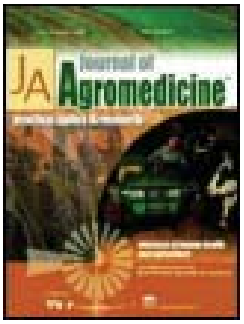

Journal of Agromedicine

ISSN: 1059-924X (Print) 1545-0813 (Online) Journal homepage: http://www.tandfonline.com/loi/wagr20

# Health Care Delay of Farmers 50 Years and Older in Kentucky and South Carolina

**Deborah B. Reed RN PhD , Mary Kay Rayens PhD , Katharine Winter BA & Mei Zhang MS**

**To cite this article:** Deborah B. Reed RN PhD , Mary Kay Rayens PhD , Katharine Winter BA & Mei Zhang MS (2008) Health Care Delay of Farmers 50 Years and Older in Kentucky and South Carolina, Journal of Agromedicine, 13:2, 71-79, DOI: 10.1080/10599240802202711

**To link to this article:** https://doi.org/10.1080/10599240802202711

Published online: 11 Oct 2008.

*ORIGINAL RESEARCH*

# Health Care Delay of Farmers 50 Years and Older in Kentucky and South Carolina

Deborah B. Reed, RN, PhD
Mary Kay Rayens, PhD
Katharine Winter, BA
Mei Zhang, MS

**ABSTRACT.** This article describes the prevalence of avoiding/delaying medical or dental care because of cost and the factors associated with whether or not farmers aged 50 and older avoid or delay seeking medical or dental care for financial reasons. Data from 957 respondents aged 50 and over who resided in farm households in 2 southern states in the United States completed either a telephone or mailed survey. Participants indicated that they had avoided or delayed seeking health care (7%) or dental care (9%) because of cost. Significant predictors of delay in medical care included age, income, self-rated health, number of health conditions, and having private insurance as the primary policy. Younger individuals, with lower annual income, poorer self-rated health, more current medical conditions, and without private medical insurance as their primary health policy were more likely to delay. Significant predictors of delay in dental care were income, having an off-farm job, taking prescription medication daily, and having Medicaid as at least one source of health coverage. Those with lower income, an off-farm job, and those who took prescription drugs daily were more likely to delay seeking dental care. On the other hand, those who had Medicaid were less likely to delay seeking dental care. While nearly all of the respondents had some form of health insurance coverage, cost was still perceived as a barrier to care. More study is needed to examine this phenomenon for a cohort of older workers with comorbidities.

**KEYWORDS.** Elder, access, farmer, health

Deborah B. Reed, RN, PhD, is affiliated with the College of Nursing, University of Kentucky, Lexington.
Mary Kay Rayens, PhD, is affiliated with the College of Nursing, University of Kentucky, Lexington.
Katharine Winter, BA, is affiliated with the College of Public Health, University of Kentucky, Lexington.
Mei Zhang, MS, is affiliated with the College of Nursing, University of Kentucky, Lexington.

This article was supported by grant DHHS.CDC.NIOSH #1 R01 OH 004157. The contents of this article reflect the opinions of the author and are not endorsed by the University of Kentucky or the funding agency.

Address correspondence to: Deborah B. Reed, RN, PhD, University of Kentucky College of Nursing, 553 CON, Lexington, KY 40536-0232 (E-mail: dbreed01@email.uky.edu).

Journal of Agromedicine, Vol. 13(2) 2008
Available online at http://www.haworthpress.com

doi:10.1080/10599240802202711

## INTRODUCTION

Nearly one of every 3 US adults report problems paying medical bills, a situation that can not only create financial difficulty but can discourage pursuit of further care.[1] Although uninsured adults are more likely than insured adults to forgo preventive screening and services, to be in poorer health, and to report that they cannot see a physician when needed due to cost, having health insurance is not necessarily sufficient to remove the financial barriers related to cost nor does it guarantee access to care.[2]

Those adults who had either public or private health insurance but also low incomes or functional impairments were found significantly more likely to delay or avoid care.[3] Health care expenditures average 17% of the total wealth of lower income elderly Americans, with some of the very poor spending as much as 43% of their wealth on health care over a 2-year period.[4] Because of the financial burden, Medicare beneficiaries may view some services that require out-of-pocket costs as discretionary, especially with regard to purchasing medication, and fail to adhere to their prescribed medication regime.[5] For people who are chronically ill, have low incomes, or who are older, individual coverage itself may not be an affordable option.[6]

Among individuals aged 50 to 64 years in the general population, health insurance coverage has been found to be associated with increased use of some clinical preventive services[7] and is an important determinant of access to care,[8] especially for older women.[9] Even higher income adults, who conceivably might be in a better position to afford services but who were without health insurance, did not use recommended preventive screenings and health care services.[10]

However, inadequate health insurance is not always a predictor of delay in seeking care. Lacking a usual source of care has been found to be more strongly associated with health care delay than insurance status.[11] Other reasons for delay in care-seeking include the belief that "It couldn't happen to me"[12] as well as perceived severity of symptoms and control over them.[13]

### The Farm Population

Farm operators in the United States are at risk for needing health services because they are an aging population that continues to work in a hazardous occupation. The 2002 agricultural census reported the average age of the principal farm operators in the United States is 55.3.[14] According to Allen and Harris, "The percentage of principal farm operators 65 or older has risen consistently since 1978 (when it was about 1 in 6), and reached 26.2 percent . . . in 2002."[15] This trend is expected to continue.

### Health Insurance and Its Significance for Farmers Over 50

In general, farmers have been found to have better health, fewer hospital admissions, and somewhat lower rates of outpatient health care utilization for causes other than trauma than their non-farming rural counterparts.[16] However, as individuals age and physical capabilities decline, the potential for injury and illness poses an increased threat. The older farmer may no longer be able to perform the work safely and becomes at elevated risk for experiencing major health problems.[17]

One solution that farmers have used in addressing the problem of health care coverage is off-farm employment for the purpose of obtaining employer-sponsored health insurance.[18] Otherwise, these agricultural producers are left to acquire self-purchased policies.

While only 6% of the American population has health insurance through self-purchased policies, farmers in some regions are more than 10 times as likely to carry self-purchased health insurance policies.[19] Because of high copayments and deductibles, those farmers who are self-insured are subject to substantial out-of-pocket expense, while at the same time there is no coverage for preventive care.[19,20]

### Rural Barriers

Farming occurs in rural areas. Rural areas present special challenges in the delivery of health care services, including high rates of uninsured and underinsured as well as shortages of primary health care providers.[21] The time and

cost associated with travel for health care by rural dwellers can be a barrier. Rural residents are more likely to have to travel more than 30 miles for health care.[22] The recent increase in fuel costs further compounds the expense and affordability of travel, potentially making travel prohibitive, even for medical reasons.

The health disadvantage of rural areas has also been found to be associated with lower education levels in rural communities.[23] With regard to minorities within the rural population, research suggests that disparities in health and in health care access found among rural racial/ethnic minority populations are generally more pronounced than those among urban racial/ethnic minorities.[22] One study also found that whites were more likely than other racial/ethnic groups to report unmet health care needs due to cost and that as risk profiles increased, unmet health care needs also increased.[24] In other words, those with the highest health care needs were least likely to get those needs met.

### *Dental Care*

Although the majority of adults in the United States over age 65 have Medicare to help with access to health care, Medicare does not include dental care. Despite increased need for preventive and restorative dental care, use of dental services is decreased among persons over age 65.[25] Variables connected with older adults' use of dental services are outlined in an article addressing information from the Elders' Oral Health Summit Proceedings.[26] Predictors of utilization of dental services for the general population include availability of dental insurance, perceived ability to pay for services, perceived need for care, and high value placed upon oral health and dental care. Older adults with third-party dental insurance are 2.5 times more likely to make regular dental visits than those without dental insurance.

The Summit Proceedings report points out that residence in rural areas is associated with more unmet dental needs and lower utilization rates for dental services, especially among older adults. Those who suffer from poor health and multiple chronic diseases make fewer visits to the dentist. For these older adults, these health problems are often a higher priority than oral health.[27] In addition, those who are irregular or nonusers of dental care do not seek care because they believe they do not need it.[28]

### *Health Expectations*

An additional barrier to seeking health care is that older adults may accept chronic disease as an inevitable and even normal part of aging. Older adults have been found to expect poor health as they age.[29] With this mindset, poor or deteriorating health in older individuals might not be a motivating factor in seeking health care, either medical or dental, especially if symptoms do not severely limit daily activities of living or if onset is gradual, in which case the condition even comes to be perceived as normal for that person.

The purposes of this article were to describe the prevalence of avoiding/delaying medical or dental care because of cost and to determine factors that are associated with whether or not agricultural producers aged 50 years and older avoid or delay seeking medical or dental care for financial reasons.

## *METHODS*

### *Design and Sample*

The data for this study were collected during the fourth wave of data collection in a longitudinal panel study of the work, health, and sociocultural characteristics in a closed cohort of family farmers residing in Kentucky and South Carolina. Members of Kentucky farm households who had participated in the Kentucky Farm Family Health and Hazard Surveillance Project (FFHHSP) were invited to participate if they were now age 50 and over.[30] Since 96% of the FFHHSP sample was married, spouses of these participants were also recruited. Additional subjects were recruited from African American farm households in Kentucky and South Carolina in order to bolster minority representation. Prior to any data collection human subjects protection approval was obtained from the participating institutions of each state.

Participants in the longitudinal study were asked to respond to surveys independently and were given the choice of completing either a

pencil-and-paper form or telephone survey. Subjects who completed the computerized-assisted telephone interview (CATI) were questioned verbally by the interviewer and data were entered directly into an electronic dataset. Surveys completed in writing and returned by mail were first checked for completeness and data quality and then merged with the electronic file.

Wave 4 data were chosen for this analysis since the survey for this wave included items on the delay of medical and dental care in addition to farm, work, health, and sociodemographic characteristics. The data were collected in 2005, and the sample consists of 957 rural farmworkers. The response rate for wave 4 was 81.3%. As shown in Table 1, slightly more than half of the participants were male, and the majority were white. Of the 957 participants, 568 had a spouse who was also in the study (59%). The remaining 389 were either single or were married but their spouse did not participate. The average age of the participants was 67.4 (SD = 7.6), with a range from 53 to 89 years old. Most of the participants had an annual household income between $25 000 and $80 000.

## Measures

The survey instrument was formed using items from the FFHHSP project, including items measuring demographic characteristics of the respondent and farm enterprise and health conditions. Farmers were asked what types of crops or livestock they grew on their farms, the number of years they had farmed, and the types of farm work they performed. They were also queried about off-farm employment. The number of current health conditions was determined by totaling the number of items endorsed from a checklist of 18 conditions. Respondents were asked to indicate which of 5 categories of health insurance they had: Medicare, Medicaid, Veteran's, private primary insurance, and private supplemental insurance. Only 3% of respondents lacked any type of insurance. Taking prescription drugs on a daily basis was used as a proxy measure of health status. Additional questions designed by the researchers or garnered from a variety of sources, including the self-rated health status question from the National Health Interview Survey (NHIS), were added to the survey instrument. Two questions that measured delay of care were modified from the NHIS: "In the last year, has there been a time you did not seek medical care, or delayed seeking medical care, because you felt you could not afford it?" and, "In the last year, has there been a time you did not seek dental care, or delayed seeking dental care, because you felt you could not afford it?"

TABLE 1. Descriptive Summary of Categorical Demographic Characteristics (*N* = 957)

| Variable | *n* | % |
|---|---|---|
| Sex | | |
| Male | 493 | 51.5 |
| Female | 464 | 48.5 |
| Race | | |
| White | 771 | 81.1 |
| Minority | 180 | 18.9 |
| Marital status | | |
| Married, spouse in study | 568 | 59.5 |
| Married, spouse not in study | 287 | 30.1 |
| Unmarried (single, divorced, widowed) | 100 | 10.4 |
| Income | | |
| <$2500 | 11 | 1.2 |
| $2500-$10 000 | 40 | 4.5 |
| $10 000-$25 000 | 179 | 20.2 |
| $25 001-$40 000 | 265 | 29.8 |
| $40 000-$80 000 | 274 | 30.9 |
| >$80 000 | 119 | 13.4 |

## Data Analysis

Descriptive statistics, including means and standard deviations or frequency distributions, were used to summarize the study variables. Since more than half of the participants were married and their spouse was also in the study, predictors of delay were determined using generalized estimating equations (GEE) with an exchangeable correlation matrix assumed; separate models were developed for health care delay and dental care delay. The GEE method accounts for the dependence of responses from members of a couple while also allowing for those without spouses in the study to be included in the regression model. Potential predictors included demographic factors (gender, race, age, marital status, and income), farm and work characteristics (type of farm, indicators for work on farm and off-farm employment, and percent of income from

farming), health status (self-rated health, number of health conditions, and daily prescription use), and types of insurance (separate indicators for each of 5 types). To test for multicollinearity among the predictor variables, variance inflation factors were determined for the predictors in the model. This was done initially using the entire sample and subsequently for 5 subsamples of participants. Each subsample consisted of one randomly chosen member of each married couple in the study plus the remaining (unpaired) participants. These subsamples were considered since they were comprised of independent observations only.

All data analyses were performed using SAS version 9.1 (SAS Institute Inc, Cary, NC); the SAS procedure PROC GENMOD was used to perform the GEE analysis, as suggested by Stokes and colleagues.[31]

## *RESULTS*

### *Summary of Farm, Work, Health, Insurance, and Delay Measures*

Most of the participants had farms that grew both crops and livestock. Many of these older farmers were still actively working on their farms and about one-third had off-farm jobs (Table 2). On average, respondents received 29.3% of their income from farming (SD = 28.9), with reported values ranging from 0% to 100%. Most participants indicated their health was "Good" or "Very good" (see Figure 1). The average number of current health conditions reported by the participants was 3.0 (SD = 2.1), with values ranging from 0 to 11. As shown in the figure, the average number of health conditions increased with decreasing self-rated health assessment. For the 8% of participants who rated their health as "Poor," the average number of health conditions they reported having was nearly 5. At the other end of the health-rating scale, the 9% of participants who chose "Excellent" as a descriptor for their own health had an average of 1.4 current health conditions. More than three quarters of the participants were taking prescription medication daily, and the most common sources of insurance were Medicare, private policies, and private supplemental policies (Table 2). Nearly 7% of participants indicated that they had avoided or delayed seeking health care because of cost, and nearly 9% had avoided or delayed seeking dental care for the same reason.

FIGURE 1. Percentage of participants in each self-rated health category, with average number of health conditions for each health category also displayed (*n* = 954).

TABLE 2. Frequency Distributions for Farm Type, Work Status, Health Status Indicators, and Health and Dental Care Delay Outcomes (*N* = 957)

| Variable | *n* | % |
|---|---|---|
| Type of farm | | |
| Livestock and crops | 658 | 69.8 |
| Crops only | 255 | 27.0 |
| Livestock only | 30 | 3.2 |
| Work on farm | | |
| Yes | 781 | 81.7 |
| No | 175 | 18.3 |
| Have an off-farm job | | |
| Yes | 315 | 33.0 |
| No | 640 | 67.0 |
| Take prescription medication daily | | |
| Yes | 750 | 78.5 |
| No | 206 | 21.6 |
| Insurance* | | |
| Have Medicare | 588 | 61.4 |
| Have Medicaid | 114 | 11.9 |
| Have Veteran's insurance | 76 | 7.9 |
| Have private insurance (primary) | 405 | 42.3 |
| Have private insurance (supplemental) | 429 | 44.8 |
| Without any health insurance | 32 | 3.3 |
| Did not seek/delayed seeking medical care | | |
| Yes | 66 | 6.9 |
| No | 888 | 93.1 |
| Did not seek/delayed seeking dental care | | |
| Yes | 81 | 8.5 |
| No | 874 | 91.5 |

*Multiple responses were allowed for health insurance.

### *Predictors of Delay in Seeking Health Care*

With demographic, farm, work, health, and insurance variables included in the GEE model, significant predictors of delay in health care included age, income, self-rated health, number of health conditions, and having private insurance as the primary policy (see Table 3). The magnitude of the odds ratios indicated that those who were younger (below age 65), with lower annual income, poorer self-rated health, more current medical conditions, and without private medical insurance as their primary health policy, were more likely to delay care. The variance inflation factors for this model, both for the full sample and the 5 subsamples chosen, were all less than 4, indicating that multicollinearity is likely not distorting regression estimates.

### *Predictors of Delay in Seeking Dental Care*

With demographic, farm, work, health, and insurance variables included in the GEE model, significant predictors of delay in health care were income, having an off-farm job, taking prescription medication daily, and having Medicaid as at least one source of health coverage. The direction of the odds ratios indicated that those who had a lower income were more likely to delay dental care, compared to more affluent participants. Those who had an off-farm job were more likely to delay than those without, and those who took prescription drugs daily were more likely to delay seeking dental care, compared to those who used prescription medication less often. On the other hand, those who had Medicaid were less likely than subjects without this type of insurance to delay seeking dental care. The variance inflation factors for this model, considering the full sample and 5 subsamples as described above, were all less than 4.

## *DISCUSSION*

Findings from this study of older members of farm households generally coincide with the literature on delay of care due to cost in the general population. It is important to note that nearly all of this sample reported having health insurance, yet cost was still a barrier to care.

A possible explanation could be that those with private policies had high deductibles and felt they still could not access care when needed. Farmers, in particular, suffer from poor-quality private plans.[19,20] Nearly all of the respondents aged 65 and over reported Medicare coverage. The burden of health care costs is much less with the more comprehensive coverage provided by this type of health insurance. Younger participants (ages 50–64) were more likely to delay medical care, perhaps indicative of the poorer quality of health care insurance coverage. Age was not a predictor of delay of dental care, which

TABLE 3. Logistic Regression Models for Delay in Seeking Medical and Dental Care, with Odds Ratios, Confidence Intervals, and Significance Tests ($n$ = 815)

| Predictor | Delay in Seeking Medical Care | | | Delay in Seeking Dental Care | | |
|---|---|---|---|---|---|---|
| | OR* | 95% Confidence Interval for OR | $\chi^2$ ($p$-Value) | OR | 95% Confidence Interval for OR | $\chi^2$ ($p$-Value) |
| Male | 0.9 | 0.5-1.8 | <0.1 (.9) | 0.8 | 0.5-1.5 | 0.5 (.5) |
| White | 1.7 | 0.7-4.2 | 1.3 (.3) | 0.6 | 0.3-1.1 | 2.6 (.1) |
| Age | 0.9 | 0.8-0.9 | 13.5 (.0002) | 1.0 | 0.9-1.0 | 1.4 (.2) |
| Married | 1.3 | 0.5-3.8 | 0.3 (.6) | 0.7 | 0.3-1.6 | 0.6 (.5) |
| Income | 0.5 | 0.3-0.6 | 20.8 (<.0001) | 0.6 | 0.4-0.7 | 13.7 (.0002) |
| Type of farm | | | 2.6 (.3) | | | 0.3 (.9) |
| Livestock and crops | 0.8 | 0.1–4.4 | | 0.9 | 0.2–3.4 | |
| Crops only | 1.5 | 0.3–8.5 | | 1.1 | 0.3–4.3 | |
| Work on farm | 2.0 | 0.7–5.1 | 2.2 (.1) | 1.2 | 0.6–2.4 | 0.2 (.7) |
| Off-farm job | 1.4 | 0.7–2.8 | 0.7 (.4) | 1.9 | 1.1–3.6 | 4.2 (.04) |
| % Of income from farming | 1.0 | 1.0–1.0 | 1.6 (.2) | 1.0 | 1.0–1.0 | <0.1 (.8) |
| Self-rated health | 0.7 | 0.5–1.0 | 4.3 (.04) | 0.7 | 0.5–1.0 | 3.4 (.07) |
| Number of health conditions | 1.3 | 1.1–1.5 | 6.4 (.01) | 1.1 | 0.9–1.3 | 1.2 (.3) |
| Take prescriptions daily | 1.5 | 0.6–3.8 | 0.7 (.4) | 2.9 | 1.1–7.6 | 6.5 (.01) |
| Medicare | 0.8 | 0.3–2.1 | 0.2 (.7) | 1.0 | 0.4–2.4 | <0.1 (>.9) |
| Medicaid | 1.2 | 0.4–3.7 | <0.1 (.8) | 0.2 | 0.0–0.8 | 10.4 (.001) |
| Veteran's insurance | 0.4 | 0.0–2.9 | 1.8 (.2) | 0.7 | 0.2–2.4 | 0.3 (.6) |
| Private (primary) | 0.4 | 0.2–0.8 | 5.9 (.02) | 1.0 | 0.5–1.9 | <0.1 (.9) |
| Private (supplement) | 0.5 | 0.2–1.1 | 2.7 (.1) | 0.7 | 0.4–1.4 | 0.9 (.4) |

*OR indicates odds ratio.

was surprising, given that older persons' use of dental care usually declines with age.[25]

Increasing income was associated with not delaying medical care, a finding consistent with previous research. Collins et al noted that low-income and modest-income adults who do have insurance often struggle to afford insurance premiums.[6] Weinick reminds us that even insured individuals may delay care because of cost, especially if they have low incomes or functional impairments.[3] Having greater annual income would assist in overcoming these barriers related to cost.

Consistent with previous findings, poor self-rated health and greater number of health conditions also predicted delay in seeking care. Goldman and Zissimopoulos found that even for Medicare beneficiaries, out-of-pocket health care expenditures for those in poor health were twice that of Medicare recipients who assessed their health as excellent or good.[4]

Another finding of this study was that prescription medication use was a predictor of delay of dental care; those who used prescription medications daily had nearly 3 times the odds of delaying seeking dental care. This agrees with Kiyak and Reichmuth, who found that those who spend more on medications and medical visits are less likely to use dental services.[26] In addition, Vargas et al found that those who suffer from poor health and multiple chronic diseases make fewer visits to the dentist, viewing oral health as a less urgent need.[27] Since prescription medication use is most typically associated with diminished health and/or chronic disease, the use of prescription medication on a daily basis might be thought of as an indicator of poor health or chronic illness; this further explains how use of prescription medicine could be related to delay of dental care.

With regard to racial and ethnic disparities in access to health care, Shi and Stevens reported that whites were more likely than other groups to report unmet health care needs due to cost.[24] The findings from this study do not support this as no difference by racial grouping in delay of care due to cost was found for either medical or dental care. This lack of disparity between white and

African American farmers should be explored further. It may be a function of their common vocation or there may be another explanation.

The presence of an off-farm job increased the likelihood of delay of dental care but not of medical care due to cost. Persons who held off-farm jobs had only slightly higher incomes, compared with those who did not work off the farm. In households where adequate income is already a challenge, dental care may not be perceived among the highest priorities. In addition, those with off-farm jobs may have less flexibility to schedule appointments and may perceive dental care to be less important than health care.

Although Medicare does not provide dental insurance coverage, Medicaid does provide coverage for dental visits.[32] Consistent with the Kiyak and Reichmuth's report on the Elders' Oral Health Summit Proceedings, in which availability of dental insurance was predictive of dental services utilization, older farmers having dental insurance, in this case Medicaid, were less likely to delay visits to the dentist.[26] Also in the Summit Proceedings, perceived ability to pay for services was a predictor of dental services use. This predictor was not inconsistent with this study's finding that delayed dental visits were less likely as income increased.

### *Limitations*

The results presented are from a non-random sample of farmers from only 2 southern states and may not be representative of all older farmers. The cross-sectional analysis presents a snapshot of delay of health care for the past 12 months and is subject to recall bias. However, for those respondents who reported a delay, it may be that the delay was of such a magnitude that the respondent was able to recall that event as opposed to times when delay could have been of little consequence.

Level of health insurance coverage was not asked. Most individual health insurance plans for farmers are accompanied by high deductibles and expensive premiums[19]; the farmers may have felt they still could not access care when needed. No questions were asked about dental insurance, which might account for some of the delay in seeking dental care.

Although having health insurance has been considered to be an important determinant of access to care, especially for older women,[9] the lack of health insurance is not always a predictor of delay in seeking care. In one study of adult patients, lacking a regular source of care was a stronger, more consistent predictor of delay than insurance status in seeking care.[11] However, in the current study, the question about having a regular source of care was not asked. Further studies are needed to examine the relationship between access to a regular health care provider and delay in seeking care among agricultural workers.

## *CONCLUSION*

As age advances and health deteriorates, it is important to understand the perception of cost associated with health care and the factors that drive that perception. In this cohort of older farmers, even having health insurance did not totally alleviate delay of care due to cost. Additional research on health care delay needs to be conducted. In rural areas, there may be many other contributors to delay of care that were not asked in this study; level of health care coverage, competing demands for money, transportation costs, availability of health care providers including those providing primary care, and distance to care may all factor into the decisions to delay care. The economic and health status factors that were found to predict delay provide a starting point for further investigation on an issue that becomes more critical as the average age of agricultural workers continues to increase.

## REFERENCES

1. Doty MM, Edwards JN, Holmgren AL. Seeing red: Americans driven into debt by medical bills. *Issue Brief (Commonw Fund).* 2005;10(837):1–12.

2. Ayanian JZ, Weissman JS, Schneider EC, Ginsburg JA, Zaslavsky AM. Unmet health needs of uninsured adults in the United States. *JAMA.* 2000;284:2061–2069.

3. Weinick RM, Byron SC, Bierman AS. Who can't pay for health care? *J Gen Intern Med.* 2005;20: 504–509.

4. Goldman DP, Zissimopoulos JM. High out-of-pocket health care spending by the elderly. *Health Aff.* 2003;22:194–202.

5. Klein D, Turvey C, Wallace R. Elders who delay medication because of cost: health insurance, demographic, health, and financial correlates. *Gerontologist.* 2004;44:779–787.

6. Collins SR, Schoen C, Doty MM, Holmgren AL, How SK. Paying more for less: older adults in the individual insurance market. *Issue Brief (Commonw Fund).* 2005; (841):1–12.

7. Vargas CM, Yellowitz JA, Hayes KL. Oral health status of older rural adults in the United States. *J Am Dent Assoc.* 2003;134:479–486.

8. Dor A, Sudano J, Baker D. The effects of private insurance on the health of older, working age adults: evidence from the health and retirement study. *Health Serv Res.* 2006;41(3 part I): 759–787.

9. Xu X, Patel DA, Vahratian A, Ransom SB. Insurance coverage and health care use among near-elderly women. *Womens Health Issues.* 2006;16:139–148.

10. Ross JS, Bradley EH, Busch SH. Use of health care services by lower-income and higher-income uninsured adults. *JAMA.* 2006;295:2027–2036.

11. DeVoe JE, Fryer GE, Phillips R, Green L. Receipt of preventive care among adults: Insurance status and usual source of care. *Am J Public Health.* 2003;93:786–791.

12. Harralson TL. Factors influencing delay in seeking treatment for acute ischemic symptoms among lower income, urban women. *Heart Lung.* 2007;36:96–104.

13. Mandelzweig L, Goldbourt U, Boyko V, Tanne D. Perceptual, social, and behavioral factors associated with delays in seeking medical care in patients with symptoms of acute stroke. *Stroke.* 2006;37:1248–1253.

14. US Department of Agriculture. 2002 Census of Agriculture. Available at: http://www.nass.usda.gov/Census_of_Agriculture/index.asp. Accessed April 11, 2007.

15. Allen R, Harris G. What we know about the demographics of US farm operators. Available at: http://www.nass.usda.gov/census/census02/otheranalysis/demographicpaper022505.htm. Accessed April 13, 2007.

16. Stiernstrom EL, Holmberg S, Thelin A, Svardsudd K. Reported health status among farmers and nonfarmers in nine rural districts. *J Occup Environ Med.* 1998;40: 917–924.

17. Hernandez-Peck MC. Older farmers: factors affecting their health and safety. Available at: http://www.cdc.gov/NASD/docs/d001701-d001800/d001760/d001760.html. Accessed March 19, 2007.

18. Prince TS, Browning SR, Heath R. Health insurance and work: characteristics among multi-job holding farmers. *J Agromedicine.* 2000;7:81–91.

19. Roy NC, Lange J. Can farmers continue to feed America? *Rural Roads.* 2007;5:36–38.

20. Lange J, Roy NC, Fisher K, Sheridan C. *Health Services Survey of Northwest Iowa Farmers 2001 and 2004: Underinsurance Among Iowa Farm Families Chartbook.* Spencer, Iowa: AgriSafe Clinic of Spencer Hospital; 2004.

21. Casey MM, Call KT, Klingner JM. 2001. Are rural residents less likely to obtain recommended preventive healthcare services? *Am J Prev Med.* 2001;21:182–188.

22. Probst JC, Laditka SB, Wang J, Johnson AO. *Mode of Travel and Actual Distance Traveled for Medical or Dental Care by Rural and Urban Residents.* South Carolina Rural Health Research Center, Federal Office of Rural Health Policy, Health Resources and Services Administration, Columbia, SC.; 2006.

23. Auchincloss H, Hadden W. The health effects of rural-urban residence and concentrated poverty. *J Rural Health.* 2002;18:319–336.

24. Shi L, Stevens GD. Vulnerability and unmet health care needs: the influence of multiple risk factors. *J Gen Intern Med.* 2004;20:148–154.

25. Janes GR, Blackman DK, Bolen JC, et al. Surveillance for use of preventive health-care services by older adults, 1995–1997. *MMWR CDC Surveill Summ.* 1999;48:51–88.

26. Kiyak HA, Reichmuth M. Barriers to and enablers of older adults' use of dental services. *J Dent Educ.* 2005;69:975–986.

27. Vargas CM, Yellowitz JA, Hayes KL. Oral health status of older rural adults in the United States. *J Am Dent Assoc.* 2003;134:479–486.

28. Macek MD, Cohen LA, Reid BC, Manski RJ. Dental visits among older US adults, 1999. *J Am Dent Assoc.* 2004;135:1154–1162.

29. Sarkisian CA, Hays RD, Mangione CM. Do older adults expect to age successfully? The association between expectations regarding aging and beliefs regarding healthcare seeking among older adults. *J Am Geriatr Soc.* 2002;50:1837–1843.

30. Browning SR, Trusczynska H, Reed DB, McKnight RH. Agricultural injuries among older Kentucky farmers: the Farm Family Health and Hazard Surveillance Project. *Am J Ind Hyg.* 1998;33:341–353.

31. Stokes ME, Davis CS, Koch GG. *Categorical Data Analysis Using the SAS System.* 2nd ed. Cary, NC: SAS Institute; 2000.

32. Kaiser Family Foundation. Benefits by service: dental services (October 2006) reported in Medicaid benefits. Available at: http://www.kff.org/medicaid/benefits/service.jsp?gr=off&nt=on&so=0&tg=0&yr=3&cat=6 &sv=6. Accessed November 27, 2007.