40	8.37
1998	6.93	5.28	8.45
1999	7.00	5.34	8.54
2000	6.89	5.54	8.14

or older; in 2000, only one (Utah) did. The magnitude of the increase in prevalence varied by state, from -14.3% for Mississippi to an increase of 166.1% for Illinois.

The prevalence of selected risk behaviors is presented in Table 4. In 2000, older Americans (75+) were more likely to be obese or have diabetes than were older Americans in 1990. The percentages of older Americans who smoked or drank any alcohol decreased from 1990 to 2000, and this group was more likely to exercise and to consume five or more fruits and vegetables daily in 2000. Older Americans were also more likely in 2000 to have recently visited a physician for a routine medical checkup.

In BRFSS 2000, no questions were asked about blood pressure or cholesterol awareness, but these questions were asked in 1999 and in 1990. The prevalence of high blood pressure among older Americans increased from 42.9% in 1990 to 49.0% in 1999, but the prevalence of high cholesterol decreased from 59.1% in 1990 to 38.7% in 2000 (data not shown).

Table 3. Percentage of participants aged 75 or older, by state, Behavioral Risk Factor Surveillance System 1990 and 2000

	1990 (percent)	2000 (percent)	Change ^a (percent)		1990 (percent)	2000 (percent)	Change ^a (percent)
Total	5.60	6.89	23.0	Missouri	7.23	7.55	4.3
Alabama	6.17	5.67	-8.0	Montana	7.06	7.26	2.7
Alaska ^b		3.49		Nebraska	8.33	9.00	7.9
Arizona	5.83	7.12	22.0	Nevada ^b		5.49	
Arkansas ^b		8.21		New Hampshire	4.73	5.57	17.7
California	5.13	6.26	22.0	New Jersey ^b		6.89	
Colorado	5.19	5.43	4.5	New Mexico	4.00	6.89	60.2
Connecticut	5.67	7.48	31.9	New York	6.33	7.48	18.2
Delaware	5.64	5.97	5.6	North Carolina	5.33	6.52	22.3
District of Columbia	5.58	7.03	26.0	North Dakota	8.30	7.52	-9.6
Florida	8.32	10.27	23.5	Ohio	5.42	7.33	35.1
Georgia	4.09	5.30	29.5	Oklahoma	6.09	6.91	13.3
Hawaii	3.24	6.27	93.9	Oregon	6.57	7.04	7.2
Idaho	6.84	7.08	3.3	Pennsylvania	6.90	7.74	12.3
Illinois	2.53	6.73	166.1	Rhode Island	6.54	8.78	34.2
Indiana	5.51	6.54	18.7	South Carolina	4.76	5.65	18.8
Iowa	8.39	9.66	15.2	South Dakota	7.97	9.09	13.9
Kansas ^b		8.61		Tennessee	5.66	6.10	7.9
Kentucky	5.02	6.39	27.3	Texas	3.77	5.63	49.6
Louisiana	2.33	6.20	165.9	Utah	4.87	4.96	1.6
Maine	7.41	6.40	-13.5	Vermont	5.68	6.37	12.2
Maryland	4.03	6.13	52.3	Virginia	3.92	5.63	43.6
Massachusetts	6.68	7.53	12.6	Washington	5.11	6.26	22.4
Michigan	5.86	6.64	13.3	West Virginia	7.29	8.09	11.1
Minnesota	6.91	7.62	10.2	Wisconsin	6.98	7.58	8.6
Mississippi	7.29	6.25	-14.3	Wyoming ^b		6.20	

^aChanges were computed by SAS first and rounded.

^bDid not participate in 1990.

Figure. Changes in the prevalence of Americans aged 75 or older among states, BRFSS 1990, 1995, and 2000

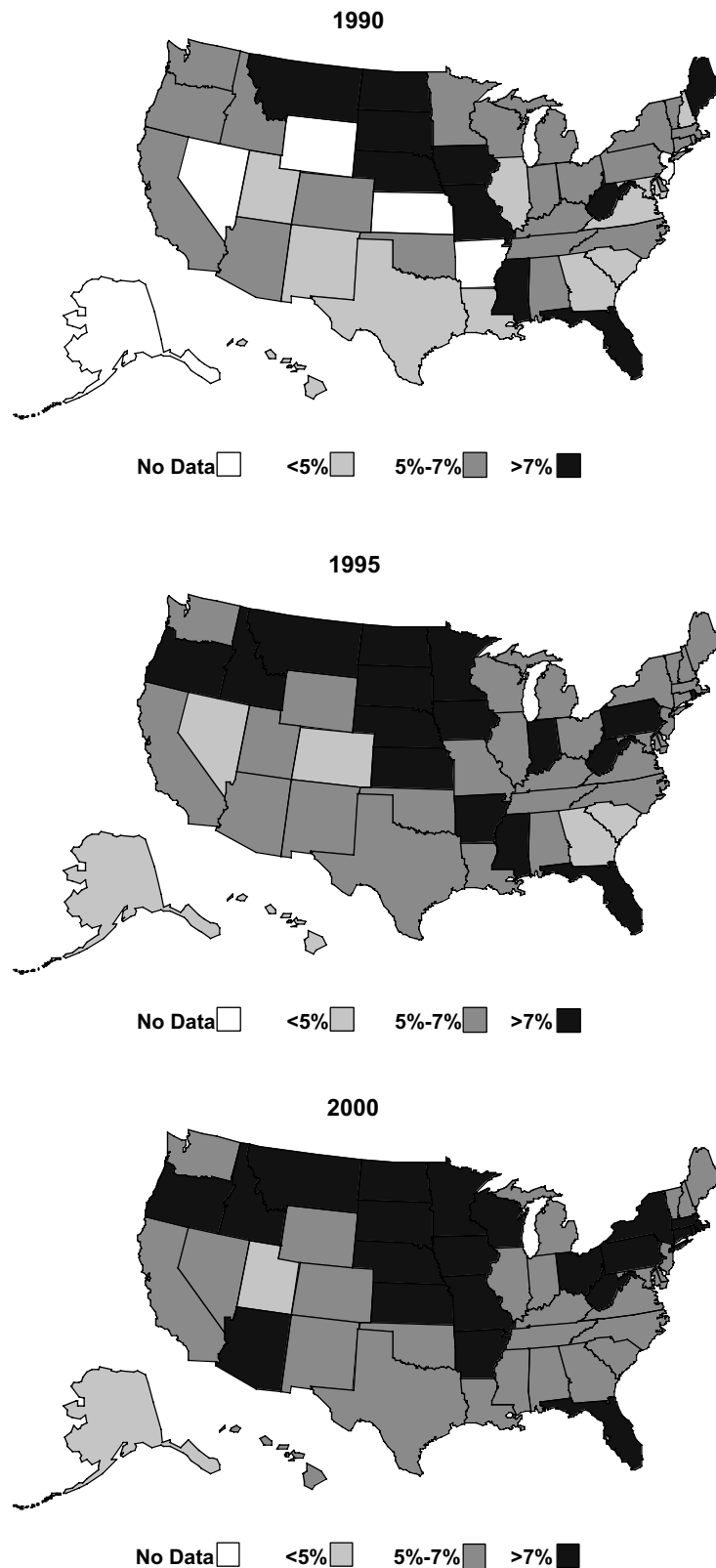


Table 4. Prevalence of selected risk factors among participants aged 75 or older, Behavioral Risk Factor Surveillance System, 1990 and 2000

<i>Risk factors</i>	<i>1990 (percent)</i>	<i>2000 (percent)</i>
Diagnosed diabetes	11.0	14.3
Drink any alcohol	75.5	69.0
Body mass index		
Normal	54.7	48.4
Overweight	31.7	35.3
Obese	13.5	16.3
Smoking status		
Never	61.2	56.0
Ex-smoker	31.4	38.0
Current	7.4	6.0
Physical activity		
Inactive	48.3	39.5
Irregularly active	21.7	25.2
Regular, not intense	18.3	16.2
Regular, intense	11.7	19.1
Fruit and vegetable intake (daily)		
None	1.9	1.5
<3	20.1	19.1
3 to <5	47.1	43.5
≥5	30.9	35.9
Routine medical checkup		
1 to 12 months	85.5	88.8
1 to 2 years	2.7	5.5
2 to 5 years	2.7	2.3
≥5 years	4.6	2.8
Never	1.5	0.6

Questions on quality of life were first asked in the 1993 BRFSS. For that year, estimates for health status were as follows: excellent, 10.6%; very good, 22.4%; good, 32.5%; fair, 22.9%; and poor, 11.6%. For 2000, the corresponding estimates were generally similar: excellent, 9.1%; very good, 23.5%; good, 34.1%; fair, 22.8%; and poor, 10.5%. For the number of days in the past month with poor physical health, poor mental health, or both, the estimates were 6.1, 1.8, and 3.0 in 1993 and 6.2, 2.0, and 6.8 in 2000. For Americans aged 18 to 74, the estimates in 2000 were 3.1, 3.3, and 3.5, respectively.

DISCUSSION

This is the first study to examine national trends in behavioral risk factors among the elderly in the United

States. Older age is the most powerful independent predictor of cardiovascular diseases, cancer, arthritis, and all-cause mortality in men and women, and thus the aging population implies an increasing burden of chronic diseases and complications. Our findings of an increasing prevalence of high blood pressure, obesity, and diabetes among persons 75 or older—combined with the upward shift in the age distribution—are cause for great concern.

Unprecedented gains in life expectancy during the 20th century have fundamentally changed the patterns of health and disease, resulting in new demands on our systems of public health, health care, and aging services. Although considerable attention has been given to the “graying” of America, public debate has largely ignored variations within the older cohorts. Differences that will affect future health costs are particularly salient. The simultaneous occurrence of longer life span and the demographic oddity of the “baby boom” generation will likely increase chronic disability, the need for long-term care, and health care costs.^{2,3} Within these overall trends, other factors—such as expected differential growth in certain racial/ethnic groups known to be at increased risk of adverse health outcomes—will influence health care demands.¹ Preventing the onset and course of chronic illness by modifying risk factors is one of the few strategies available to temper the expected pressures on the health care system, yet the nation has been slow to realize this potential. States—where financial demands of increased long-term care costs will be felt most severely—have had even less useful information on prevention opportunities for older adults.

In the present study, we found that from 1990 to 2000, the percentage of persons aged 75 years and older (as a percentage of all adults) increased in almost every state in which we could make the comparison. We also found that older Americans seem to be living more healthfully. From 1990 to 2000, older Americans became less likely to smoke or drink alcohol and more likely to exercise, eat five or more fruits and vegetables daily, and to have recently consulted a physician for a routine checkup.

Although older Americans appear to be living more healthfully now, their higher rates of obesity, high blood pressure, and diabetes are not good signs; perhaps these rates can be tied to the higher rates we found for days of poor physical and mental health.⁷ In 1993, the average number of days in the past month of both poor physical and poor mental health was just 3.0; in 2000 it was 6.8. The improvement in health risk behaviors we found at a later age is encouraging, but we expected that the benefits of having had a healthier

lifestyle in earlier years would have resulted in a better health status for older Americans. On the other hand, the fact that older Americans had only 2.0 days of poor mental health per month (versus 3.3 for Americans aged 18 to 74) is a positive indication.

Any interpretation of our findings must appreciate the likelihood that the rates are underestimates. People without telephones are not included in the BRFSS, and such persons are likely to be of low socioeconomic status, a factor associated with increased risk factors. In addition, we may have excluded older Americans unable to speak over the phone. Older Americans living in nursing homes were also excluded from the survey. We have no reason to believe that such a percentage would have varied between 1990 and 2000, however, and thus these limitations should not affect our ability to report on trends. In addition, BRFSS data have been shown to be reliable, valid, and with minimum bias.^{4,8}

Our findings show a disparity in aging patterns by population group. Hispanics showed a decline in the percentage of older persons, whereas whites and African Americans did not. The migration of younger Hispanics to the United States may explain some of these findings, but there are also clear indications that Hispanics have higher mortality rates at younger ages than do other ethnic groups. This underscores the need to develop and implement culturally sensitive prevention programs directed at various risk factors to target all ethnic groups. These programs should focus on the importance of disease prevention to eliminate racial and ethnic disparities in morbidity and mortality from chronic disease.

Our findings reveal a wide range of variation in population aging by state. Our data will provide states with unique population-based estimates against which planning programs can be developed and evaluated. These programs should focus on primary and secondary prevention of chronic diseases among the elderly. State-level population-based estimates of the population aged 75 or older and their increase in the past decade should be used to provide each state with a

basis for prioritizing public health interventions and health resource allocation.

Our data suggest that developing strategies and programs for improving the health behaviors and health status of older Americans must become a higher priority. Although improving health behaviors at a younger age results in lifetime health benefits, it is never too late to start healthy habits and gain benefits. Older Americans are capable of substantial health improvements. Programs that enhance healthy behaviors across life span, including those that address the special needs, interests, and functional abilities of older adults, should help alleviate the burden of chronic diseases among this growing segment of the population.

REFERENCES

1. Population projections of the United States, by age, sex, race, and Hispanic origin: 1993 to 2050. Washington: Bureau of the Census (US); 1993. Current Population Reports:25-1104.
2. Schneider EL, Guralnik JM. The aging of America. Impact on health care costs. *JAMA* 1990;263:2335-40.
3. Clark DO. US trends in disability and institutionalization among older blacks and whites. *Am J Public Health* 1997;87:438-40.
4. Mokdad AH, Stroup DF, Giles WH. Public health surveillance for behavioral risk factors in a changing environment. Recommendations from the Behavioral Risk Factor Surveillance Team. *MMWR Morb Mortal Wkly Rep* 2003;52(RR-9):1-12.
5. SAS system. Version 8.2. Cary (NC): SAS Institute Inc.; 1998.
6. Shah BV, Barnwell BG, Bieler GS. SUDAAN user's manual, Release 7.5. Research Triangle Park (NC): Research Triangle Institute; 1997.
7. Ford ES, Moriarty DG, Zack MM, Mokdad AH, Chapman DP. Self-reported body mass index and health-related quality of life: findings from the Behavioral Risk Factor Surveillance System. *Obes Res* 2001;9:21-31.
8. Nelson DE, Holtzman D, Bolen J, Stanwyck CA, Mack KA. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Soz Praventivmed* 2001;(46)Suppl 1:S3-42.