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Who Receives Outpatient Monitoring During High-Risk Depression Treatment Periods?

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Abstract

Background—VA patients in depression treatment have higher suicide rates in the 12 weeks following psychiatric hospitalization and following new antidepressant starts. Risks are highest following inpatient hospitalization.

Objectives—Patients should receive close outpatient monitoring during high risk periods for suicide. Using the VA National Depression Registry, we examined the intensity of monitoring received by important patient subgroups during high-risk periods.

Design & Measurements—Analyses examined the relationship between the number of outpatient visits for each group and patient characteristics in the twelve-week period following psychiatric hospitalizations and antidepressant starts.

Setting & Participants—VA patients in depression treatment between April 1, 1999-September 30, 2004 who had psychiatric inpatient stays (N=73,137) or new antidepressant starts (N=421,536).

Results—The characteristic associated with significantly lower rates of monitoring for both high-risk treatment periods was age over 65. White race and living in the South or Northeast were also associated with significantly lower rates of monitoring following new antidepressant starts and inpatient stays, respectively. Substance abuse disorders increased monitoring following both types of depression events but did not seem to interact with other patient characteristics in determining levels of monitoring.

Conclusion—VA patients who are older, white, and living in the South or Northeast receive less intensive monitoring during high-risk treatment periods for suicide. This is of concern, given that older patients appear to be at higher risk for suicide, particularly following inpatient stays, and may need particular attention in this time frame. Adapted interventions and proactive outreach may be needed that target this patient group.

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Keywords

Disparities; mental health; disease management

INTRODUCTION

In 2003, the Food and Drug Administration (FDA) warned clinicians that antidepressants might increase suicidality in children and adolescents, and recommended close monitoring of patients newly started on these medications for symptoms of suicidal ideation. While not proven to reduce suicides, the close monitoring of patients during high-risk periods is considered an important element of many clinical prevention efforts.1 Guidelines vary tremendously in terms of the frequency and timing of follow-up visits for patients beginning antidepressants. The most commonly used set of measures was developed by the National Committee for Quality Assurance (NCQA) for improving depression treatment efficacy. In the NCQA Health Employer Data and Information Set (HEDIS), "optimal provider contact" is defined as a minimum of three follow-up visits for mental healthcare in the 12 weeks following a new antidepressant start. 2,3 The FDA has made a number of monitoring recommendations for periods following antidepressant starts, with the most stringent recommendation being 7 visits in 12 weeks for children and adolescents.4 One FDA advisory suggested that adults should be monitored similarly.5

Prior studies have consistently documented far less monitoring than either the FDA or NCQA recommendations. A 2006 study noted that only 23% of patients received the FDA-recommended level of care at 12 weeks.2 Another study6 found that the visit frequency of patients with new episodes of depression treated with antidepressants did not change following the 2003 FDA advisory, with only about 40% of adults meeting HEDIS criteria at 12 weeks.

With limited resources, health systems may need to prioritize the "when" and the "who" of clinical monitoring efforts. In terms of the "when", research and clinical monitoring efforts have typically focused on the 12-week period following new antidepressant starts. However given finite resources, there are few data on which treatment periods should be considered highest risk and, therefore prioritized for prevention efforts. In a prior study, we established that VA patients in depression treatment have higher suicide rates during two readily identifiable treatment periods: the 12 weeks following 1) psychiatric hospitalization and 2) new antidepressant starts.7 Risks were highest following inpatient hospitalization where suicide rates were 568/100,000 person years (approximately 5 times the overall base rate). After new antidepressant starts, suicide rates were 210 per 100,000 person years. Smaller elevations in the suicide rate were found in the 12-week periods after other antidepressant starts (e.g. switches) or dose changes.

There is even more limited information on "who" should or does receive the closest monitoring. Prior studies have noted that certain patient populations may be at higher risk for inadequate depression care (e.g. antidepressant dosage and duration adequacy) including younger age, African-American race, and exclusive primary care treatment.8 In our prior study5, older patients had the same patterns in terms of periods of risk as in the overall sample. In addition, in other analyses performed in that study, older patients had significantly higher absolute rates than younger patients in the periods following psychiatric hospitalization; here, older adults aged 61-70 had a suicide rate per 100,000 person-years of 1234.8 vs. a rate of 673.5 for veterans 30 or under. However to our knowledge, there are few data on which patient subgroups receive more intensive monitoring during high-risk periods for suicide. Given the advisability of close outpatient monitoring during these high-risk

periods, we examined whether certain patient characteristics (age, race, gender, marital status, living region and comorbidities) were associated with disparities in monitoring. We used a unique longitudinal VA dataset with comprehensive diagnosis, utilization and pharmacy data to examine rates of clinical monitoring during the two highest risk treatment periods (12 weeks after inpatient stay and after new antidepressant start) in a comprehensive sample of VA patients in depression treatment between April 1, 1999-September 30, 2004.

METHODS

Data for this study were obtained from the VA's National Registry for Depression (NARDEP) which was developed by the VA's Serious Mental Illness Treatment Research and Evaluation Center (SMITREC) in Ann Arbor, Michigan. This study was approved by the Institutional Review Board of the Veterans Affairs Ann Arbor Health System.

Study Population

The study population consisted of patients in NARDEP between April 1, 1999-September 30, 2004. Entry into the study required either two depression diagnoses or a diagnosis of depression and an antidepressant fill. Depression diagnoses were identified using the ICD-9 codes: 296.2x, 296.3x, 296.90, 296.99, 298.0, 300.4, 311, 293.83, 301.12, 309.0, or 309.1. Patients with diagnoses of bipolar I or II, schizophrenia, or schizoaffective disorder during the study period were excluded. Patients were also excluded if they had unknown or missing race, were <18 years old, or had a missing value for 'region'.

Treatment Events and High-Risk Cohorts

Because monitoring may be inherently different during the high-risk period after a psychiatric hospitalization vs. after a new antidepressant start, we constructed two separate cohorts based on the presence of these treatment events. The *inpatient cohort* was comprised of patients who had a psychiatric inpatient hospitalization, and observation days started from the discharge date. The *new start cohort* was comprised of patients who had a new antidepressant start.

Psychiatric hospitalizations were defined as hospitalizations with a primary psychiatric discharge diagnosis of ICD-9 codes 290.x – 319.x or hospitalizations with bed section codes of 33, 38, 39, 70, 71, 72, 73, 74, 79, 84, 89, 90, 91, 92, 93 or 94. A *new antidepressant start* was defined as an antidepressant medication fill within the VA system that occurred after a "clean period" of ≥ 6 months without any antidepressant fills. As in prior studies, we considered trazodone, mirtazapine, amitriptyline, and nortriptyline to have been used as antidepressants rather than for other purposes only if the doses were ≥ 300 mg/day, ≥ 15 mg/day, ≥ 75 mg/day, or ≥ 25 mg, respectively.9

Observation Days for the 84-day High Risk Periods

Observation-days for study analyses began on the date of patients' first new antidepressant treatment for the *new start cohort*, and on the day of discharge from the first psychiatric hospitalization for the *inpatient cohort* and continued for the next 84 days. Patients were excluded (36,928 patients from the new start cohort and 21,268 from the inpatient cohort) if they had less than 84 days (12 weeks) of observation following the treatment event due to death (as indicated in the National Death Index) or the end of the study period (September 30, 2004). For each patient, only the first qualifying treatment event followed by at least 84 high-risk days was considered. Any non-psychiatric or psychiatric inpatient hospitalization days that occurred during the high-risk period of 84 days were excluded from the number of high-risk days because only outpatient monitoring visits were of interest. Also, any days following a psychiatric hospitalization that occurred during the high-risk period were

excluded from the number of high-risk days because post-psychiatric hospitalization days would indicate potential changes in risks. These meant that high-risk days were less than 84 days for those with any hospitalization within the 84 days following the index new AD start for the new start cohort or following the initial discharge date for the inpatient cohort.

Monitoring

We defined monitoring visits using the VA-modified HEDIS criteria. A HEDIS visit is an outpatient visit that has a psychiatric Current Procedural Terminology (CPT) code or visits that have a mental health diagnosis with a non-psychiatric CPT code. All monitoring visits occurring during high-risk days, i.e., the 12 weeks following an inpatient hospitalization or new antidepressant start, were identified. On any given day, only one monitoring visit was counted even if more than one visit was made.

Patient Characteristics

Patients were categorized into three age groups of 18-44, 45-64, and ≥65 years based on their age at the beginning of cohort entry. Each patient was classified into one of three racial categories (African American, White, or Other), and patients' ethnicity was defined as Hispanic or Non-Hispanic. Having a psychiatric comorbidity was defined having at least one diagnosis of post-traumatic stress disorder, personality disorder, or anxiety disorder during the time period from 12 months prior to cohort entry through the end of the study period. Similarly, a substance abuse comorbidity was defined as having at least one diagnosis of alcohol or other substance use in the same time frame. Having a medical comorbidity was defined as having at least one of the 20 Charlson medical comorbidities10 during the 12 months prior to cohort entry.

Data Analyses

Descriptive statistics were computed for patient characteristics, using frequencies or means as appropriate. Analyses examining the relationships between the rate of monitoring during high-risk treatment periods and patient characteristics were completed separately for the two cohorts. Distribution of the number of visits during high-risk periods was examined graphically, and the rate of monitoring per 84 high-risk days was calculated as 84*[total number of visits/total high-risk days] and reported as a summary measure. To assess the relationship between level of monitoring and patient characteristics, we used both multiple regression models and negative binomial models. Negative binomial models were needed because the distribution of number of visits was skewed, with the majority of patients having just 0, 1, or 2 visits during high-risk periods, but with some patients having many more visits. In the model, total number of visits was capped at 20; i.e, patients > 20 visits were categorized as having 20 visits. The model also allowed us to adjust for the total number of high-risk days, which were less than 84 days for those with a hospitalization within the 84 days following discharge from the index psychiatric hospitalization or following the new antidepressant start. The coefficients from a negative binomial model were exponentiated to reflect relative risks. For example, a coefficient of 0.5 for females would correspond to an increase in monitoring visits of about 65% (= exp(0.5)) in females relative to males when other variables are held constant. All analyses were performed using SAS version 9.2.11

In either cohort, patients who had at least one subsequent hospitalization during the 84-day high-risk period after entry into the cohort may have been monitored more intensively even before the hospitalization. In addition, a varying number of high-risk days across patients might bias the estimation of the strength of the relationship even with the use of a model adjusting for exposure. Therefore, we repeated the analyses after excluding patients who had ≥1 hospitalization within the high-risk period to see if the results in the subsample with the full 84 high-risk days differed from those of the main analyses.

Analyses were also done: 1) after stratifying by substance abuse status and by each of the three age groups of 18-44, 45-64, and ≥65 years old; and 2) using location of index antidepressant start (primary care vs. mental health). The latter was determined based upon the clinic visit that directly preceded the antidepressant fill.

RESULTS

Patient Sample

The characteristics of patients undergoing VA depression treatment during the study period (N = 798,217) are outlined in Table 1. The study sample was comprised of patients who had psychiatric inpatient stays (N = 73,137) or new antidepressant starts (N = 421,536). These groups had a mean (SD) age of 52.2 (12.6) years for the inpatient cohort and 59.6 (14.4) years for the new start cohort, and were predominantly male (95% and 92%, respectively). A higher percentage of inpatients were African American, younger, unmarried, and had substance abuse and psychiatric comorbidity.

Monitoring Following Psychiatric Inpatient Stays

The number of visits following a psychiatric inpatient stay was highly skewed. Approximately four percent of patients had > 20 visits during the high-risk period; however, the median number of visits during this 84-day period was 2. The mean visit rate during the high-risk period was 4.56 visits (95% CI = 4.55, 4.58), a rate that differed significantly by patient characteristics (Table 2).

The patient characteristic associated with significantly lower rates of monitoring for the post-inpatient period was age ≥65 (RR = 0.71, 95% CI=0.69, 0.74, relative to age <45). Substance abuse disorders (RR = 1.49, 95% CI=1.45, 1.52) and having a psychiatric comorbidity (RR=1.57, 95% CI=1.54, 1.61) were associated with increased monitoring rates following psychiatric hospitalizations. Monitoring visits varied greatly by region with those living in the South (RR = 0.77, 95% CI=0.75, 0.79) and Northeast (RR = 0.80, 95% CI=0.78, 0.82) being monitored significantly less than the Midwest (reference) region.

Monitoring Following New Antidepressant Starts

The number of visits following new antidepressant starts was also highly skewed with 0.46% having at least 20 visits; however, the median number of visits was 1. The mean monitoring visit rate was 2.03 per 84 days (95% CI = 2.02, 2.04) in the new start cohort. Examining the new start cohort, we found that 23.9% of patients met the suggested NCQA recommendations for 3 or more visits during the 84-day period. Only 4.7% of patients met the FDA monitoring recommendation of 7 or more visits. Characteristics associated with significantly lower rates of monitoring included age ≥65 (RR = 0.75, 95% CI=0.74, 0.76) and white race (RR = 0.83, 95% CI=0.82, 0.84). Substance abuse disorders (RR = 1.53, 95% CI=1.52, 1.55) and having a psychiatric comorbidity (RR = 1.55, 95% CI=1.54, 1.56) were associated with increased rates of monitoring. Monitoring did not vary significantly by region as in the inpatient cohort.

Sensitivity Analyses

When the analyses were repeated after excluding those who had at least one subsequent hospitalization within the 84-day high risk period, the relationships between patient characteristics and rate of monitoring remained nearly identical as in the main analyses. Of note, a surprisingly large 20.5% (N = 15,008) of inpatient cohort had a subsequent re-hospitalization during the high-risk period. On the other hand, only 4.4% (N = 18,383) of new start cohort had a hospitalization during the high-risk period.

To explore if some of the monitoring patterns seen with regard to gender and race differed with age and substance abuse comorbidities, analyses were also done after stratifying by substance abuse status and by each of the three age groups (18-44, 45-64, and ≥65 years). In these analyses, characteristics associated with lower rates of monitoring were similar to the overall analyses.

We also performed analyses using location of the index antidepressant start (mental health or MH; primary care or PC) controlling for covariates including substance abuse and psychiatric comorbidity as well as demographic characteristics. Here we found that overall, MH pts were more likely to be monitored than PC pts in all three age groups with an RR of MH versus PC of 1.68 ($p=<.0001$) for age< 45, 1.88 ($p<0.001$) for age 45 to 65, and 1.74 ($p<0.001$) for age>65. We also found that the age effects for older patients seen in the main analyses held regardless of location of the index visit. Specifically, older (age>65) patients were less likely to be monitored than younger (age<45) patients with a RR of 0.86 ($p<0.001$) when the index start was in PC, and 0.90 ($p<0.001$) when the index start was in MH.

DISCUSSION

We used a unique longitudinal VA dataset with comprehensive diagnosis, utilization and pharmacy data to examine rates of clinical monitoring during the two highest-risk treatment periods (12 weeks after inpatient stay and after new antidepressant start) in a comprehensive sample of VA patients in depression treatment. Characteristics associated with significantly lower rates of monitoring include older age, white race, and living in the South or Northeast. Of concern, older age has been associated with higher risks of suicide following psychiatric hospitalization.5

The results indicating significantly less depression monitoring for older patients are troubling, but perhaps not surprising. In terms of new antidepressant starts, most older adults with depression are identified by their primary care physicians and treated as part of their overall medical care.12 Multiple prior studies in the 1990's indicated that depression was underdiagnosed and undertreated in the elderly.13,14,15 Although there is ample evidence that antidepressant therapy can effectively ameliorate symptoms of later-life depression16,17,18, a number of factors or confounds create complexity in its overall management.19 Patient factors, such as medical illness and neuropsychiatric comorbidity, may interact with provider factors to make treatment more complex. Even among the inpatient cohort in our study, most of whom would be expected to have psychiatric outpatient followup after hospitalization, the rates of monitoring were significantly lower than in younger adult patients. Factors such as comorbidity and functional impairment as well as provider scheduling decisions, patient preferences, and transportation issues may have played a role in preventing older patients from returning to clinic as often as their younger counterparts.

Although the FDA meta-analysis did **not** show increased risks when older adults were randomized to an antidepressant rather than a placebo, the monitoring recommendation did not appear to be amended for older adults (e.g. no new recommendation was made by the FDA regarding a lower visit frequency for this population). However, providers may have noted the FDA meta-analysis results and not felt as much need to follow older adults as closely. This would perhaps stem from concern over the risks of suicide ensuing from depression medication itself rather than absolute suicide rates. In prior work5, we found that in clinical settings, these periods are very high risk for older adults, likely because of illness severity which prompted the medication initiation or change rather than a medication effect per se.

During the period of this study, the VA had mandated depression screening on an annual basis. In its depression guidelines, it recommended regular follow-up for new depression episodes. It also emphasized following HEDIS guidelines for follow-up after psychiatric hospitalization, documenting outpatient visits in the first 7 days after discharge and in the first month after discharge. Aside from mandated annual screening, the guideline recommendations and follow-up recommendations were similar to those used by other health systems—although they may have been more rigorously monitored and emphasized in the VA. More recently (after this study period), the work outlined in our prior study5 was widely disseminated in VA settings.

Subsequently, more intensive monitoring has been implemented for post-hospitalization periods, likely due in part to the documentation of high suicide risks during this period.

Given our results demonstrating that the elderly receive less intensive monitoring during high-risk periods, these patients may require adapted interventions to get the depression care follow-up that they require. The VA has recently initiated home-based primary care programs for medically ill and older veterans. Routinely including depression care as part of these programs could enhance monitoring efforts for patients that may find it difficult to return to clinic for more frequent outpatient visits. Health systems serving large numbers of elderly patients may need to consider guidelines and followup measures specific to older adults during high-risk treatment periods.

Somewhat less expected were the results for African-American patients indicating that they had significantly more monitoring visits than white patients following new antidepressant starts. These findings could not be explained by increased care due to substance use comorbidities in the exploratory analyses stratified by substance abuse diagnosis. Prior studies have shown that minorities have significantly lower rates of mood disorder diagnoses20, may be less likely to receive guideline-concordant antidepressant treatment21 or to fill prescriptions for antidepressant medications than whites22, and may prefer counseling to medications.23 However, the results of the present study are similar to an earlier analysis where we found no racial differences in healthcare utilization for mood disorders in older patients diagnosed with depression in the VA system.24 Additionally, other studies have found that African Americans were actually more likely than whites to receive an adequate course of psychotherapy in VA25 settings. Our findings support the idea that the VA may be doing a good job reaching out to racial minority patient groups who have been traditionally underserved with depression care.

Limitations

In this paper, we report significantly lower monitoring rates for older than for younger patients during high risk treatment periods (e.g, after antidepressant starts and post-hospitalization); we have previously reported *higher suicide rates* among older than younger patients in this cohort during the post-hospital period. However, in this paper, we did not use our observational data to directly assess the relationship between lower rates of monitoring and suicide risks among elders. To do so would require highly complex analyses, given the small number of completed suicides (suicide is a low base rate event) and salient issues of treatment selection in clinical settings. In clinical settings, treatments are not assigned at random, and patients with more severe mental health issues often have more frequent visits and are more likely to commit suicide, resulting in potentially spurious associations between high monitoring rates and suicide. Thus, we note, that even though the mental health literature, governmental organizations, and clinical practice guidelines routinely suggest higher levels of monitoring for higher risk populations, it may be that increased monitoring would not result in reduction in suicide risks among older patients.

The study has a number of other limitations. Consistent with the demographic characteristics of the VA patient population, the study cohort was primarily male and thus, the results may not be generalizable to other clinical populations. Additionally, we relied upon antidepressant fills and hospitalizations within the VA to characterize high-risk periods. Some patients may have used mental health services outside of the VA system. However, prior reports indicate that only a minority of VA mental health users receive care in other health systems.26 27 Older adults, in particular, may often exclusively use the VA because of generous drug benefits. It is also possible, given the VA's monitoring efforts, that depressed older patients during the time of the study may have actually been followed somewhat more closely in VA than in other settings.

CONCLUSIONS

Characteristics associated with significantly lower rates of monitoring in two different high-risk periods for patients in depression treatment include older age, white race, and living in the South or Northeast. The elderly may be more in jeopardy for inadequate monitoring during high-risk periods; these patients may require adapted interventions to get the depression care follow-up that they require. Health systems serving large numbers of elderly patients may need to consider additional guidelines and followup measures specific to older adults during high-risk treatment periods. In addition, further studies are needed to better understand why followup rates, particularly after hospitalization are lower for older adults.

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Table 1

Characteristics of Patients

Patient Characteristic	Entire Cohort N=798,217	Inpatient Stay Cohort N=73,137	New Start Cohort N=421,536
Gender			
Female	59,080 (7.4)	3,831 (5.2)	33,155 (7.9)
Male	739,137 (92.6)	69,306 (94.8)	388,381 (92.1)
Race			
African American	108,612 (13.6)	18,178 (24.9)	55,614 (13.2)
White	671,008 (84.1)	53,094 (72.6)	356,031 (84.5)
Other	18,597 (2.3)	1,865 (2.6)	9,891 (2.4)
Hispanic			
No	759,663 (95.2)	69,393 (94.9)	399,815 (94.9)
Yes	38,554 (4.8)	3,744 (5.1)	21,721 (5.2)
Age			
18-44 years old	114,073 (14.3)	19,161 (26.2)	63,093 (15.0)
45-64 years old	387,218 (48.5)	42,960 (58.7)	199,515 (47.3)
>=65 years old	296,926 (37.2)	11,016 (15.1)	158,928 (37.7)
Marital Status			
Married	437,768 (54.8)	25,999 (35.5)	233,945 (55.5)
Not Married	356,885 (44.7)	47,025 (64.3)	185,801 (44.1)
Any substance abuse*			
No	620,569 (77.7)	24,841 (34.0)	335,435 (79.6)
Yes	177,648 (22.3)	48,296 (66.0)	86,101 (20.4)
Comorbid Psychiatric Diagnosis†			
No	451,906 (56.6)	29,923 (40.9)	249,046 (59.1)
Yes	346,312 (43.4)	43,214 (59.1)	172,490 (40.9)
Charlson Medical Comorbidity			
0	476,676 (59.7)	47,468 (64.9)	268,731 (63.8)
>=1	321,541 (40.3)	25,669 (35.1)	152,805 (36.3)
Region (location on entry into cohort)			
North East	161,781 (20.3)	15,793 (21.6)	81,768 (19.4)
Central	179,746 (22.5)	17,852 (24.4)	94,601 (22.4)
South	302,843 (37.9)	25,257 (34.5)	164,382 (39.0)
West	153,847 (19.3)	14,235 (19.5)	80,785 (19.2)

Cell values are N (%).

*Diagnosis of alcohol or other substance abuse 12 months prior to entry through end of study period

†Diagnosis of PTSD, Personality Disorder or Other Anxiety Disorder 12 months prior to entry through end of study period

Table 2

Relative risk[a] estimates from negative binomial regression models

	Inpatient Cohort				New Start Cohort			
	All Patients N = 73,137		Full 84 days* N = 58,129		All Patients N = 421,536		Full 84 days* N = 403,153	
Variables	**RR**	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**	**RR**	**95% CI**
Age 45-64†	1.08	(1.05, 1.10)	1.12	(1.09, 1.15)	0.95	(0.94, 0.95)	0.95	(0.95, 0.96)
Age ≥ 65†	0.71	(0.69, 0.74)	0.75	(0.72, 0.78)	0.75	(0.74, 0.76)	0.75	(0.74, 0.76)
White‡	0.93	(0.90, 0.95)	0.92	(0.90, 0.94)	0.83	(0.82, 0.84)	0.84	(0.83, 0.84)
Other‡	0.91	(0.85, 0.97)	0.94	(0.88, 1.01)	0.94	(0.92, 0.95)	0.95	(0.93, 0.97)
Hispanic	1.08,	(1.03, 1.13)	1.09	(1.04, 1.14)	1.08	(1.07, 1.10)	1.08	(1.07, 1.10)
Female	1.13	(1.08, 1.19)	1.17	(1.12, 1.23)	1.00	(0.99, 1.01)	1.01	(1.00, 1.02)
Comorbid Psych Diagnosis	1.57	(1.54, 1.61)	1.57	(1.54, 1.61)	1.55	(1.54, 1.56)	1.55	(1.54, 1.56)
Comorbid Substance Abuse	1.49	(1.45, 1.52)	1.41	(1.37, 1.44)	1.53	(1.52, 1.55)	1.48	(1.47, 1.49)
Medical Comorbidity§	0.91	(0.89, 0.93)	0.91	(0.88, 0.93)	0.97	(0.97, 0.98)	0.96	(0.96, 0.97)
Married	1.02	(1.00, 1.04)	1.08	(1.05, 1.11)	0.92	(0.91, 0.92)	0.92	(0.92, 0.93)
South‖	0.77	(0.75, 0.79)	0.78	(0.76, 0.80)	0.88	(0.87, 0.89)	0.89	(0.88, 0.89)
Northeast‖	0.80	(0.78, 0.82)	0.83	(0.81, 0.86)	1.02	(1.01, 1.03)	1.03	(1.02, 1.04)
West‖	0.85	(0.83, 0.88)	0.88	(0.85, 0.91)	1.11	(1.10, 1.12)	1.12	(1.11, 1.13)

[a] Relative risk refers to the likelihood of receiving outpatient followup; a RR of <1 indicates that a particular group was less likely to receive followup compared with the reference group.

* Includes only those with no subsequent hospitalizations within the 84-day high risk period

† Reference age group is age < 45 years old.

‡ Reference race is African American.

§ Having Charlson comorbidity score ≥ 1

‖ Reference region is Midwest.

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