"Sometimes It's Hard to Figure": The Functional Health Literacy of Appalachians in a Metropolitan Area

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Given the importance of health literacy to full participation in and benefit from this nation's health care system, this study examines the functional health literacy and coping strategies of Appalachian adults within the greater Cincinnati metropolitan area. A total of seventy self-identified Appalachian adults who presented at one of thirteen primary care safety-net clinics were interviewed and compared with 602 non-Appalachian adults. The interview consisted of administering the Short Test of Functional Health Literacy, collecting self-reported health status, assessing level of understanding and remembering what the doctor said, and identifying coping strategies for effectively interacting with clinicians. Appalachian adults appear to be at greater risk for low functional health literacy, but do not report different coping behavior, than non-Appalachian adults. Poor health literacy appears to have a greater effect among Appalachians in terms of their level of difficulties interacting with physicians, coping behaviors, and self-reported health. The study findings imply a need for a better understanding of the potential risks of poor functional health literacy among the Appalachian population, the nature of the underlying causes, and appropriate strategies for assisting persons with poor health literacy to effectively use this nation's health care system.

Functional Health Literacy of Metropolitan Appalachians

Full participation in and maximum benefit from this nation's health

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care system requires individuals to be functionally literate. That is, they must be able to read medical instructions and other information such as consent forms and medicine labels, be able to understand written and oral information from health care providers, remember relevant details and directions, and act on procedures and instructions such as medication and appointment schedules (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs 1999). Inadequate functional health literacy may result in poor compliance due to difficulty in knowing how to take medication or when the next appointment is scheduled, decreased empowerment due to a lack of understanding informed consent procedures, and decreased access to services due to inability to understand Medicaid, as well as other insurance, rights, and responsibilities (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs 1999). With over 90 million U.S. adults estimated to have low health literacy skills (Kirsch et al. 1993; Rudd, Moeykens, and Colton 1999), inadequate functional health literacy has been shown to be associated with poorer health (Weiss et al. 1992), poorer control of asthma, diabetes, and hypertension (Williams et al. 1998a; Williams et al. 1998b), higher health care use (Baker et al. 1997), increased hospitalizations (Baker et al. 1998), increased violence (Davis et al. 1999), premature death (Tuckson 2000), and higher costs (Weiss et al. 1994).

Although low health literacy can affect every ethnic, racial, gender, and age group (Kirsch et al. 1993), it has been most strongly associated with disadvantaged populations (Weiss and Coyne 1997; Rudd, Moeykens, and Colton 1999). While the last decade has seen a broad expansion in efforts to understand health literacy and to improve the readability of medical pamphlets, prescriptions, informed consent forms, and other patient-directed materials among traditionally minority populations, such as African Americans and Hispanics, less attention has been given to other potentially disadvantaged populations, such as Appalachians.

As part of a larger study conducted to identify the issues underlying functional health literacy among patients treated by primary care providers who serve the poor within the greater Cincinnati metropolitan area (Wells et al. 2001), this paper reports on the functional health literacy and coping strategies of self-identified Appalachian patients. Many Appalachians, particularly those living in or migrating from Central Appalachia, experience some of the nation's highest rates of poverty and economic distress (Appalachian Regional Commission 2003). Between 1940 and 1970, over 3 million persons left Central Appalachia for cities such as Cincinnati where Appalachian enclaves were established and still exist as the migration continues (Rowles and Watkins 1991; Borman and Obermiller 1994; Obermiller and Howe 2002). Appalachians in

the Cincinnati metropolitan area constitute the region's largest ethnic minority at 25 percent and experience many of the same socioeconomic and resource disadvantages as other minority populations. For example, urban Appalachian neighborhoods in the Cincinnati metropolitan area tend to have higher school dropout rates and lower adult education levels than other neighborhoods, with about one-quarter of the urban Appalachian population living in poverty (Urban Appalachian Council 2002). Many of these neighborhoods have school dropout/push-out rates over 90 percent (Urban Appalachian Council 2002).

Methods

Site Selection

Primary care practice sites were selected for inclusion in the study based on three criteria: (1) location within the twenty counties of Indiana, Kentucky, and Ohio that comprise the greater Cincinnati metropolitan area; (2) willingness on the part of clinic management to be involved in an assessment of functional health literacy; and, (3) one or more of the following: (a) belonging to a community public health system or a county health department; (b) using a sliding-scale fee payment schedule; (c) having a majority of uninsured patients; and/or, (d) being designated as a federally qualified health center. Initially, ten of the approximately forty sites that met these criteria were randomly selected for the study; three practice sites were later added to include more urban fringe areas and provide greater access to Hispanic patients.

Patient Selection

An intercept approach was used to obtain a sample of patients eighteen years and older who presented themselves at the selected primary care clinics. One of three trained interviewers, all of whom wore identification badges and nametags, invited individual patients being treated for their personal health to participate in the study as they registered at the clinic. Of the 976 patients invited to participate, thirty-eight were ineligible because they were less than eighteen years old or not physically able (e.g., blind) or capable (e.g., mentally retarded) of taking the survey. A total of 192 refused to participate due primarily to lack of time. Thus, 746 patients completed the interview, for an overall response rate of 79.5 percent. Of this sample of patients, seventy or 9.4 percent self-identified themselves as Appalachian (do you consider yourself to be Appalachian?). Thus, a total of seventy Appalachian patients comprised the study group and 602 non-Appalachian patients comprised the comparison group[1].

Data Collection

Each patient was interviewed to obtain information on demographic characteristics, health status, functional health literacy, and coping skills. The interviews, which typically lasted from twenty to sixty minutes, were held in unused exam rooms and were conducted in Spanish for Hispanic patients not fluent in English. Longer interviews usually involved patients eager to share experiences and concerns. Participants were remunerated with a $20 grocery coupon at the end of the interview.

Measures

Functional Health Literacy

Functional health literacy was measured by the Short Test of Functional Health Literacy in Adults (S-TOFHLA) (Baker et al. 1999). This instrument requires the patient to read and interpret a series of sentences of increasing complexity and demonstrate comprehension by selecting one of four fill-in-the-blank options in order to make sense of the material. The S-TOFHLA, also available in Spanish, has been validated and used in several other studies (Nurss et al. 1998). A total score, based on the number of correct responses, ranges from a low of 0 to a high of 36. The S-TOFHLA is typically used in a trivariate fashion, categorized as either adequate (scores 23 - 36), marginal (scores 17 - 22), or inadequate (scores 0 - 16) functional health literacy, and/or as a bivariate variable to distinguish between adequate and deficient (marginal and inadequate combined) functional health literacy.

Demographic Characteristics

In addition to Appalachian status (yes, no), data were obtained on four other patient demographic variables: gender (male, female), age (18 - 34, 35 - 64, 65+), native language (English, Spanish/other), and race/ethnicity (white, black/African American, Hispanic/Latino, other). Also, the location of the primary care practice site at which the patient presented himself or herself (urban, suburban, urban fringe) was documented as a proxy measure of the patient's geographic residence. Demographic data were not collected on the patients' income, education, or occupational status. Therefore, no direct indicators of the patients' socioeconomic status are available. However, there may exist relatively small differences in patient socioeconomic status given that the primary care practice sites included in the study serve primarily low-income patients.

Health Status

Interviewers asked patients four questions taken from the SF-12 Health Status Assessment Questionnaire (Ware et al. 1996). These questions assessed general health status (self-rated health from poor to excellent),

physical role (accomplish less than would have liked in past four weeks due to physical health—yes, no), emotional role (accomplish less than would have liked in past four weeks due to emotional problems—yes, no), and mental health (time felt downhearted and blue in past four weeks–none of the time to all of the time).

Understanding and Remembering What Doctor Said

To obtain an assessment of patients' own perceptions regarding their level of understanding as well as remembering, patients were asked two questions: (1) When you speak with a doctor, do you find it difficult to understand the doctor (almost all of the time, most of the time, only some of the time, almost none of the time)?; and, (2) When you speak with a doctor, do you find it difficult to remember what the doctor says (almost all of the time, most of the time, only some of the time, almost none of the time)? These questions were developed by the study team and have not been previously used or validated elsewhere.

Coping Strategies

To identify the coping skills used by patients with different levels of functional health literacy to effectively interact with clinicians, patients were asked a series of questions regarding their strategies for dealing with those situations when they have difficulty understanding and/or remembering what their doctor said. First, patients were asked if they do anything when it is difficult to understand a doctor and if they do anything when it is difficult to remember what the doctor says and, if so, did they find these actions helpful. Second, patients were asked whether or not they ever use each of seven coping strategies when they have difficulty understanding a doctor and each of six strategies when they have difficulty remembering what a doctor tells them[2]. These questions, and associated strategies, were developed by the study team based on a focus group of nine health professionals involved with health literacy (Wells et al. 2001) and have not been previously used or validated elsewhere.

Analyses

Three sets of analyses were conducted. First, bivariate analyses examined differences between Appalachian and non-Appalachian adults in regards to the demographic characteristics (gender, age, native language, race/ethnicity, site location) and functional health literacy (S-TOFHLA scores, literacy level). Chi-square tests of significance were performed on the categorical variables and a t-test was used with the mean S-TOFHLA scores. Second, statistical regression techniques were applied to assess the relative (adjusted) effect of Appalachian status on the two measures of

functional health literacy while statistically controlling for the effects of the other demographic variables. Logistic regression was employed for the dichotomous functional healthy literacy measure (adequate, deficient) and ordinary least-squares (OLS) regression was used with the continuous S-TOFHLA scores. Third, contingency table analyses examined differences in the understanding and remembering coping mechanisms between those with deficient and those with adequate functional health literacy. These analyses were conducted separately for Appalachians and non-Appalachians as well as between Appalachians and non-Appalachians. Similar analyses were also conducted to examine differences in the four measures of health status (general health, physical role, emotional role, mental health).

Results

Demographic Characteristics

Table 1 shows that self-identified Appalachian adults are similar to the comparative non-Appalachian adults in terms of gender, native language, and race/ethnicity. However, the Appalachians are older on average than their non-Appalachian counterparts, with a significantly greater percent of Appalachians being 35 - 64 years old and a significantly smaller percent being 18 - 34 years of age. Also, Appalachians are more likely than non-Appalachians to have been patients at either urban or urban fringe practice sites and less likely to have been patients at suburban sites.

Functional Health Literacy

As illustrated in Table 2, Appalachians have significantly poorer functional health literacy than non-Appalachians. Appalachians scored on average 3.6 points lower on the S-TOFHLA and have a greater percent with deficient (marginal or inadequate) functional health literacy than non-Appalachians (29.6 percent vs. 11.5 percent, respectively). After controlling for the effects of gender, age, native language, race/ethnicity, and site location, Appalachians are 4.5 times more likely than non-Appalachians to have deficient functional health literacy and to score 3.9 points lower on average on the S-TOFHLA (Table 3).

Understanding What the Doctor Says

Table 4 shows that there is no statistically significant difference between Appalachians and non-Appalachians in their level of difficulty understanding what the doctor says, with 70.6 percent of Appalachians reporting difficulty almost none of the time as compared to 61.1 percent of non-Appalachians. Approximately 4 percent of Appalachians report having difficulty understanding what their doctor says almost all or most of the time, which is not significantly different from the 5.9 percent of non-

Appalachians. For both Appalachians and non-Appalachians, there are no statistically significant differences by level of functional health literacy in understanding what the doctor says, although those with deficient health literacy tend to be more likely than respondents with adequate health literacy to report difficulty at least some of the time.

Approximately 95 percent of both Appalachian and non-Appalachian patients surveyed report taking some action to understand their doctor, with almost everyone agreeing that their actions help (Table 4). There are no significant differences by level of functional health literacy for either cohort, although Appalachians with deficient health literacy tend to be less likely than Appalachians with adequate health literacy to find their actions helpful. Also, Appalachians with deficient health literacy are significantly less likely than non-Appalachians with deficient health literacy to perceive their actions to be helpful.

The most frequent action taken by both groups is to talk to someone about what the doctor says, either at the clinic or elsewhere (Table 4). Few patients elect to take the more aggressive approach of changing doctor/clinic. While there are no significant differences by functional health literacy regarding the actions taken by Appalachian patients, those with deficient health literacy appear less likely than those with adequate health literacy to talk to a nurse or someone else at the clinic. However, non-Appalachians with deficient functional health literacy are more likely than those with adequate health literacy to bring someone else to the clinic and to schedule another visit.

Remembering What the Doctor Says

As shown in Table 5, there is no statistically significant difference between Appalachians and non-Appalachians in their level of difficulty remembering what the doctor says, although 14.9 percent of Appalachians report difficulty remembering what the doctor says almost all or most of the time as compared to only 5.2 percent of non-Appalachians. Remembering what the doctor says is particularly a problem for Appalachians with deficient health literacy, where 38.9 percent of these adults report difficulty almost all or most of the time as compared to only 6.1 percent of Appalachians with adequate health literacy and 8.1 percent of non-Appalachians with deficient health literacy. One-third of Appalachians with deficient health status report difficulty remembering almost none of the time as compared to 59.2 percent of Appalachians with adequate health literacy and 43.2 percent of non-Appalachians with deficient health literacy.

Over three-quarters of Appalachian and non-Appalachian patients interviewed take some action to remember what the doctor says, with no significant differences between the two groups (Table 5). Although there

are no statistically significant differences by level of functional health literacy, Appalachians with deficient health literacy appear less likely than Appalachians with adequate health literacy to take some action to remember what the doctor says.

While the vast majority of patients surveyed consider their actions helpful, significantly fewer of Appalachians than non-Appalachians perceive their actions to be helpful (Table 5). Also, Appalachians with deficient functional health literacy are significantly less likely than non-Appalachians with deficient health literacy to find their actions helpful.

The three most frequent actions taken to remember what the doctor says for both population subgroups are: telling someone else what the doctor said, writing down what the doctor said, and calling back later (Table 5). There are no statistically significant differences between Appalachians and non-Appalachians in the use of these coping mechanisms, although Appalachians appear less likely than their non-Appalachian counterparts to call back later. Also, the use of these coping mechanisms does not vary by level of functional health literacy for either group. However, Appalachians with deficient health literacy appear less likely than Appalachians with adequate health literacy to write down what the doctor says, which would require a certain level of literacy skills, and are more likely to ask the doctor to write down what s/he says. This is also the case for non-Appalachians, but to a lesser extent.

Impact on Health Status

Table 6 indicates that compared to Appalachians with adequate health literacy, Appalachians with deficient health literacy are more likely to report fair or poor health status and less likely to rate their health status as very good or excellent. This is also the case for non-Appalachians, but the differences are of a smaller magnitude. Appalachians with deficient health literacy appear to rate their overall health status as being poorer than non-Appalachians with deficient health literacy, although the differences are not statistically significant. In addition, Appalachians with deficient health literacy are significantly more likely than those with adequate health literacy to feel that they accomplished less than they would have liked with their work or other regular daily activities in the past four weeks as a result of their physical health. This relationship between functional health literacy and physical role does not exist for non-Appalachians. However, there are no differences in the emotional role and mental health scales by level of functional health literacy among Appalachians, whereas non-Appalachians with deficient health literacy are more likely to feel that they accomplished less than they would have liked with their work or other regular daily activities in the past four weeks as a result of emotional problems. Despite

the lack of statistically significant differences, Appalachians with deficient health literacy appear more likely to report depressive symptoms at least some of the time than Appalachians with adequate health literacy as well as non-Appalachians regardless of their level of functional health literacy.

Discussion and Implications

Among a population of patients being treated in safety-net clinics within the greater Cincinnati metropolitan region, Appalachians have poorer functional health literacy than their non-Appalachian counterparts. Even though the Appalachian patients who participated in the study are older and more likely to reside in either the urban or urban fringe areas of the region than the non-Appalachian participants, controlling for the effects of these variables did not eliminate the Appalachian/non-Appalachian difference in functional health literacy. While the reasons for this difference are not known, one variable not included in this study that needs to be examined is education. Previous research on the Appalachian population in the greater Cincinnati area shows that Appalachian adults have lower educational levels than non-Appalachian adults. For example, 43 percent of first generation Appalachian adults have less than a completed high school education as compared to 22 percent of non-Appalachian adults (Ludke 2003). Also, as mentioned earlier, urban Appalachian neighborhoods in the area tend to have higher high school dropout rates and lower adult education levels than other neighborhoods (Urban Appalachian Council 2002). However, it is not known whether the Appalachian adults participating in this study had lower educational levels than non-Appalachian participants or whether these safety-net clinic patients had comparable educational as well as socioeconomic backgrounds. Inclusion of education as well as other measures of socioeconomic status would provide insight into whether the Appalachian/non-Appalachian differences are a matter of cultural/ethnic group membership or simply an artifact of education or socioeconomic status.

Even if lower Appalachian educational completion explains most of the inadequate health literacy observed here, it would not fundamentally alter the significance of the finding that low literacy is associated with poorer health status. That low literacy may also be associated with low educational completion suggests that the problem of educational/cultural disparity between doctors/materials and patients could be more serious and complex than the limited notion of health literacy suggests. But the association between health literacy and health status also suggests that efforts made to improve health literacy and to diminish communicative problems between doctors and patients may be a more direct way of improving health.

The 30 percent of Appalachian adults with marginal or inadequate

functional health literacy is twice that found by Montalto and Spiegler (2001) in their study of adult patients at a rural community health center in West Virginia. Although West Virginia is an Appalachian state, Montalto and Spiegler did not confirm the Appalachian origins of the patients and, thus, their study sample may have included patients other than self-identified Appalachians. Also, with a response rate of 38 percent (less than half the response rate of the present study), their study may have excluded a greater proportion of patients with poorer functional health literacy.

Despite the differences in functional health literacy between Appalachian and non-Appalachian patients in this study, there are no significant differences in their reported level of difficulty understanding and/or remembering what the doctor says as well as their coping mechanisms for dealing with their difficulties. The only exception is that Appalachians are less likely to feel that their actions to remember what the doctor says are helpful.

While deficient health literacy does not appear to significantly increase Appalachian patients' difficulty in understanding what a doctor says, it does significantly increase their difficulty in remembering what a doctor says. The differences are less dramatic for non-Appalachians. There may be several factors contributing to this finding. First, doctors may be communicating at a level that is difficult for patients to comprehend regardless of their level of functional health literacy. Second, there may be reluctance on the part of functionally illiterate patients to acknowledge their difficulty understanding written and/or oral communication due to the associated stigmatization, but a greater willingness to express problems in the more socially acceptable area of forgetfulness. This particularly may be the case for Appalachians, who continue to struggle to overcome the negative connotations associated with the "hillbilly" stereotype (Billings et al. 1999). Third, patients appear more likely to take some action to understand what the doctor says than to remember what the doctor says, with the vast majority of patients finding their actions to be helpful. As a result, they may report less difficulty understanding the doctor. This may particularly be the case for Appalachians with deficient health literacy, where the difference in action-taking appears to be the greatest, and who are least likely to find their actions helpful.

Deficient health literacy appears to have a greater effect among Appalachians than among non-Appalachians. Although the differences are not always statistically significant, due primarily to the small sample sizes, Appalachians with deficient health literacy appear to have greater difficulty understanding and remembering what the doctor says, be less likely to take actions to cope with their difficulties and to find their actions helpful, and use different coping mechanisms that do not highlight their level of

literacy than either Appalachians with adequate health literacy or non-Appalachians with deficient health literacy. Although the reasons for this are not known, possible explanations may be related to an interplay between the lack of cultural competence among health care providers, the cultural backgrounds of patients, and the negative stereotypes of Appalachians and their associated stigmatizations. For example, Tripp-Reimer (1982) found that non-Appalachian health care providers judged the behaviors of their Appalachian clients from their own cultural perspectives and viewed their client behaviors as negative characteristics. Negative interpretations of Appalachian characteristics and behaviors by health care providers may be detrimental to serving the health care needs of this population. As reported by Friedl (1978), Appalachians are sensitive to judgmental comments and tend not to use facilities staffed by health care providers who interpret the Appalachian "lifestyle" from a negative perceptual set. This implies that health care providers be sensitive not only to the particular health needs of Appalachians, but also to their potentially poorer functional health literacy.

As reported in other studies (Weiss et al. 1992; Baker et al. 1997), deficient health literacy is associated with poorer self-rated health status. This is particularly the case among Appalachians, which at least regionally is a cultural group at risk of poorer physical health status (Ludke and Wade 2001). The direction of this associative relationship is not known; that is to say, it is not determined whether chronically poor health status coupled with living in impoverished environments leads to limited educational opportunities and illiteracy or whether limited literacy results in poor health. Further longitudinal studies are needed to understand the nature of this relationship, particularly among Appalachians.

While Appalachians with deficient health literacy perceive greater lack of accomplishment due to their physical health and appear to have greater depressive symptomatology than other adults, they do not perceive that emotional problems limit their ability to attain their desired level of accomplishment. Although this may in fact be the case, it is also possible that this finding is due to a cultural response bias related to the stigma of mental illness or to the somatization or somatic presentation of emotional or mental illness. Whether these factors account for some of the differences between Appalachians and non-Appalachians requires further qualitative research.

Conclusions

Appalachian adults seeking health care services at metropolitan area safety-net clinics appear to be at greater risk for low functional health literacy, but do not report different coping behavior, than non-Appalachian adults.

Deficient health literacy appears to have a greater effect among Appalachians in terms of their level of difficulties interacting with physicians, coping behaviors, and self-reported health. Traditionally overlooked as a medically disadvantaged population, Appalachians are estimated to constitute one out of every ten people in the U.S. population and may very well account for a large percentage of the white, native-born Americans who have been found to be at greatest risk of poor literacy (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs 1999). This implies a need for further research to develop a better understanding of the potential risks of poor functional health literacy among the Appalachian population, the nature of the underlying causes, and appropriate and effective strategies for assisting patients with deficient health literacy to fully participate in and obtain maximum benefit from this nation's health care system. Specifically, future research should collect data on the socioeconomic status of patients, particularly educational attainment and household income, to assess its role in Appalachian health literacy. Moreover, because of the growing literature on Appalachian stereotypes, the existence or extent of these stereotypes in doctor-patient interactions should be studied with attention to the resulting effect they may have on health literacy among Appalachians.

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Notes

1. The seventy-four patients who did not know whether they were Appalachian or not and who were not born in an Appalachian county were excluded from the analyses conducted for this paper.

2. The seven strategies for understanding a doctor are: (1) ask the doctor to write down what he/she is saying; (2) talk to a nurse or someone else who works in the clinic; (3) talk to someone else; (4) bring someone else with you to the clinic; (5) schedule another visit to the clinic; (6) go to a different clinic; and, (7) do anything else. The six strategies for remembering what a doctor says are: (1) write down what the doctor says; (2) go to a different clinic; (3) tell someone else what the doctor told you; (4) call back later and speak to someone at the clinic; (5) ask the doctor to write down what they are saying; and, (6) do anything else.

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Table 1: Description of Appalachian and Non-Appalachian Sample

Characteristic	Appalachian	Non-Appalachian
Number of Participants	70	602
Gender		
% Male	27.9	20.9
% Female	72.1	79.1
Age**		
% 18 - 34 years	27.1	45.9
% 35 - 64 years	62.9	47.4
% 65+ years	10.0	5.8
Mean**	44.7	38.7
Standard Deviation	14.9	15.1
Native Language		
% English	100.0	96.0
% Spanish/Other	0.0	4.0
Race/Ethnicity		
% White	65.7	54.4
% Black/African American	22.9	37.9
% Hispanic/Latino	2.9	3.2
% Other	8.6	4.5
Site Location*		
% Urban	51.4	46.5
% Suburban	34.3	47.3
% Urban Fringe	14.3	6.1

* $p < 0.05$
** $p < 0.01$

Table 2: Functional Health Literacy of Appalachian and Non-Appalachian Adults

Functional Health Literacy	Appalachian	Non-Appalachian
TOFHLA Score**		
Mean	27.2	30.8
Standard Deviation	10.9	8.4
Level of Functional Health Literacy***		
% Adequate	70.4	88.6
% Marginal	14.1	3.6
% Inadequate	15.5	7.9

** $p < 0.01$
*** $p < 0.001$

Table 3: Correlates of Functional Health Literacy

Correlate	Logistic Regression[1]	OLS Regression[2]
Appalachian Background		
Non-Appalachian	(ref)	(ref)
Appalachian	1.50***	-3.85***
Gender		
Male	(ref)	(ref)
Female	-0.79*	2.76***
Age		
18 - 34 years	(ref)	(ref)
35 - 64 years	1.47***	-2.84***
65+ years	3.51***	-10.71***
Native Language		
% English	(ref)	(ref)
% Spanish/Other	2.70***	-11.44***
Race/Ethnicity		
White	(ref)	(ref)
Black/African American	1.50***	-2.88***
Hispanic/Other	0.78	-1.28
Site Location		
Urban	(ref)	(ref)
Suburban	-1.62***	2.83***
Urban Fringe	-1.03	1.76

[1] Logistic regression coefficients or the natural logarithms of the odds ratios
[2] Unstandardized ordinary least squares regression coefficients
* $p < 0.05$
*** $p < 0.001$

Table 4: Coping Mechanisms for Understanding What the Doctor Says

	Appalachian			Non-Appalachian		
	Deficient	Adequate	Total	Deficient	Adequate	Total
Coping Mechanism						
Difficulty Understanding What Doctor Says						
% Almost or Most of the Time	5.0	4.2	4.4	9.5	5.4	5.9
% Only Some of the Time	35.0	20.8	25.0	41.9	31.9	33.1
% Almost None of the Time	60.0	75.0	70.6	48.6	62.8	61.1
% Take Some Action to Understand Doctor	89.5	95.6	93.8	93.1	96.2	95.8
% Action Helps[1]	94.1	100.0	98.4	100.0	99.2	99.3
Action Taken						
% Talk to Nurse/Someone Else at Clinic	45.0	62.0	57.1	52.7	53.7	53.6
% Talk to Someone Else	45.0	44.0	44.3	36.5	39.8	39.4
% Bring Someone Else to Clinic[2]	35.0	26.5	29.0	39.2	18.1	20.7
% Schedule Another Visit[3]	35.0	26.0	28.6	31.9	18.8	20.4
% Ask Doctor to Write Down Statements	30.0	22.0	24.3	33.8	23.7	25.0
% Other	10.0	8.0	8.6	8.1	12.4	11.8
% Go to a Different Clinic	10.0	8.0	8.6	11.0	11.0	11.0

[1] Difference between deficient Appalachian and deficient non-Appalachian significant at $p<0.05$

[2] Difference between deficient and adequate significant at $p<0.001$ for non-Appalachian adults

[3] Difference between deficient and adequate significant at $p<0.01$ for non-Appalachian adults

Table 5: Coping Mechanisms for Remembering What the Doctor Says

	Appalachian			Non-Appalachian		
	Deficient	Adequate	Total	Deficient	Adequate	Total
Coping Mechanism						
Difficulty Remembering What Doctor Says[1,2]						
% Almost or Most of the Time	38.9	6.1	14.9	8.1	4.2	5.2
% Only Some of the Time	27.8	34.7	32.8	48.6	33.0	34.9
% Almost None of the Time	33.3	59.2	52.2	43.2	62.3	59.9
% Take Action to Remember What Doctor Says	66.7	78.7	75.4	74.0	78.4	77.9
% Action Helps[3,4]	91.7	97.3	95.9	100.0	99.5	99.6
Action Taken						
% Tell Someone Else What Doctor Said	60.0	68.0	65.7	66.2	59.6	60.4
% Write Down What Doctor Says	45.0	58.0	54.3	40.8	50.3	49.2
% Call Back Later	55.0	52.0	52.9	62.2	64.8	64.5
% Ask Doctor to Write Down Statements	40.0	22.0	27.1	46.0	35.8	37.1
% Go to a Different Clinic	5.0	6.0	5.7	2.7	3.2	3.2
% Other	0.0	2.0	1.4	6.8	5.9	6.0

[1] Difference between deficient and adequate significant at $p<0.01$ for Appalachian and non-Appalachian adults

[2] Difference between deficient Appalachian and deficient non-Appalachian significant at $p<0.01$

[3] Difference between Appalachian total and non-Appalachian total significant at $p<0.01$

[4] Difference between deficient Appalachian and deficient non-Appalachian significant at $p<0.05$

Table 6: Health Status of Appalachian and Non-Appalachian Adults

	Appalachian		Non-Appalachian	
	Deficient	Adequate	Deficient	Adequate
Health Status Measure				
Perceived Overall Health Status[1]				
% Very Good/Excellent	5.0	38.0	18.7	34.2
% Good	30.0	30.0	34.7	35.9
% Fair/Poor	65.0	32.0	46.7	30.0
Physical Role				
% Accomplish Less Than Would Like[2]	75.0	44.0	52.0	47.3
Emotional Role				
% Accomplish Less Than Would Like[3]	45.0	46.0	49.3	34.8
Depressive Symptoms				
% At Least a Good Bit of the Time	30.0	22.0	22.7	20.1
% Some of the Time	40.0	34.0	28.0	27.9
% Little/None of the Time	30.0	44.0	49.3	52.0

[1] Difference between deficient and adequate significant at $p<0.05$ for Appalachian adults and at $p<0.01$ for non-Appalachian adults

[2] Difference between deficient and adequate significant at $p<0.05$ for Appalachian adults

[3] Difference between deficient and adequate significant at $p<0.05$ for non-Appalachian adults