

HIGH-END USERS OF HEALTH CARE AMONG THE OLDEST OLD

WHO ARE THEY?

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Increasingly large amounts of money are being spent on health care in the United States. In 2000, the national health expenditure was \$1,299.5 billion, up 6.9 percent from 1999. Of this \$1,299.5 billion, \$587.2 billion came from public funds (up 7.0 percent from 1999).¹ The substantial increase in costs, sometimes referred to as the "health care crisis," has placed a huge burden on government agencies, families, and individuals. There have been increased efforts to find viable solutions to slow this escalating expense. Adding to the intensity of this issue is the realization that the elderly are using a disproportionately large amount of health care services.^{2,3,4} Individuals over 65 years of age generate health care expenditures that are four times as high as those of younger individuals.⁵ Increasing utilization of health services is not the only factor leading to growing expenditures; other changes such as advances in medi-

cal technology also contribute to higher costs. However, slowing the rates of utilization has been targeted as the only reliable way to combat the growth of health care expenditures and, therefore, health care utilization will be the focus of this study.⁶

Obtaining more information on the most frequent users of health care services among the elderly is important for several reasons. The information could help health care providers and insurers to highlight areas in which overuse of services may be occurring to help reduce excess use. It will provide health insurers with more accurate information about their consumers, which could lead to more tailored insurance plans and better planning of future expenditures. In addition, the information could be valuable to individuals as they attempt to plan for future health care costs for themselves and their family members. Perhaps most importantly, this type of information is valuable to policymakers to guide decisions on budget allocations and program design.

To highlight the disproportionate cost and, presumably, use of health services, evidence shows that, of the elderly, the oldest old (those 85 years and older) spend the largest amount of the national health care budget. For example, expenditures (both out-of-pocket and covered) of Medicare beneficiaries increase consistently during each 5-year period after 65 years of age. Specifically, the average yearly expenditure in 1996 for individuals age 65 to 69 years was \$5,864, while those age 85 or older spent approximately \$16,465.⁷

Not only do the elderly account for a large proportion of the medical care expenditures, but this proportion is expected to increase in the coming years due to demographic changes in the population. The number of elderly individuals will be growing at a much faster rate than the rest of the population. Ten years from now, the rate of growth of the elderly population (60 years and older) will be approximately three and one-half times as high as that of the total population.⁸ Even more daunting is the fact that the number of individuals 85 years and older is increasing faster than any other age group. In 2000, there were approximately 4 million individuals over 85, but by 2050 this number is estimated to increase to 19 million.⁹ Additionally, the oldest old are projected to remain the fastest growing age group for the rest of this century.

Focus on this specific age group is necessary because the oldest old are different from the younger old (individuals 65 to 84 years of age) in a number of demographic, social, economic, and health characteristics that may each influence the type or amount of health care needed. For example, the sex ratio differs dramatically between the young old and the oldest old. For individuals 65 and older, there are 70 males for every 100 females. For individuals 85 and older, there are only 41 males for every 100 females.¹⁰ This is important because the type of care required by women is different than that required by men. For example, women over the age of 70 are more likely to have functional limitations and chronic conditions such as hypertension and arthritis, but less likely to have conditions such as heart disease and stroke.¹¹

Differences in marital status also exist among age groups within the elderly population and this can also affect the type of health care needed. Most notably, the percentage of women who are widowed increases substantially with age. While only 32 percent of women age 65 to 74 are widowed, nearly 77 percent of women are widowed by age 85 and older.¹² With only 13 percent of women and 50 percent of men in the oldest age-group being

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married, their health care needs, especially in regards to services such as nursing home care, will reflect these changes in marital status. For men, this trend is also seen, but to a much lesser degree. Financially, the percentage of the population living in poverty increases from 10.5 percent among all elderly to 14.2 percent among the oldest old and the median household net worth decreases significantly between individuals 65 to 74 and those 75 and older.¹³ Low socioeconomic status is one of the most documented, and most persistent, risks for poor health and elevated mortality rates, perhaps even more so for the elderly.^{14, 15} In addition, limited financial resources often lead to decreased use of preventive care, which generates increased utilization of other types of services.¹⁶

Perhaps most importantly, the oldest old differ from the younger old in respect to their health status. Individuals 85 and older are more likely to have degenerative joint diseases, osteoporosis, cardiovascular diseases, vision problems, cognitive impairment, and urinary incontinence.¹⁷ Chronic health

problems that force elderly individuals to become dependent on others are much more prevalent in the oldest old. More than half of those 85 and older need help performing activities of daily life because of a chronic health condition, while only 20 percent of those age 75 to 84 need help and less than 10 percent of those 65 to 74 need help.¹⁸

Despite the widespread interest in health care costs and knowledge of the changing needs of the elderly, few, if any, recent studies have examined the socioeconomic and demographic characteristics of the highest users of health care among individuals aged 85 and older. This paper will provide a comparison of the characteristics of elderly individuals by their level of health care utilization. Through an analysis of a nationally representative sample, the following question will be answered: Among the oldest old, how do individuals who frequently use health services differ from those who do not?

PRIOR STUDIES

The majority of studies in this area are motivated by the need to control the escalating costs of health care or the desire to address inequalities in health. Often research efforts focus on levels of access to health care services, measured by financial characteristics such as insurance or income. For example, at least one study has looked at the effect of insurance coverage on levels of use and found it to be significant.¹⁹ Similarly, other studies have looked at differences in health care use by socioeconomic status.^{20, 21}

Other individual determinants of health care use, such as gender, age, and race, have received more attention. One of the most established findings is that women use more health services than men. The use of physician services, hospital inpatient services, and prescription drugs are all higher for adult women than for adult men, as are the number of physician contacts.^{22, 23, 24} Age is another characteristic that has been found to affect the use of health services.²⁵ For example, older individuals have more chronic conditions and an increased need for long-term care services.²⁶ With regard to race, differences can be found depending on the type of health service use examined. For example, African Americans report more visits to medical personnel, but lower rates of hospitalization when controlling for health and economic variables.²⁷ Level of illness is perhaps the most predictive individual characteristic.^{28, 29, 30} For example, self-rated health has been found to be a strong predictor of health service use.³¹ Health-related behaviors are also associated with

health care use. Cigarette smoking and alcohol consumption are two examples of this. Smoking was related to an increased use of hospital services while moderate drinking was associated with lower use.³²

Although this literature is extensive, and still growing at a rapid pace, there appears to be a gap. With one exception, none of the studies exclusively focus on individuals 85 and older.³³ In fact, many of studies of health care utilization examine all individuals over the age of 18. In addition, many of the studies in this area represent populations outside of the United States.^{34, 35, 36} Even in domestic studies, a large section of the work done in this field concentrates on health care expenditures and not health care utilization. Furthermore, studies that focus on utilization rates often restrict their sample to individuals with a certain condition or investigate one specific type of health care service.

CONCEPTUAL FRAMEWORK

The conceptual framework for this study is based upon the classic model of health care utilization set forth by Andersen and Newman.³⁷ While there are more specific models proposed to examine different predictors of health service use, including those based on sex roles, social support, and stress, this model provides a theoretical foundation for individual determinants that can be analyzed empirically. This model categorizes determinants into three groups: predisposing, enabling, and illness level.

Predisposing characteristics are those that influence an individual's use of health services. These traits exist before a specific illness or condition arises and do not directly account for the health service use. Included in this group are demographic factors of the individual (age, sex, marital status, and past illness), attributes of the social structure that surround the individual (education, race, occupation, family size, ethnicity, religion, and residential mobility), and beliefs held about health, illness, and health care.

Enabling characteristics include all factors that affect an individual's ability to access health care. This includes a wide range of factors from income to health insurance to whether the individual has a regular source of health care.

The final set of individual characteristics, need or illness level, is often considered the most important group because of its position as the most proximate determinant in this model. The two types of illness level that must be considered are perceived and

evaluated. Perceived need includes the number of disability days, symptoms, diagnosis, and self-reported health status. The evaluated needs represent a more objective perspective of the individual's symptoms and diagnosis. Although the optimal measure of this would come from a physician or other health care provider, in the majority of cases this is not possible and alternative measures are used.

Consistent with this model, the characteristics included under illness level should show the greatest difference among individuals with different levels of health care use. Predisposing and enabling characteristics should vary among groups, but not to the same extent. A possible exception to this is with income and health insurance. Individuals with different levels of service use are expected to show contrasting levels of these two measures of economic resources.

ANALYTICAL STRATEGY

Following the framework outlined above, this analysis compares high and low users of health care by their predisposing, enabling, and illness level characteristics. Specifically, this is a descriptive analysis of individuals by quartile of health care use. The quartiles were constructed by dividing the sample into four groups based on total number of health services used. Each quartile represents one-fourth of the sample. A general linear modeling procedure was used to determine the unadjusted mean levels of each variable by level of health care use. This procedure provides a test to determine if each quartile is statistically different from the others for each individual variable. These differences indicate which type of characteristics are most important in differentiating individuals who use the highest amounts of health care from those with lower levels of use.

DATA

The Asset and Health Dynamics Among the Oldest Old Survey (AHEAD) provides the data for this study. The AHEAD survey is a nationally representative longitudinal study of non-institutionalized individuals born before 1924.³⁸ It was created to supplement the Health and Retirement Study (HRS), a panel study that investigates the physical and cognitive health, retirement status, family composition, and economic characteristics of older adults. Oversamples of Hispanics and African

Americans permit more extensive ethnic and racial comparisons as well as intra-group analyses. The principal advantage of this data set is the unparalleled range and comprehensiveness of the information it supplies about both the financial status and health characteristics of the sample.

Data from the second set of interviews performed in 1995 (Wave 2) is used because it includes the greatest number of individuals over the age of 85. The total sample size of Wave 2 was 7,027 respondents. This sample size was reduced to 1,373 due to the elimination of individuals younger than 85 years of age and individuals with missing data in the dependent variables. For missing data in the independent variables and covariates, the mean value was assigned.

VARIABLES

Health Care Services

The nine different types of health services used in this study represent the most common services used by the elderly, as well as a composite category of all other types of use. Services include hospital, nursing home, physician, outpatient surgery, prescription drugs, dental, in-home services, preventative, and other services. Utilization of each particular type of health care was measured over a two-year period and all measures of service use are self-reported. The final measure is created by summing the total number of services used and dividing the sample into quartiles.

Predisposing

The demographic variables include *age*, *gender*, and *marital status*. The social variables examined here include *education*, *race*, *number of children*, and *ethnicity*. Race includes whites and African Americans, while ethnicity notes if the respondent is Hispanic. Other race and ethnic groups were excluded due to low numbers in this age group. Also in this category is a variable for *religious attendance*, which measures the respondent's frequency of attending religious services in the last year. Finally, a measure of *residential mobility* is included. This variable represents the respondents' reported number of years living in or around their current main residence. The health behavior variables cover exercise as well as the use of *cigarettes* and *alcohol*. They are each dichotomous measures.

Enabling

This category incorporates three variables concerning the financial resources of the respondents: *Medi-*

care, percent of health care covered, and family income. The variable Medicare measures whether this type of insurance covers the individual. Percent of health care covered is a variable that applies only to persons who used some type of health care. This variable is calculated by dividing the number of times insurance fully covered a service by the total number of services used by each individual. Insurance coverage is determined by the question, "Was the service completely covered, partially covered, or not covered at all?" The variable family income measures the amount of money the respondent and his or her spouse earned in the past year.

Illness Level

The measure of perceived illness is *self-rated health*. Self-rated health is measured by asking respondents to rate their health as excellent, very good, good, fair, or poor. The evaluated measures of illness level include both physical and mental health variables. The number of *debilitating conditions* is calculated by summing the number of specific conditions reported by the respondent. These seven conditions included hypertension, diabetes, cancer, lung disease, heart disease, stroke, and hip fracture. In each of these health outcomes, higher scores indicated worse health. A scale that sums the reported activity limitations of each respondent measures *functional impairment*. Limitations were determined by twelve questions regarding activities of daily life (ADL). *Frequent pain* is measured by asking the respondents if they are often troubled by pain. *Psychiatric problems* are determined by the following question: "Have you had or has a doctor told you that you have any emotional, nervous, or psychiatric problems?" The *CESD scale* is created by summing the number of depressive symptoms reported in response to nine questions.

RESULTS

Table 1 displays the demographic, socioeconomic, and health characteristics of the sample as well as the Pearson correlation coefficients. The mean age of the sample is almost 89 years, two-thirds of the sample is female, and one-third is married. Relatively small percentages of the sample are racial or ethnic minorities (13 percent African American and 5 percent Hispanic). The average number of children is approximately 2.5, most individuals attend church less than once a week, and the vast majority has lived in the same area for a long period of time. Respondents averaged 10.1 years of education

and a family income of about \$16,000. Insurance covered nearly two-thirds of health services used and 96.5 percent of the sample reports Medicare coverage.

In terms of health variables, on average, respondents rated their health as good, had several functional limitations, and had at least one chronic condition. One-third of the sample reported being frequently bothered with pain. One-fourth of the sample uses alcohol, a very small percentage smokes, and approximately one out of five regularly engages in exercise. Mental health variables show low levels of psychiatric or depressive symptoms.

The bivariate correlations show that the physical and mental health variables are most associated with health care use. In addition, the presence of health care insurance also has a highly significant correlation with service use, as do residential mobility, race, and alcohol use. Variables such as ethnicity, marital status, number of children, religious attendance, and cigarette use are not associated with health care use.

Unadjusted mean levels of selected characteristics by level of health care use are shown in Table 2. The sample was divided into quartiles of service use, and differences between the quartiles for each characteristic are presented in the final column of the table along with significance levels of each difference. Quartile 1 represents individuals with the lowest amount of service use, while Quartile 4 represents those who use the most services. Variables corresponding to the illness level of the individual are most highly associated with levels of health care use while more indirectly involved traits show fewer differences between use level groups. The most group differences exist in self-rated health, debilitating conditions, and the depression scale. Specifically looking at differences between the high-end users and everyone else, the most prominent differences exist for the two mental health variables. No inter-group differences exist for number of children, ethnicity, residential mobility, cigarette use, or Medicare coverage.

DISCUSSION

The amount of health care use is most closely associated with individual illness level. This finding is consistent with prior research and the logic underlying the health utilization framework used here. More specifically, the results support the rationale that measures of illness level, both perceived and evaluated, are the most proximate factors related to

Table 1
Descriptive Statistics and Zero-Order Pearson Correlations for AHEAD Wave 2.

Variable	Mean (Range)	Correlations with Health Care Use
Service Use	3.29 (0-8)	
Demographic Variables		
Age	88.7 (85-106)	-.07*
Female	.67 (0-1)	.04*
African American	.13 (0-1)	-.07**
Hispanic	.05 (0-1)	.00
Married	.30 (0-1)	.01
Number of Children	2.48 (0-15)	-.02
Religious Attendance	2.60 (1-5)	-.03
Residential Mobility	40.4 (0-94)	-.01**
Socioeconomic Variables		
Education	10.1 (0-17)	.05*
Family Income	15932 (0-125000)	.05+
Medicare	.97 (0-1)	-.02
Percent of Care Covered	61.7 (16-100)	-.21***
Health Variables		
Self-Rated Health	3.27 (1-5)	.26***
Functional Ability	5.11 (1-11)	.27***
Chronic Conditions	1.43 (1-6)	.34***
Frequent Pain	.33 (0-1)	.15***
Health Behaviors		
Alcohol Use	.28 (0-1)	-.08**
Current Smoker	.03 (0-1)	-.01
Vigorous Exercise	.18 (0-1)	-.07*
Mental Health Variables		
Psychiatric Problems	.12 (0-1)	.14***
CESD Scale	2.58 (0-9)	.15***

*Notes: +p < .10; *p < .05; ** p < .01; *** p < .001. Values for self-rated health indicate the mean response for ordinal data.*

health service use and are, therefore, the most significant. More distal factors, such as demographic and socioeconomic characteristics, have less of an association with an individual's level of health care use. Therefore, these traits show fewer differences between levels of use. Numerous previous studies support these findings that need for health care is the most influential factor in use of health care; however, none of these studies focused on individuals 85 and older.^{39, 40, 41}

Of the demographic variables, the most frequent users of health services are different from the other groups in terms of age and gender, but not marital status. Individuals who use more health services are more likely to be female, a result that has received much support elsewhere in the literature.^{42, 43} However, the relationship between age and health care use is unexpected. Here, the mean age of individuals in the highest level is actually lower than individuals in the lowest level of service use.

The traits labeled as social characteristics in the framework appear to have less of an association with health care use. Only race and number of children differentiate the high-end users from the others while number of children, ethnicity, and residential mobility do not differ at all between levels of use. This analysis shows that African Americans use fewer health services than do whites. This is notable because previous studies on this topic have yielded mixed results.⁴⁴

The final group within the predisposing characteristics is health behaviors. Levels of both exercise and alcohol consumption differ between the fourth quartile of health care users and the other three quartiles. High-end users exercise less frequently than other individuals. This can be expected since individuals who require high amounts of care may be unable to exercise. In other words, certain conditions may affect both the use of health services and the ability to exercise frequently. The high-end

Table 2
Unadjusted Mean Levels of Selected Variables by Level of Health Care Use.¹

	Levels of Health Care Use (Low to High)				Quartile Differences ²
	1 st Quartile (Mean)	2 nd Quartile (Mean)	3 rd Quartile (Mean)	4 th Quartile (Mean)	
Predisposing					
<i>Demographic</i>					
Age (in years)	89.11	88.42	88.61	88.55	a, c
Female (0=No, 1=Yes)	.53 ³	.55	.51	.61	c, f
Married (0=No, 1=Yes)	.27	.35	.30	.28	a
<i>Social Characteristics</i>					
Education (in years)	9.71	10.12	10.48	10.13	b
African American (0=No, 1=Yes)	.18	.11	.10	.12	a, b, c
Children (number of children)	2.59	2.48	2.27	2.56	
Hispanic (0=No, 1=Yes)	.06	.04	.05	.06	
Religious Attendance (1=Never, 5=Once a Week)	2.65	2.72	2.45	2.52	d
Residential Mobility (years in current area)	41.1	40.5	38.9	40.9	
<i>Health Behaviors</i>					
Physical Activity (0=No, 1=Yes)	.21	.20	.15	.15	b, c
Current Smoker (0=No, 1=Yes)	.040	.027	.037	.036	
Drink Alcohol (0=No, 1=Yes)	.30	.31	.24	.23	c, d, e
Enabling					
Medicare (0=No, 1=Yes)	.97	.96	.95	.97	
Percent of Health Care Covered (%)	73.2	59.7	58.1	57.5	a, b, c
Family Income (in dollars)	12693.9	14939.5	20952.3	16564.4	b, d
Illness Level					
<i>Perceived</i>					
Self-Rated Health (1=Excellent, 5=Poor)	2.92	3.09	3.58	3.71	a, b, c, d, e
<i>Evaluated</i>					
Debilitating Conditions (number of conditions)	.92	1.42	1.73	1.86	a, b, c, d, e
Functional Impairment (0=No, 1=Yes)	.87	.89	.93	.97	b, c, e
Frequent Pain (0=No, 1=Yes)	.26	.30	.37	.45	b, c, d, e
Psychiatric Problems (0=No, 1=Yes)	.083	.090	.12	.21	c, e, f
CESD Scale (number of depressive symptoms)	2.33	2.33	2.77	3.11	b, c, d, e, f

Notes:

¹ Health care services include hospital stay, nursing home, physician visit, outpatient surgery, prescription drugs, dental care, in-home services, preventative care, and other services.

² Quartile differences indicate significant differences (at $p < .05$) between the quartiles as follows:

- Quartile 1 and Quartile 2
- Quartile 1 and Quartile 3
- Quartile 1 and Quartile 4
- Quartile 2 and Quartile 3
- Quartile 2 and Quartile 4
- Quartile 3 and Quartile 4

³ The mean value for a dichotomous value is the percentage of respondents with that trait. For example, a mean of .53 indicates that 53% of individuals in the 1st Quartile are female.

users also drink less frequently than low-end users. This result supports the common finding that moderate drinking is related to better health outcomes and, therefore, less need for health care services.

The enabling characteristics covered in this study include health insurance and family income. Both percent of health care covered and family income showed differences among levels of health care use, but only health insurance differentiated the high-end users from the others. Those in the highest use

category had lower levels of coverage than the other groups. For example, 73.2 percent of services were covered for those in the low-end use category while only 57.5 percent of services were covered for those in the high-end use group. Receiving health insurance through Medicare did not appear to have any relationship to level of health services used.

Within the illness level category, each of the variables differed by level of health care use. It is most interesting to examine the association between men-

tal health and health care service use. For both psychiatric problems and the CESD scale, high-end users were different from each of the other three use level groups. These results indicate that people who use health services the most are significantly more likely to have psychiatric problems and depressive symptoms. There is substantial support for this in the literature.^{45, 46, 47}

LIMITATIONS

There are several limitations to this study. For one, use of cross-sectional data does not allow the determination of causal ordering. In other words, showing an association between variables measured at the same point in time does not permit assumptions of causation. However, because the goal of this study was to examine the differences between those who use the largest amounts of health care services and those who do not, rather than to determine the causes of health care use, longitudinal data was not necessary. There is also a problem with taking the mean value of ordinal data, as done for religious attendance and self-rated health. Here, the mean values displayed can be interpreted as the mean response for that question. While median and mode averages are more appropriate for this type of data, mean values were used to maintain consistency in the descriptions and models.

A more substantial problem exists within one of the measures of financial resources used in this study. Income had a large proportion of missing data. The mean value was given to individuals with missing data; however, results may have been more accurate if an imputed value for this was used instead. Also, recent work on the elderly has shown that wealth is a better measure of economic resources than income. This is especially true for individuals 85 and older because individuals of this age are usually not employed and, therefore, depend on other sources of income, such as Social Security, pensions, and savings. For these variables, and all others, each value was self-reported. Data from official records from health care providers would be more accurate regarding service use. Similarly, data from a physician's diagnosis would permit more precise measures of physical and mental health conditions.

CONCLUSION

The present study extends the research on the health care use of older adults by examining the

demographic, socioeconomic, and health characteristics of individuals by their level of use. This research reveals that determinants of health care use by the oldest old are consistent with patterns seen at other ages. Information of this type is indispensable to individuals involved in subject areas relating to health care and the elderly. Data from this study can be helpful in a variety of ways. For example, although high-end health care users are almost entirely covered by Medicare (97 percent), 42.5 percent of the health services they used were not fully covered by their insurance. This could highlight a potential weakness in Medicare policies, such as the limited or non-existent coverage of certain services such as nursing homes, prescription drugs, and in-home services. More specific information on the types of care used and the amount of coverage received for each type would provide additional information to assist policymakers. Policymakers who deal with a widespread range of topics from Medicare benefits to long-term care services rely on specific, up-to-date, and accurate information on the population that benefits from these programs. Future research could expand upon this study by looking at each type of health care service individually and by comparing the characteristics of the high-end users from this study to those of different ages.

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NOTES

1. Katharine Levit, et al., "Inflation Spurs Health Spending in 2000," *Health Affairs*, vol. 21, no. 1 (2002), pp. 172-181.
2. C. Fisher, "Differences by Age Groups in Health Care Spending," *Health Care Financing Review*, vol. 1 (1980), pp. 65-90.
3. J. Lubitz and R. Prihoda, "Use of Medicare Services in the Last Years of Life," in *Health, United States, 1983*, DHHS Publication 84-1232 (Washington, DC: Government Printing Office, 1983).
4. Beth J. Soldo and Kenneth G. Manton, "Changes in the Health Status and Service Needs of the Oldest Old: Current Patterns and Future Trends," *Milbank Memorial Fund Quarterly*, vol. 63 (1985), pp. 286-323.
5. Karen Davis, "Health and Aging in the 21st Century," President's Message, *The Commonwealth Fund Annual Report* (1999).
6. Victor R. Fuchs, "Health Care for the Elderly: How Much? Who Will Pay for It?," National Bureau of Economic Research, Working Paper Series, No. 6755 (1998).
7. Federal Interagency Forum on Aging Related Statis-

- tics, *Older Americans 2000: Key Indicators of Well-Being* (2000).
8. U. S. Bureau of the Census, *Census 2000*. Online. Available: www.census.gov/ipc/www/idbnew.html. Accessed: March 14, 2002.
 9. Ibid.
 10. Lisa Hertzler and Annetta Smith, "The 65 Years and Over Population: 2000," *Census 2000 Brief* (October 2001), pp. 1-8.
 11. *Older Americans 2000*.
 12. Ibid.
 13. Ibid.
 14. Mary Haan, George Kaplan, and Terry Camacho, "Poverty and Health," *American Journal of Epidemiology*, vol. 125, no. 6 (1987), pp. 989-998.
 15. James House, et al., "The Social Stratification of Aging and Health," *Journal of Health and Social Behavior*, vol. 35 (1994), pp. 213-234.
 16. Felicia LeClere, Leif Jenson, and Ann Biddlecom, "Health Care Utilization, Family Context, and Adaptation Among Immigrants to the United States," *Journal of Health and Social Behavior*, vol. 35 (1994), pp. 370-384.
 17. Sally Bould, Beverly Sanborn, and Laura Reif, *Eighty-Five Plus: The Oldest Old* (Belmont, CA: Wadsworth Publishing Company, 1989).
 18. Ibid.
 19. R. S. Hopkins, "Insurance Coverage and Usage of Preventive Health Services," *Journal of the Florida Medical Association*, vol. 80, no. 8 (1993), pp. 529-532.
 20. J.F. Alberts, et al., "Socioeconomic Inequity in Health Care: A Study of Services Utilization in Curacao," *Social Science and Medicine*, vol. 45, no. 2 (1997), pp. 213-220.
 21. Gail R. Wilensky and Gail L. Cafferata, "Woman and the Use of Health Services," *The American Economic Review*, vol. 73, no. 2 (1983), pp. 128-133.
 22. Ronald Andersen, Joanna Lion, and Odin W. Anderson, *Two Decades of Health Services* (Cambridge: Ballinger, 1976).
 23. Lois Verbrugge, "Sex Differentials in Health," *Public Health Reports*, vol. 97 (1982), pp. 417-437.
 24. P. F. Adams and V. Benson, "Current Estimates from the National Health Interview Survey, 1991," *Vital Health Statistics*, vol. 10, no. 184.
 25. Fredric D. Wolinsky, Ray R. Mosely, and Rodney M. Coe, "A Cohort Analysis of the Use of Health Services by Elderly Americans," *Journal of Health and Social Behavior*, vol. 27 (1986), pp. 209-219.
 26. David Haber, *Health Care for an Aging Society: Cost-Conscious Community Care and Self-Care Approaches* (Creighton University: Taylor and Francis Publishers, 1989).
 27. Jan E. Mutchler and Jeffrey Burr, "Racial Differences in Health and Health Care Service Utilization in Later Life: The Effect of Socioeconomic Status," *Journal of Health and Social Behavior*, vol. 32 (1991), pp. 342-356.
 28. L. A. Aday, G. V. Fleming, and Ronald M. Andersen, *Access to Medical Care in the U.S.* (Chicago: Pluribus Press, 1984).
 29. Fredric D. Wolinsky and Rodney M. Coe, "Physician and Hospital Utilization Among Noninstitutionalized Elderly Adults: An Analysis of the Health Interview Survey," *Journal of Gerontology*, vol. 39 (1984), pp. 334-341.
 30. Fredric D. Wolinsky, et al., "Health Services Utilization Among the Noninstitutionalized Elderly," *Journal of Health and Social Behavior*, vol. 24 (1983), pp. 325-337.
 31. Neal M. Krause, "Stress in Racial Differences in Self-Reported Health Among the Elderly," *The Gerontologist*, vol. 27 (1987), pp. 72-76.
 32. N. Haapanen-Niemi, et al., "The Impact of Smoking, Alcohol Consumption, and Physical Activity on Use of Hospital Services," *American Journal of Public Health*, vol. 89 (1999), pp. 691-698.
 33. Soldo and Manton.
 34. Alberts, et al.
 35. Haapanen-Niemi, et al.
 36. N.P. Roos, E. Shapiro, and R. Tate, "Does a Small Minority of Elderly Account for a Majority of Health Care Expenditures? A Sixteen-Year Perspective," *Milbank Memorial Fund Quarterly*, vol. 67, no. 3-4 (1989), pp. 347-369.
 37. Ronald M. Andersen and John F. Newman, "Societal and Individual Determinants of Medical Care Utilization in the United States," *Milbank Memorial Fund Quarterly*, vol. 51 (1973), pp. 95-121.
 38. S. G. Heeringa and J. Connor, "Technical Description of the Health and Retirement Study Sample Design," *HRS/AHEAD Documentation Report DR-002* (1995).
 39. Aday, et al.
 40. Wolinsky and Coe.
 41. Wolinsky, et al.
 42. Andersen, Lion, and Anderson.
 43. Verbrugge.
 44. Mutchler and Burr.
 45. C. M. Callahan, et al., "Longitudinal Study of Depression and Health Services Use Among Elderly Primary Care Patients," *Journal of the American Geriatric Society*, vol. 42 (1994), pp. 833-838.
 46. Harold G. Koenig, et al., "Survival and Health-Care Utilization in Elderly Medical Inpatients with Major Depression," *Journal of Religion and Health*, vol. 37 (1998), pp. 15-29.

47. Jurgen Unutzer, et al., "Depressive Symptoms and the Cost of Health Services in HMO Patients Aged 65 and Older: 84-Year Prospective Study," *Journal of the American Medical Association*, vol. 277, no. 20 (1997), pp. 1618-1624.

REFERENCES

- Adams, P. F. and V. Benson. "Current Estimates from the National Health Interview Survey, 1991." National Center for Health Statistics. *Vital Health Statistics*, vol. 10, no. 184.
- Aday, L.A., G. V. Fleming, and Ronald M. Andersen. *Access to Medical Care in the U.S.* Chicago: Pluribus Press, 1984.
- Alberts, J.F., R. Sanderman, J. M. Eimers, and W. J. van den Heuvel. "Socioeconomic Inequity in Health Care: A Study of Services Utilization in Curacao." *Social Science and Medicine*, vol. 45, no. 2 (1997), pp. 213-220.
- Andersen, Ronald, Joanna Lion, and Odin W. Anderson. *Two Decades of Health Services*. Cambridge: Ballinger, 1976.
- Andersen, Ronald and John F. Newman. "Societal and Individual Determinants of Medical Care Utilization in the United States." *Milbank Memorial Fund Quarterly*, vol. 51 (1973), pp. 95-121.
- Bould, Sally, Beverly Sanborn, and Laura Reif. *Eighty-Five Plus: The Oldest Old*. Belmont, CA: Wadsworth Publishing Company, 1989.
- Callahan, C. M., S. L. Hui, N. A. Nienaber, B. S. Musick, and William M. Tierney. "Longitudinal Study of Depression and Health Services Use Among Elderly Primary Care Patients." *Journal of the American Geriatric Society*, vol. 42 (1994), pp. 833-838.
- Davis, Karen. "Health and Aging in the 21st Century." President's Message, The Commonwealth Fund Annual Report, 1999.
- Fisher, C. "Differences by Age Groups in Health Care Spending." *Health Care Financing Review*, vol. 1 (1980), pp. 65-90.
- Fuchs, Victor R. "Health Care for the Elderly: How Much? Who Will Pay for It?" National Bureau of Economic Research, Working Paper Series, No. 6755 (1998), pp. 1-14.
- Haan, Mary, George A. Kaplan, and Terry Camacho. "Poverty and Health." *American Journal of Epidemiology*, vol. 125, no. 6 (1987), pp. 989-998.
- Haapanen-Niemi, N. S. Miilunpalo, I. Vuori, M. Pasanen, and P. Oja. "The Impact of Smoking, Alcohol Consumption, and Physical Activity on Use of Hospital Services." *American Journal of Public Health*, vol. 89 (1999), pp. 691-698.
- Haber, David. *Health Care for an Aging Society: Cost-Conscious Community Care and Self-Care Approaches*. Creighton University: Taylor and Francis Publishers, 1989.
- Heeringa, S. G and J. Connor. "Technical Description of the Health and Retirement Study Sample Design." *HRS/AHEAD Documentation Report*, DR-002, 1995.
- Hertzfel, Lisa and Annetta Smith. "The 65 Years and Over Population: 2000." *Census 2000 Brief* (October 2001), pp. 1-8.
- Hopkins, R.S. "Insurance Coverage and Usage of Preventive Health Services." *Journal of the Florida Medical Association*, vol. 80, no. 8 (1993), pp. 529-532.
- House, James S., James M. Lepkowski, Ann M. Kinney, Richard P. Mero, Ronald C. Kessler, and A. Regula Herzog. "The Social Stratification of Aging and Health." *Journal of Health and Social Behavior*, vol. 35 (1994), pp. 213-234.
- Koenig, Harold G., F. Shelp, V. Goli, Harvey J. Cohen, and Dan G. Blazer. "Survival and Health-Care Utilization in Elderly Medical Inpatients with Major Depression." *Journal of Religion and Health*, vol. 37 (1998), pp.15-29.
- Krause, Neal M. "Stress in Racial Differences in Self-Reported Health Among the Elderly." *The Gerontologist*, vol. 27 (1987), pp. 72-76.
- LeClere, Felicia B., Leif Jenson, and Ann E. Biddlecom. "Health Care Utilization, Family Context, and Adaptation Among Immigrants to the United States." *Journal of Health and Social Behavior*, vol. 35 (1994), pp.370-384.
- Levit, Katharine, Cynthia Smith, Cathy Cowan, Helen Lazenby, and Anne Martin. "Inflation Spurs Health Spending in 2000." *Health Affairs*, vol. 21, no. 1 (2002), pp.172-181.
- Lubitz, J. and R. Prihoda. "Use of Medicare Services in the Last Years of Life." In *Health, United States, 1983*, DHHS Publication 84-1232. Washington, DC: Government Printing Office, 1983.
- Mutchler, Jan E. and Jeffrey Burr. "Racial Differences in Health and Health Care Service Utilization in Later Life: The Effect of Socioeconomic Status." *Journal of Health and Social Behavior*, vol. 32 (1991), pp. 342-356.
- National Health Statistics Group, Office of the Actuary. "National Health Expenditures, 2000." *Health Care Financing Review*, vol 21(2). Health Care Financing Administration, No. 03420. Washington, DC: Government Printing Office (Winter 1999).
- Older Americans 2000: Key Indicators of Well-Being*. Federal Interagency Forum on Aging Related Statistics (2000), pp.1-114.
- Older Women's League. *Fact Sheet*. Washington, DC: Older Women's League, 1985.

- Roos, N.P., E. Shapiro, and R. Tate. "Does a Small Minority of Elderly Account for a Majority of Health Care Expenditures? A Sixteen-Year Perspective." *Milbank Memorial Fund Quarterly*, vol. 67, no. 3-4 (1989), pp. 347-369.
- Soldo, Beth J. and Kenneth G. Manton. "Changes in the Health Status and Service Needs of the Oldest Old: Current Patterns and Future Trends." *Milbank Memorial Fund Quarterly*, vol. 63 (1985), pp. 286-323.
- Unutzer, Jurgen, Donald L. Patrick, Greg Simon, David Grembowski, Edward Walker, Carolyn Rutter, and Wayne Katon. "Depressive Symptoms and the Cost of Health Services in HMO Patients Aged 65 and Older: 84-Year Prospective Study." *Journal of the American Medical Association*, vol. 277, no. 20 (1997), pp. 1618-1624.
- U. S. Bureau of the Census. *Census 2000*. Online. Available: www.census.gov/ipc/www/idbnew.html. Accessed: March 14, 2002.
- U. S. Department of Health and Human Services (hereafter DHHS). *Health, United States, 1989*. Publication No. 90-1232. Washington, DC: DHHS, 1990.
- Verbrugge, Lois. "Sex Differentials in Health." *Public Health Reports*, vol. 97 (1982), pp. 417-437.
- Wilensky, Gail R. and Gail L. Cafferata. "Woman and the Use of Health Services." *The American Economic Review*, vol. 73, no. 2 (1983), pp. 128-133.
- Wolinsky, Fredric D. and Rodney M. Coe. "Physician and Hospital Utilization Among Noninstitutionalized Elderly Adults: An Analysis of the Health Interview Survey." *Journal of Gerontology*, vol. 39 (1984), pp. 334-341.
- Wolinsky, Fredric D., Rodney M. Coe, D. K. Miller, John M. Prendergast, Myra J. Creel, and M. Noel Chavez. "Health Services Utilization Among the Noninstitutionalized Elderly." *Journal of Health and Social Behavior*, vol. 24 (1983), pp. 325-337.
- Wolinsky, Fredric D., Ray R. Mosely, and Rodney M. Coe. "A Cohort Analysis of the Use of Health Services by Elderly Americans." *Journal of Health and Social Behavior*, vol. 27 (1986), pp. 209-219.