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Factors Associated with Emergency Department Use among the Rural Elderly

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Abstract

Context—Emergency Department (ED) use among the rural elderly may present a different pattern from the urban elderly, thus requiring different policy initiatives. However, ED use among the rural elderly has seldom been studied and is little understood.

Purpose—To **characterize** factors associated with **having any versus no** ED use among the rural elderly.

Methods—A cross-sectional and observational study of 1736 Medicare beneficiaries age 65 and older who lived in non-metropolitan areas. The data are from the 2002–2005 Medical Expenditure Panel Survey (MEPS). A logistic regression model was estimated that included measures of predisposing characteristics, enabling factors, need variables, and health behavior as suggested by **Anderson's behavioral** model of health service utilization.

Findings—20.8% of the sample had at least one ED visit during one year period. Being widowed, more education, Medicaid enrollment, fair/poor self perceived physical health, **respiratory diseases** and heart disease were associated with higher likelihood of having any ED visits while residing in the Western and Southern U.S. and being enrolled in Medicaid managed care were associated with lower probability of having any ED visits. While Medicaid enrollees who reported excellent, very good, good, or fair physical health were more likely to have at least one ED visit than those not on Medicaid, Medicaid enrollees reporting poor physical health may be less likely to have any ED visits.

Conclusion—Policy makers and hospital administrators should consider these factors when managing the need for emergency care, including developing interventions to provide needed care through alternate means.

Keywords

emergency department; rural; elderly; Medicaid; self-perceived health

The U.S. Census Bureau reported that 35 million individuals **age≥65 years** lived in the US in 2000. It is predicted that this number will double to 70 million by 2030.¹ Emergency departments (EDs) are a critical healthcare access point for the elder adult, **with 16.7**

million visits in 2005.² Compared with younger persons, older adults use **EDs** at a higher rate, their visits have a greater level of urgency, and they have longer stays. **They** are more likely to be admitted **to hospitals** and have repeat ED visits, and they experience higher rates of adverse health outcomes after discharge.^{3,4} Due to the **growth** of the older adult population,⁵ the number of ED visits increased by 20% between 1995 and 2005² **and is** estimated will approach 11.7 million for patients ages 65 to 74 alone by 2013.⁴

In 2000, 55.4 million people (**19.7%** of the population) lived in non-metropolitan areas,⁶ nearly 15% of them aged 65 and older.⁷ Access to healthcare is a critical concern for rural residents.^{8–18} Important determinants of access include less health insurance coverage, increased travel time and distance, and a shortage of healthcare providers, **as compared to urban areas.**^{8,10,13,16,19} Studies have shown that healthcare use is lower for rural elderly.^{16, 20–23}

Few studies describe ED use among the rural elderly.^{24–27} They demonstrate that unique barriers **exist** to obtaining emergency care in rural areas, such as the shortage (**sometimes** because of closure) of rural hospitals. Despite the similarity of the need for emergency care across urban and rural areas, the rural elderly have lower ED use than would be expected.^{24,26,27}

The projected increase in demand for ED services poses a significant challenge to the healthcare system.⁵ However, most ED studies have been conducted in urban areas. Whether a similar situation applies in rural areas is not clear. Discrepancies in ED use patterns between rural and urban areas, as implied by the above mentioned studies,^{24,26–28} indicate that the problems the rural elderly face may be different from those faced by urban elderly. Understanding ED use among rural elderly (e.g., what factors impact their use) will help to inform the development of public policy, hopefully leading to better allocation of health resources. In this study we identify factors associated with having any ED use by community-dwelling rural older adults in comparison to those with no ED use. To our knowledge, no studies have previously systematically investigated this for the U.S. rural elderly.

Methods

Conceptual Model

Andersen's behavioral model²⁹ is the most widely used conceptual model for explaining variation in the use of health services. According to this model, healthcare use is due to predisposing, enabling, and need factors. Predisposing factors include demographic variables (e.g., age, gender), social structure (e.g., ethnicity, education) and health beliefs. Enabling factors include personal/family resources (e.g., health insurance, travel time) and community resources (e.g., census region, community medical care organizations). Need is primarily measured by self-perceived health, professionally evaluated need, and functional limitations. Previous studies outside of emergency medicine have shown that this model accounts for up to 28% of the variation in healthcare use.³⁰

Prior studies have used Andersen's model to explain variations in health services use among elderly adults.^{3,30–32} These studies have found that enabling, predisposing and need factors are all significantly associated with healthcare use, with need appearing to be the most important determinant.

Few studies have attempted to explain ED use with the Andersen model.^{30–32} One study found that attitude toward healthcare, previous healthcare experience, hospital admissions, and number of sources of care were associated with ED visits.³² Another concluded that

there was an association of ED use with poor nutritional status, being widowed, and need factors.³¹ A third study found that age greater than 85 years, living alone, less education, and need were associated with ED use.³⁰

Data Source

Data are from **the** 2002–2005 Household Component of Medical Expenditure Panel Survey (MEPS).³³ MEPS uses a rotating panel design with 2 overlapping cohorts of the U.S. non-institutionalized civilian population combined to produce annual estimates. A new cohort of households is initiated each year and interviewed 5 times to collect 2 calendar years of data. The MEPS household component gathers information on the following from one individual household member on all household members: demographic characteristics, health status, use of medical care services, access to care, satisfaction with care, health insurance coverage, income, and employment.

Study Design

The 2002–2005 MEPS data served as a cross-sectional observational dataset for **this** study. We used logistic regression analysis to identify factors associated with **any** ED use among the rural elderly during a one-year period, **specifically**, the first year each person was participating in MEPS.

Study Eligibility Criteria

We included only those individuals age 65 and over with Medicare coverage who lived in rural areas. Rural was defined as residing in a Non-Metropolitan Statistical Area (NMSA) county, the definition used by **the** U.S. Office of Management and Budget.³⁴

Dependent Variable

The dependent variable in our analyses is a dichotomous measure of whether or not each person had ED use during one year. MEPS **also** has information on frequency of individual ED use in a year. We chose to group those who had one or more ED visits into a single category (**any use or not**) for **2** reasons. First, the mechanisms that drive ED care-seeking and the amount of ED care sought may well be different, and the former must precede the latter. Further, the mechanisms that drive care-seeking may have policy implications independent of those that drive the amount of care. Second, ED use is self reported in MEPS. Prior research validating household reports of healthcare use in MEPS has found substantial accuracy for reporting of any ED use but significant underreporting of total ED visits.³⁵ Because of this measurement error we feel it is not appropriate to examine frequency of ED use.

Independent Variables

Following Andersen's model, we selected the following independent variables and also explored possible interaction effects.

Predisposing characteristics – Age (**65–74, 75–84, and 85+**), gender, race (**white and non-white**), ethnicity (**Hispanic and non-Hispanic**), marital status (**married, widowed, and other**), education (less than high school graduate, high school graduate, more than high school graduate), and living alone (living alone or not). ED use would perhaps be expected to increase with age since there is a greater risk for cardiovascular and other significant health events that represent true emergencies.

Enabling factors -- Usual source of care (USC) (**yes or no**), health insurance, family income (poor [$<100\%$ of the Federal poverty line], near poor [100–124%], low income [125–199%],

middle income [200–399%], and high income [$\geq 400\%$]), and U.S. Census (**Northeast, Midwest, South and West**) region. All of the subjects in the study had Medicare coverage. However, previous studies have shown that additional insurance (e.g., private insurance, Medicaid coverage) is an important determinant of ED use.^{27,36–42} **Thus**, we included variables **to indicate whether each person had** private insurance and whether they were enrolled in Medicaid. It is also reasonable to assume that a managed care plan such as an HMO has an impact on an individual's ED use as has been shown in previous studies.^{43–46}

Need factors – Perceived physical health status **and** perceived mental health status (excellent, very good, good, fair and poor for both), and medical conditions (diabetes, respiratory diseases [asthma and emphysema], high blood pressure, heart diseases [coronary heart disease, angina or angina pectoris, heart attack or myocardial infarction, and any other kind of heart disease], stroke, and joint pain).

In addition, we **included** whether a person had a **medical** checkup in the past year in our model. Studies using the Andersen model have suggested that health behaviors are associated with healthcare use.⁴⁷ A medical checkup in the past year may reduce ED use. Finally, we include year in our model to reflect changes in the Medicare program and other changes over time.

Statistical Analysis

We first employed bivariate analysis to examine the strength of the association between each independent variable and ED use. We used the Chi-square test for the categorical variables and the t test for age (the only continuous variable) to evaluate the differences **between ED use and no ED use**. Variables which had an association of $p < 0.20$ with ED use were then included in **unweighted and weighted** logistic regression analysis. Potentially important interaction terms between independent variables were explored. The goodness-of-fit tests used for the logistic regression model included Pregibon's linktest,⁴⁸ the Hosmer-Lemeshow test,⁴⁹ and the C statistic (area under the receiver area characteristics [ROC] curve).⁵⁰ A significant Pregibon test will mean either that the model does not fit the S-shaped regression line well or that one or more relevant explanatory variables are omitted. The Hosmer-Lemeshow test is a widely used summary goodness-of-fit test for logistic regression that is based on the values of the estimated probabilities. The C statistic measures the model's ability to distinguish between those observations for which the dependent variable is 1 and those for which it is 0.⁴⁹ Robust standard errors were calculated to correct for **potential misspecification**.^{51,52} Chi-square joint tests were used to test for the joint significance of sets of independent variables, e.g., when testing the joint significance of the four U.S. Census Regions. Because the results of the unweighted analysis are very close to those of the weighted analysis, we only report the latter. All analyses were conducted using the statistical software package SAS 9.1.

Results

We identified 1736 people as age 65 years and older, enrolled in Medicare, and residing in rural areas. Of these persons, 361 (20.8%) had at least one ED visit **in the first study year** comprising the study sample. The most frequent 3-digit International Classification of Diseases (ICD-9) diagnoses for ED visits among the rural elderly were diseases of the circulatory system (22.3%), injury and poisoning (19.3%), respiratory system (10.5%), digestive system (9.5%) and musculoskeletal system (7.8%) (Table 1).

Descriptive characteristics

Rural Medicare beneficiaries had a mean age of **74.4 (SD=0.2)** years, **56.4%** were female, **7.2%** were non-white, and **2.1%** were Hispanic. **A total of 30.6%** of the sample reported not having a high school diploma and **41.0%** reported poor, near poor or low income. **Over half, 57.1%**, of the beneficiaries were married and **33.3%** lived alone. **A total of 43.5%** lived in the Southern U.S., **29.0%** in the Midwest, **14.3%** in the West, and **13.2%** in the Northeast (**first column of Table 2**).

Bivariate analysis

The proportion and means of a number of predisposing, enabling, and need factors differed significantly between those individuals with and without at least one ED visit at $p<0.20$ (Table 2 columns 2 through 4).

Multivariate analysis

In the final logistic regression model for factors associated with having at least one ED visit, two predisposing characteristics – widowed and being more than a high school graduate, one enabling factor – being enrolled in Medicaid (but not in Medicaid managed care), and three need variables – fair/poor perceived physical health status, respiratory diseases, and heart diseases -- were significantly associated with greater likelihood of having at least one ED visit. Two enabling factors – enrollment in Medicaid managed care and residing in the Western U.S. – were associated with lower probability of having any ED visits (Table 3).

The interaction between Medicaid **status** and self perceived physical health **status** was also significantly associated with having any ED visits ($p=.016$). For persons reporting excellent, very good, good, and fair physical health, the predicted probability of having any ED visits **was significantly higher** for people on Medicaid **than for those** not on Medicaid (these differences are statistically significant [$p=.003$ for excellent physical health and $p<.001$ for the other 3 categories] and their 95% confidence intervals do not overlap). However, for persons reporting poor physical health, the probability of having any ED visits was lower for persons on Medicaid than for those not on Medicaid but this difference was of borderline statistical significance ($p=.06$) and their confidence intervals overlapped (Table 4). (These findings exclude persons enrolled in Medicaid managed care.)

Discussion

While **research has examined ED use by rural elderly Americans in 3 rural communities, 26 111 counties in one state,²⁵ and 2 states,^{24,27} to our knowledge this is the first study that** has investigated factors associated with ED use exclusively among the community-dwelling (non-institutionalized) rural elderly for the entire United States. We found that being a widow or widower, having more than a high school education, being enrolled in Medicaid (but not Medicaid managed care), having fair or poor self perceived physical health, and reporting **respiratory diseases or heart diseases** increased the likelihood of having any ED visits. Enrollment in Medicaid managed care and residence in the western U.S. were associated with lower probability of having any visits.

We found that about 20% of the community-residing rural elderly had at least one ED visit, which is approximately what Lisher and colleagues found for Medicare beneficiaries in Washington state in 1994.²⁷ The most frequent diagnoses for ED visits in the present study were similar to those found in previous studies: circulatory system diseases, injury, and respiratory system diseases.^{24,27}

We used the Andersen behavioral model for our conceptual framework. Although the model has been widely used, concerns about its utility have been raised.^{29,53} One concern is that the model may work better for some types of health services. However, few studies have attempted to modify it, particularly for ED use.³ Another concern is that the model may have different utility for different populations. Previous studies have found it to be a poor predictor of physician, hospital, and dentist utilization among the elderly with only need characteristics as significant predictors.⁵³ However, we found that not only need factors but also predisposing (marital status and education) and enabling (Medicaid enrollment, Medicaid managed care) factors as well as an interaction between a need and an enabling variable are significant predictors of ED use among the rural elderly.

Marital status as a significant determinant of any ED use is seldom documented in previous work.^{41,53} Only one study⁵³ reports a positive association between being widowed and ED use. There are several possible explanations for **our finding**. It may be because widowed persons have worse health status.⁵⁴ Even though we have controlled for health status **our** variables **may not be sufficient**. **Second**, married people might have access to better information and a superior referral network.⁵⁵ A third reason is the impact of marital status change on healthcare use.⁵⁴ However, we do not have **the detailed** information **necessary** to **determine whether this is the case**.

The literature that has investigated the factors associated with having any ED visits has mixed evidence about the impact of age.³ In most studies, older age has been associated with increased ED use in bivariate analysis. However, in multivariate analysis it is statistically significant in only a few studies.^{3,27,30,56} Our study found a similar pattern. Age is an enabling factor primarily through its relationship to other factors such as health. Controlling for other factors could mitigate the age effect.

Both Medicaid enrollment and **fair/poor** self-rated physical health were found to be independently associated with increased probability of having any ED use, which **is** consistent with previous research.^{27,36,39,41,42} Further, we found an interaction between these two factors. For persons reporting excellent, very good, good, and fair self-rated physical health status, individuals on Medicaid are more likely to have at least one ED visit than those not on Medicaid. Further, while the evidence is not completely consistent, **among** persons reporting poor physical health Medicaid enrollees **may be** less likely to have any ED visits.

It should be noted that elderly Medicaid enrollees are dual eligible beneficiaries, that is, enrolled in both Medicare and Medicaid. Nearly 10% of our MEPS sample are dual eligible compared to 17% reported by Walsh and colleagues using **the** Medicare Current Beneficiary Survey.⁵⁷ The difference may be because we excluded rural elderly living in facilities (mostly nursing homes), who are much more likely to be dual eligible beneficiaries than the community-dwelling elderly.

Dual eligible beneficiaries are a special population known to have **worse** health status, higher healthcare costs, less education, and an increased likelihood of using long term care.⁵⁷ Because they are sicker and older, they are also more likely to have healthcare use. However, Medicaid enrollment was still significantly associated with greater likelihood of ED use after we controlled for other variables including health status. Thus, it appears that there are other pathways through which Medicaid impacts ED use among the rural elderly.

Another of our findings is that enrollment in Medicaid managed care is associated with lower probability of any ED use. This has been found in previous studies.^{45,46} There are several possible reasons that may explain this. First, those enrolled in Medicaid managed care might be healthier.⁵⁸ Second, Medicaid managed care may limit enrollees' health

services use. Access to care has been shown to be worse under for-profit than non-for-profit plans for Medicaid managed care enrollees.⁵⁹ Third, Medicaid managed care may be superior to other health services (e.g. they may focus on providing **continuity of** primary care services to enrollees), thereby keeping people healthier and reducing the likelihood of **ED use**.⁶⁰

Our study found regional variation in rural elderly ED use **after controlling for other variables**. Compared to the Northeast US, the rural elderly in the West and the South had lower probability of having any ED visits. There are several possible reasons for this. First, rural residents in different regions may face different travel distance and time. Previous studies have suggested that **greater** travel distance, more time spent traveling, and more difficulty for rural residents in obtaining transportation in order to receive medical care present geographic access barriers to healthcare in rural areas.^{8,10,13,16} Second, the geographic variation in ED use may be explained by variation in healthcare resources across different regions. Previous studies have found that in the South and West the supply of physicians and medical education capacity have not kept up with the **population** increase.^{61,62} An insufficient supply of physicians presents an access barrier and may result in worse health outcomes, thus increasing ED use. Another reason for the regional **variation in ED use** may be variation in access and quality of other healthcare services. For example, better primary care may lead to better health outcomes, thus lowering the likelihood of requiring any ED visits. However, this explanation seems implausible because of evidence in the literature of less supply of physicians and lower quality of care in the West and South.^{61–63} It should follow from this that people in the West and South should have higher ED use, which contradicts our finding.

Several of our findings are inconsistent with previous studies. **First**, we found that **more** education was associated with higher likelihood of having any ED visits. **This** contradicts other studies.^{30,40,64–66} **Second**, we failed to find a significant association between **continuity of care** (as measured by having a usual source of care) and having any ED visits, as other studies did.^{37,38,41,67} But those studies were mostly conducted with urban populations. The rural elderly may behave differently. For instance, one explanation for the association between education and having any ED visits might be that more highly educated people are more conscious about health, and tend to seek healthcare more often when they feel sick,^{68–76} but because of the lack of primary care physicians in rural areas they may have to go to an ED for their “regular” healthcare. The failure to find an association between continuity of care and ED use may have occurred because the only measure of continuity of care we included was whether a person had a USC. Such a measure is likely to miss other critical information, such as how often and how effectively individuals use their usual source of care, which has been carefully examined in other studies.^{37,38,41,67} Unfortunately, MEPS does not provide such information.

How do our results compare to those of the only previous study of an exclusively rural sample that included whether or not there was any ED use as the dependent variable in a logistic regression model? Neither **our not the West Texas** study²⁵ found age or gender to be statistically significant. **However**, the West Texas study found better physical and mental health as measured by the SF-12 Physical and Mental Component Summary scores to be associated with less likelihood of having any ED visits. While our study did not include the SF-12, we did find a significant association for self perceived physical, but not mental, health, with people reporting better physical health having lower likelihood of at least one ED visit.

There are several limitations to our study. First, we did not include several factors that **we would expect to** influence whether people had any ED visits. For example, we did not

include any “supply side” information (for **instance**, for a geographic area, the number of hospitals with an ED and the numbers of physicians per thousand persons). **Another** important consideration **for rural residents** is geographic distance and transportation. We did not include variables for them because of lack of information on distance, too many missing values for travel time to usual source of care, and lack of variance in transportation (e.g. the majority of people drive or are driven). Second, measurement error may be an issue. As MEPS interviews a single informant who reports for each household during each survey round, accuracy about household reported medical conditions and healthcare use may be of concern.³⁵⁻⁷⁷ In particular, the accuracy of this approach is questionable as it relates to specific individuals when a single informant reports on the mental health status of all members in each household. Third, our dependent variable, having any ED use (yes or no), is dichotomous. For a continuous dependent variable, frequent ED users might differ from non-frequent users. Fourth, there are different kinds of rurality. Some rural areas are more populous than others while some are more remote from urban areas. Previous studies have found that the elderly in remote rural areas are less likely than those in urban areas to have an ED visit while rural areas adjacent to a city are more likely to have an ED visit than those in urban areas.²⁷⁻³⁸ Thus, types of rurality may be important in determining ED use patterns. However, we could not differentiate between different kinds of rurality in the public use MEPS dataset. Fifth, the 43.5% of the study sample that resided in the Southern Census Region is 22% higher than the 35.6% for the entire US population for the 2000 Census (100 million of 281 million) and 20% higher than the 36.4% for 2006 (109 million of 299 million). We expect that this difference is due to the higher proportion of people in the Southern US than the other 3 Census Regions that reside in rural areas. Further, we do not expect that this higher proportion will distort our results. Finally, some may consider that we did not adequately control for Type I error as we tested **24** hypotheses, **which has an expected 1.25 false rejections**.⁷⁸ But in a study such as ours that examines an issue for the first time, we felt it better to use the traditional **significance level** of 0.05 **for each test** as we would rather falsely accept a hypothesis than identify a significant factor as non-significant. Identification as non-significant in initial research could lead to important variables being excluded from future research.

In conclusion, for the rural elderly widowhood, **post-high school** education, Medicaid enrollment, fair/poor self perceived physical health, **respiratory diseases**, and heart disease were associated with higher probability of having any ED visits while living in the South and West and being enrolled in Medicaid managed care were associated with lower probability of any ED use. While Medicaid enrollees reporting other than poor physical health are more likely to have at least one ED visit than those not on Medicaid, persons **on Medicaid** reporting poor physical health may be less likely to have any ED visits. Policy makers and hospital administrators should consider these factors when **addressing** the demand for emergency care, including developing interventions to provide needed care through alternate means.

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Figure 1.
Predicted Probability of Having Any Emergency Department Visits by Medicaid Status and Self Perceived Physical Health Status

Table 1

Diagnoses for Emergency Department Use among the Rural Elderly

Disease	Number	National Population Estimate *	Percent *
Circulatory system	102	1,062,914	22.3%
Injury and poisoning	108	920,939	19.3%
Respiratory system	70	502,175	10.5%
Digestive system	47	455,989	9.5%
Musculoskeletal system	44	370,522	7.8%
Genitourinary system	26	221,722	4.6%
Infectious	18	154,565	3.2%
Endocrine	25	146,700	3.1%
Nervous system	15	122,053	2.6%
Mental disorder	9	81,112	1.7%
Neoplasm	8	75,899	1.6%
Skin	7	41,084	0.9%
Congenital anomalies	2	12,650	0.3%
Blood	2	12,228	0.3%

* National estimation and percentage are based on the weights MEPS provides.

Table 2

Sample Characteristics (Weighted)

	Percent of Total (N=1736)	Percent with At Least 1 Emergency Department Visit (N=361)	Percent with No Emergency Department Visits (N=1375)	P Value (χ^2 Test/t Statistic)
PREDISPOSING FACTORS				
Age (mean) (SD)	74.4 (0.2)	75.7 (0.4)	74.1 (0.2)	<0.001
Age (category)				0.018
65–74	53.5	44.8	55.6	
75–84	35.9	41.6	34.5	
85 and older	10.6	13.6	9.8	
Gender				0.370
Male	43.6	41.4	44.1	
Female	56.4	58.6	55.9	
Marital Status				0.002
Married	57.1	50.8	58.7	
Widowed	31.4	40.1	29.2	
Other	11.5	9.1	12.1	
Race				0.875
Non-White	7.2	7.0	7.2	
White	92.8	93.0	92.8	
Ethnicity				0.875
Non-Hispanic	97.9	98.0	97.9	
Hispanic	2.1	2.0	2.1	
Education				0.002
Below High School	30.6	36.5	29.1	
High School	50.8	42.5	52.8	
Above High School	18.6	20.9	18.1	
Living Arrangement				0.172
Alone	33.3	36.5	32.6	
Not Alone	66.7	63.5	67.4	
ENABLING FACTORS				
Family Income				0.061
Poor	10.0	12.6	9.3	
Near poor	8.9	9.2	8.8	
Low income	22.1	26.8	20.9	
Middle income	31.6	28.7	32.3	
High income	27.5	22.7	28.7	
Private Health Insurance				0.036
Yes	56.0	50.1	57.5	
No	44.0	49.9	42.5	
Medicaid				<0.001
Yes	9.8	17.4	7.9	

	Percent of Total (N=1736)	Percent with At Least 1 Emergency Department Visit (N=361)	Percent with No Emergency Department Visits (N=1375)	P Value (χ^2 Test/t Statistic)
No	90.2	82.6	92.1	
Medicaid Managed Care				0.618
Yes	2.1	1.7	2.2	
No	97.4	97.9	97.2	
Usual Source of Care				0.692
Yes	91.8	92.3	91.7	
No	7.8	7.1	8.0	
U.S. Geographic Region				0.027
Northeast	13.2	15.5	12.6	
Midwest	29.0	32.7	28.1	
South	43.5	42.3	43.8	
West	14.3	9.5	15.5	
NEED FACTORS				
Self Perceived Physical Health Status				<0.001
Excellent	14.3	10.6	15.3	
Very good	27.4	15.2	30.4	
Good	30.8	25.3	32.2	
Fair	18.5	25.9	16.6	
Poor	7.8	19.0	5.0	
Self Perceived Mental Health Status				<0.001
Excellent	26.3	21.8	27.4	
Very good	29.3	21.5	31.3	
Good	32.2	35.9	31.3	
Fair	7.9	11.5	7.0	
Poor	3.0	5.5	2.3	
Diabetes				0.078
Yes	17.6	20.8	16.8	
No	81.1	75.2	82.6	
Respiratory Diseases				<0.001
Yes	12.8	19.2	11.2	
No	85.8	76.9	88.0	
High Blood Pressure				0.004
Yes	60.7	66.2	59.3	
No	37.8	29.4	39.9	
Heart Diseases				<0.001
Yes	30.3	45.2	26.6	
No	68.0	50.5	72.4	
Stroke				0.005
Yes	10.9	15.0	9.8	
No	87.5	80.7	89.2	

	Percent of Total (N=1736)	Percent with At Least 1 Emergency Department Visit (N=361)	Percent with No Emergency Department Visits (N=1375)	P Value (χ^2 Test/t Statistic)
Joint Pain				0.013
Yes	58.5	64.0	57.2	
No	40.0	31.8	42.1	
HEALTH BEHAVIOR				
Preventive Services (Medical Checkup in Last Year)				0.199
Yes	77.5	79.1	77.1	
No	19.7	15.5	20.8	

Table 3
Probability of Having Any Emergency Department Visits Logistic Regression Model Results

Variable	Coefficient	Standard Error	P Value*	Odds Ratio	95% Odds Ratio Confidence Interval
Marital Status			0.005		
Married					
Widowed	0.559	0.222	0.012	1.75	1.13–2.70
Other	–0.106	0.290	0.714	0.899	0.51–1.59
Education			<0.001		
Below High School	0.113	0.162	0.486		0.82–1.54
High School					
Above High School	0.693	0.177	<0.001	2.000	1.41–2.83
Medicaid	2.142	0.472	<0.001		
Medicaid Managed Care	–1.518	0.503	0.003	0.219	0.08–0.59
Region			0.001		
Northeast					
Midwest	0.048	0.185	0.796	1.049	0.73–1.51
South	–0.356	0.212	0.092	0.700	0.46–1.06
West	–0.704	0.230	0.002	0.495	0.32–0.78
Self-perceived Physical Health			<0.001		
Excellent					
Very good	–0.476	0.329	0.148		
Good	–0.037	0.297	0.900		
Fair	0.641	0.303	0.034		
Poor	1.634	0.340	<0.001		
Asthma / Emphysema	0.404	0.174	0.020	1.497	1.07–2.10
Heart Disease	0.603	0.150	<0.001	1.828	1.36–2.46
Medicaid*Self Perceived Physical Health			0.016		
Medicaid*Excellent					
Medicaid*Very Good	–0.875	0.688	0.203		
Medicaid*Good	–0.894	0.507	0.078		
Medicaid*Fair	–1.400	0.597	0.019		

Variable	Coefficient	Standard Error	P Value *	Odds Ratio	95% Odds Ratio Confidence Interval
Medicaid *Poor	-2.111	0.614	0.001		

Note: This analysis is weighted.

*Where p values are by themselves the p value indicates the significance of a joint test. For example, the p value of 0.005 for marital status is for the joint significance of married, widowed, and other.

Table 4

Predicted Probability of Having Any Emergency Department Visits by Medicaid Status and Self Perceived Physical Health Status

Self Perceived Physical Health Status	Medicaid (95% Confidence Interval)		t-test	
	No	Yes	t	P Value
Excellent	0.14 (0.13, 0.15)	0.33 (0.22, 0.44)	-3.79	0.003
Very good	0.10 (0.09, 0.11)	0.26 (0.22, 0.31)	-6.96	<0.001
Good	0.15 (0.15, 0.16)	0.30 (0.26, 0.34)	-7.43	<0.001
Fair	0.27 (0.25, 0.28)	0.35 (0.32, 0.39)	-4.31	<0.001
Poor	0.48 (0.45, 0.50)	0.42 (0.36, 0.47)	1.91	0.060