

**Depression in Rural Populations:  
Prevalence, Effects on Life Quality,  
and Treatment-Seeking Behavior**



*At the Heart of Public Health Policy*

# **Depression in Rural Populations: Prevalence, Effects on Life Quality, and Treatment-Seeking Behavior**

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## Executive Summary

### Study Purpose

Information obtained by the 1999 National Health Interview Survey (NHIS), a nationally representative survey of more than 30,000 US adults, provided a unique opportunity to explore the prevalence of selected mental health diagnoses across rural populations, including rural minority residents. The 1999 NHIS administered the depression scale from the Comprehensive International Diagnostic Interview (CIDI), an instrument that has been widely used to estimate the prevalence of mental health diagnoses in the United States. We used this data set to explore the depression among rural versus urban residents, with “rural” defined as residing in a non-metropolitan area.

### Findings

#### *Prevalence of Depression*

- The prevalence of major depression was significantly higher among rural (6.11%) than among urban (5.16%) populations ( $p = 0.0171$ ). Among rural residents, the prevalence of depression did not vary significantly with race/ethnicity.
- The increased prevalence of depression among rural individuals does not appear to be a result of rural residence itself, as place of residence was not significant in multivariate analyses that controlled for other characteristics of the individual. Rather, the rural population contains a higher proportion of persons whose characteristics, such as poor health, place them at high risk for depression.

#### *Effects of Depression*

- Nearly all individuals scoring positive for depression reported that their symptoms interfered with their life or activities (46.67% rural, 44.25% urban; not significantly different).
- African Americans with depressive symptoms were significantly less likely than whites to report interference with their life and activities due to these symptoms. Hispanics and “other” minorities did not differ from whites.
- Insurance coverage influenced reported effects from depressive symptoms. Among rural residents with private insurance, for example, only 36.52% of respondents experienced interference with life activities, versus 64.65% of those with public insurance and 56.31% of those with no insurance at all (Table 4). The correlation of effects with public insurance might be endogenous: mental illness and related disability may lead to public insurance coverage. The higher prevalence of depression among publicly insured adults than among privately insured persons (12.86% among rural publicly insured adults versus 4.96% among rural privately insured) supports this possibility.

#### *Communication of symptoms*

- Slightly more than half of rural residents with depression have reported their symptoms to a physician (56.41%), significantly more than among urban residents (50.29%;  $p = 0.0429$ ). However, in multivariate analysis that held respondent characteristics constant, rural residence was no longer significantly associated with communication of symptoms to a practitioner.

- Rural minorities were less likely to report their symptoms to a physician than were whites, a pattern also present in urban areas. For African Americans and Hispanics, this pattern persisted even after other characteristics of the individual were held constant in multivariate analysis.
- In both urban and rural areas, the likelihood that an individual with depression would have communicated with a practitioner rose as the person's self reported health declined. For example, 51.3% of rural residents who reported their health as being "excellent" or "very good" had communicated with a practitioner about the feelings they experienced versus 73.0% of rural respondents who reported that their health was "fair" or "poor."
- Persons without any health insurance were less likely to have communicated with a physician than were the privately insured (OR 0.47, CI 0.33-0.66). Publicly insured persons did not differ from the privately insured.

### Conclusions

- In light of the greater prevalence of depression among rural populations, rural shortages of mental health personnel should be addressed.
- The ability of the medical care system to address mental health care through tele-education should be expanded.
- The ability of rural first responders to recognize mental health problems should be enhanced through training.
- Rural safety net programs should cooperate with each other and with the community to provide access to mental health services.
- Medicaid fosters access to mental health care among beneficiaries at a level paralleling private insurance.

### Issues for Future Research

- Additional research is needed to define how rural minorities conceptualize mental health problems and access mental health professions.
- Addition research is needed into factors that allow primary care physicians to initiate screening for depression in primary care.
- Policy research into the effects of mental health parity laws is essential to planning.

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# Chapter One: Introduction

## Background: Prior Research Findings

Depression is a common disorder. The National Comorbidity Survey (NCS), conducted between 1990 and 1992, estimated the 30-day prevalence of a major depressive episode at 4.9% across the US population between the ages of 15 and 54, with no differences by residence (Blazer, Kessler et al, 1994). The National Comorbidity Survey Replication (NCS-R), conducted through household interviews in 2001 – 2002, found a 12-month prevalence of depression among US adults aged 18 and above to lie between 5.2% and 7.6%, depending on the instrument used (Kessler, Berglund et al, 2003). In a 2002-2003 survey, the WHO World Mental Health Survey estimated that 9.6% of the US adult population suffers from mood disorders (12 month prevalence; World Mental Health Survey Consortium, 2004). Among women in the U.S., estimates of the lifetime risk of depression range between 10 and 25%; the risks of depression peak during childbearing years (Desai and Jann, 2000; Wisner, 1999). Among the older population, between 1992 and 1998, the rate of depression diagnosis more than doubled, up to 5.8%. Further, it is well established that depression is notably under-recognized in older adults (e.g., Crystal et al., 2003; Lebowitz et al. 1997). Thus, depression affects the lives of a substantial minority of individuals in the U.S. and their families. Depression has a substantial impact on the use of health services, life quality, and functioning.

The WHO survey estimated treatment rates across all diagnoses that ranged from 52% of those with serious symptoms through 23% of those with mild symptoms. Although the proportion of persons experiencing depression who sought

treatment was not specifically reported in the National Comorbidity Survey, analysis across all diagnoses found that only one-fifth of persons experiencing a MH problem in the past year had seen any health professional, specialized or not, for their problem (Kessler, McGonagle et al, 1994).

Because the majority of rural counties are whole or partial mental health (MH) professional shortage areas (Mervin, Hinton, Dembling, Stern, 2003), rural residents with MH problems may be less likely to receive services than persons with better access. On the other hand, expansion of psychiatric prescribing into the general health care sector, accompanied by direct to consumer advertising by pharmaceutical manufacturers, may have increased the options for mental health care across all populations. The identification of rural-urban disparities in the receipt of care for MH problems, if any, coupled with identification of specific populations at greatest risk for under-use of services, will improve the targeting of MH resources. If the prevalence of depression is higher in rural than in urban areas, this would support promoting policies to enhance access to MH service providers.

## Rural Urban Differences in MH Prevalence

Research has demonstrated that individuals living in rural areas often face barriers to receiving needed MH care (Roberts et al., 1999; Hartley, 1999; Robertson, 1997; Rocheford, 1997). The literature on whether rural needs for MH care are greater or lesser than needs of urban populations, however, is mixed. Several studies found no differences in prevalence between rural and urban areas (Kessler et al., 1994; Jonas et al., 1997; Rost et al.

1999), while other studies have found that the prevalence of MH disorders is lower in rural than urban areas (Lambert et al. 1999; Wang 2004).

Several researchers have found different patterns of MH utilization between people living in rural and urban areas. For example, Rost et al. (1999) found that people living in rural areas had lower outpatient and higher inpatient rates than those in urban areas, a pattern suggestive of equal need but less appropriate treatment. On the other hand, Petterson (2003) found that rural residents with MH needs had higher hospitalization rates and higher physician visits than those living in urban areas. Alegria et al. (2002) found that people living in rural areas were less likely to receive specialized MH services than those in urban areas.

### **Race and Ethnicity Differences in Prevalence and Utilization**

African Americans, Hispanics, and American Indians have been found to experience higher rates of depression than whites (Dunlap et al., 2003; Duran et al., 2004; Wells 2001). However, there is evidence the race and ethnicity differences disappear after controlling for confounding factors. For example, Dunlap et al. (2003) found that unadjusted risks of depression were higher for Hispanics and Whites; after adjusting for other factors, the risks were not distinguishable between Hispanics and Whites, and were lower for African Americans than whites. Health status and insurance factors played a major role in mitigating the difference in prevalence of depression between minorities and whites: that is, poor health and lack of insurance were significant independent predictors of depression (Dunlap et al., 2003). Among Hispanics, MH disorders were positively associated with increased disability (Peek et al., 2005).

A recent study investigating the effects of depression on the health of mothers and infants found that mothers who were depressed had lower birth weight babies (Conway & Kennedy, 2004). Among African American mothers, depression was associated with delayed access to prenatal care; this was not the case for whites (Conway & Kennedy, 2004). Among both African Americans and whites, mothers who were depressed were also more likely to use tobacco or alcohol (Conway & Kennedy, 2004). In a related area, some research has found that lower income women are at higher risk of depression; among low income women, those receiving Medicaid face the highest risk (Lennon et al. 2001).

The relationship between race/ethnicity and use of MH services is not fully understood. Among rural African Americans, help may be sought from alternative caregivers, such as churches, rather than from the formal health care system (Blank, Mahmood, et al, 2002). Some research has shown that community characteristics play an important role in the relationship between race and ethnicity and use of MH care. Race and ethnicity disparities in MH utilization have been found to be more prevalent in low poverty than high poverty areas (Chow et al., 2003). Further, a number of researchers have emphasized the need for more culturally appropriate approaches to prevention and treatment of MH disorders (e.g., Duran et al., 2004; Roberts et al. 1999).

### **Study Purpose**

The present study provides a new perspective about the prevalence of mental health problems among rural populations. Information obtained by the 1999 National Health Interview Survey (NHIS) provides a unique opportunity to explore the prevalence of selected MH diagnoses across rural populations, including rural minority

residents. The 1999 NHIS administered selected scales from the Comprehensive International Diagnostic Interview (CIDI), including the scales for depression and generalized anxiety disorder. The CIDI has been widely used to estimate the prevalence of MH diagnoses in the United States (Kessler, McGonagle et al 1994; Mojtabai and Olfson, 2004), Canada (Wang, 2004; Patten, Stuart, Russell, Maxwell, Arboleda-Florez, 2003), and internationally (WHO, 2004). The 1999 NHIS offers significant advantages over previous data sources. Unlike the National Comorbidity Survey, another nationally representative U.S. study, the NHIS CIDI was administered to all adults, not limited to those 54 or younger. The NHIS adult sample of 30,801 respondents is considerably larger than the 9,282 respondent sample of the National Comorbidity Survey Replication (NCS-R) carried out in 2001 - 2003, allowing development of estimates for rural and rural minority populations. Finally, the NCS-R survey was intentionally administered only in English, while the NHIS household interviews are conducted in English, Spanish or other languages as needed.

Using information from the 1999 NHIS, the present study examines three topics. Specifically, we:

- Estimate the prevalence of depression and generalized anxiety disorder among rural populations, including prevalence among racial/ethnic minorities
- Estimate the proportion of rural persons with depression who experience notable adverse effects on life quality.
- Estimate the proportion of persons with depression who report their symptoms to a professional.

Unadjusted prevalence, or proportion of the rural population with depression or generalized anxiety disorder, is reported in Chapter Two. Similarly, unadjusted estimates of the proportion of persons with depression who experience effects on their life from their condition and who report it to a physician, or another type of health provider, or other professional such as clergy, are provided. Next we estimate the likelihood of depression, experiencing adverse effects on life quality due to depression, and reporting symptoms to a health care or another professional controlling for other factors (reported in Chapter 3). The policy implications and recommendations are discussed in Chapter 4. In the Appendices we describe the data and limitations in greater detail (Appendix A), and provide detailed results tables (Appendix B).



# Chapter Two: The Prevalence of Depression and Generalized Anxiety and Effects of Depression on Life Quality

## Population Characteristics

The adults sampled by the 1999 National Health Interview Survey, reflecting the total US population, were principally urban residents (78.70%). The rural population contained a larger white majority (85.00%) than did the urban population (71.83%). African Americans formed the largest rural minority group (7.67%), followed by Hispanics (4.66%) and persons of “other” race (2.66%). Other characteristics of the adult US population reached by the 1999 NHIS are presented in Table 1 (All Tables in Appendix B). With the exception of low English fluency, many factors associated with the prevalence of depression, such as low education, poorer health status, low income and unemployment, were more common among the rural population.

## Prevalence of Major Depression and Generalized Anxiety Disorder

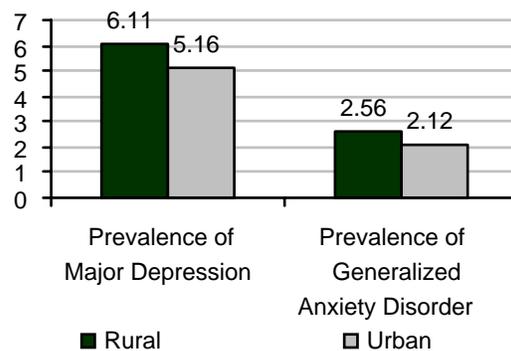
An estimated 2.6 million rural residents suffer from depression. The prevalence of major depression was significantly higher among rural than among urban populations ( $p = 0.0171$ ; see Figure 1 and Table 2). About 1.1 million rural residents experience generalized anxiety disorder. The prevalence of generalized anxiety disorder was just over two percent across residence, with no significant difference ( $p = 0.1040$ ; data not shown). Because the prevalence of generalized anxiety disorder was too low to permit accurate estimates for subgroups within

residence categories, detailed analysis of factors associated with this diagnosis were not performed.

Among rural residents, the prevalence of depression did not vary significantly with race/ethnicity (Table 2). In urban areas, the prevalence of depression was highest among whites (5.43%) and lowest among Hispanics (3.95%);  $p = 0.0032$ ). Within race/ethnicity categories, only the “other” category had significant residence differences, most probably reflecting

The National Health Interview Survey (NHIS) is representative of the non-institutionalized, civilian adult US population. The 1999 NHIS administered selected scales from the Composite International Diagnostic Interview (CIDI), the diagnostic instrument used by the NCS and WHO surveys. “Rural” was defined as living in a county that is not in a metropolitan area. Further analysis within rural was not possible with the public use data set.

differences between the urban “other” category, which is principally Asian American, and the rural “other” group, principally American Indian. Across both rural and urban residence, 12.6% of persons who gave their race/ethnicity as American Indian screened positive for depression, the highest rate among any group (unweighted n



= 28; estimate may be unstable).

We also examined the associations between depression and other demographic factors that have previously been found to be related to depression (e.g., Bromberger et al., 2004; Dunlop et al., 2003; Egede & Zheng, 2003). In addition to residence, factors significantly associated with a higher prevalence of depression included female sex, age in the 35-49 age group, English fluency, less than high school education, and not being married. Health factors associated with a higher prevalence of depression included reporting less than excellent to very good health, reporting a change in health during the past 12 months, whether an improvement or a decline; having a low or a high BMI, and current smoking. Resource characteristics associated with an increased prevalence of depression included not being employed, having an annual family income of less than \$20,000, having public insurance or no coverage (working age adults), and, among urban older adults, having public insurance.

Significant rural effects were present within several of these factors, suggesting that protective or risk factors may play out differently based on residence. While both urban and rural women were more likely to be depressed than men, rural women were also more likely to be depressed than urban women (7.90% versus 6.69%;  $p = .0265$ ). Similarly, while married persons were less likely to experience depression than those not married, rural married persons benefited less from this status than urban residents (prevalence among rural married, 5.27%, versus 3.56%, urban;  $p = .0008$ ). While persons in the best and the worst health status categories had a similar prevalence of depression in both rural and urban areas, rural individuals in the middle category (“good”) were more likely to screen positively for depression than their urban peers (8.55% versus 6.37%;  $p = .0158$ ). In

general, reflecting population level differences, rates of depression among rural residents classed in various ways tended to be higher than among urban residents, although differences were not always statistically significant. The only exception to this pattern occurred among older adults with public insurance, for whom the prevalence of depression was lower among rural residents (2.45% versus 6.58%).

### Effects of depressive symptoms on life quality

Nearly all individuals scoring positive for depression reported that their symptoms interfered “a lot” with their life or activities (46.67% rural, 44.25% urban; Table 3). Among urban residents, age and marital status were associated with reporting that depression interfered with a person’s life or activities. Among rural residents, females were slightly less likely to report interference.

Effects were measured with this question: How much did these problems interfere with your life or activities: a lot, some, a little, or not at all?

Health status variables were related to the degree to which depressive symptoms were perceived to interfere with the respondent’s life or activities. As might be expected, the degree to which symptoms interfered increase as self-reported health status declined. Among persons who saw their health as “excellent” or “very good,” about a third reported interference with life or activities (34.2% rural, 35.3% urban; Table 3), while among persons who reported “fair” or “poor” health status, about three of every five reported such interference (64.0% rural, 61.1% urban). Persons whose health status had changed, either for better or for worse, over the previous year reported more interference in activities from their depressive symptoms than did persons whose health remained the same. Among respondents whose health had gotten worse,

for example, 60.9% of rural and 55.6% of urban individuals reported interference in life or activities, while among persons whose health had stayed the same, only 32.9% of rural and 39.3% of urban respondents reported such interference. Interestingly, persons who reported that their health had improved were also likely to report interference due to symptoms of depression, and rural residents were significantly more likely to do so than urban residents (59.93% rural, 43.56% urban,  $p = 0.0174$ ). Persons who smoke were more likely to report that depressive symptoms interfered with life or activities, in both rural and urban populations

Unemployed persons, low income persons, and working age adults receiving public insurance were all significantly more likely to report that depressive symptoms affected their life or activities. Causal direction cannot be determined from the cross-sectional survey used for the study. It is possible, and perhaps even likely, that severity of symptoms led the individuals to become unemployed, to have low income status, or to receive public assistance.

The presence of a chronic condition (diabetes, asthma, hypertension) or self-reported limitations in activities of daily living was not related to the likelihood that an individual would report that depressive symptoms interfered with his or her activities. Normal to underweight status, defined as a Body Mass Index less than 25, was associated with increased likelihood that depressive symptoms would affect life, but only among the rural population. A similar pattern was not found among urban groups.

Persons screening positive for depression were asked whether they had “used alcohol or drugs more than once for these problems” (Variable MHDSADAC). Because the question does not specifically

exclude medications ordered by a physician or other appropriate healthcare provider, it is possible that some respondents to this question may have defined such medications as “drugs.” Thus, the analysis of this item was limited to presenting general frequencies of the behavior. Overall, about a quarter of persons with depression reported using alcohol or drugs more than once as a coping behavior (23.24% rural, 26.88% urban,  $p = 0.1458$ ; Table 4). With the exception of marital status (the unmarried were more likely to report using alcohol or drugs), none of the demographic, need or enabling factors used in this study was statistically associated with alcohol or drug use. We hypothesize that psychological factors, not tapped by this NHIS, may underlie a tendency to “self-medicate” depression with alcohol or drugs. Because of our uncertainty regarding the interpretation of this variable, no further analysis was performed on it.

### **Communication of symptoms by persons with major depression**

The NHIS asked persons who screened positive for depression whether or not they had reported the feelings or problems they were experiencing to a doctor. Feelings were not labeled as “depression.” Respondents were not asked whether the physician or other helping professional made any diagnosis on the basis of the information they communicated, nor whether any therapy was offered. Thus, the focus of this analysis is on patient-reported behavior

<p>Questions used: Did you tell a doctor about these problems? By “doctor” I mean either a medical doctor or an osteopath or a student in training to be either a medical doctor or osteopath.  Did you tell any other health professional such as a psychologist, social worker, counselor, nurse, clergy or other helping professional?</p>
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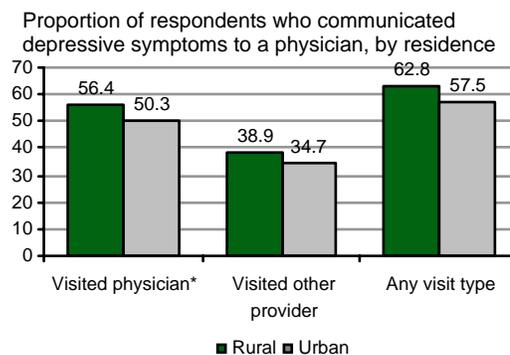
that might offer the practitioner an opportunity for intervention. Practitioner behavior was not measured.

About half of all persons with major depression report having told a physician or other health care provider about their feelings during the past year (Table 5). Rural adults were slightly more likely than urban adults to have described their symptoms to a physician (Table 5 and Figure at right;  $p = 0.0429$ ). Approximately a third of individuals with depression reported telling a non-physician health professional about their feelings, with no significant difference between rural and urban respondents (Table 6;  $p = 0.1180$ ). There was considerable overlap in use between the two types of practitioner. When visits to either type of professional were considered, the proportion of persons with depression who had communicated their symptoms to some form of potential helper during the past year increased only slightly (Table 7;  $p = 0.0622$ ).

Other demographic factors influenced the likelihood that a person with depression would communicate with a practitioner, whether a physician or other professional. In rural areas, there was a tendency for whites to be more likely to have described their symptoms to a professional than other races, but differences were not statistically significant ( $p = 0.0840$ ). In urban areas, whites and persons of other races were more likely to report having communicated with a professional about depressive symptoms than were others. In urban areas, women were more likely to report having told a professional about their feelings than were men; in rural areas, the proportions were nearly identical for both sexes (Table 7). Rural men were significantly more likely than urban men to report having talked to a practitioner about their feelings. Among urban residents, communicating with a practitioner about

depressive symptoms peaked among individuals in the 50 – 64 age group; there were no significant differences by age among rural residents.

#### Individuals who were not employed



at the time they were surveyed were more likely to report having talked to a practitioner about their feelings than were employed persons. This may be a function of time, as a person without a job would have more time to visit a practitioner; it may also be that persons with severe depression are more likely to be unable to work and to seek care.

In both urban and rural areas, the likelihood that an individual with depression would have communicated with a practitioner rose as the person's self reported health declined. In both rural and urban residents who reported their health as being "excellent" or "very good," about half of respondents had communicated with a practitioner about the feelings they experienced (51.3% rural, 50.8% urban). Among persons who reported that their health was "fair" or "poor," however, over two-thirds had talked to a practitioner (73.0% rural, 67.4% urban). Change in health status was associated with increased likelihood that an individual would report depressive symptoms to a practitioner. Approximately three quarters of rural residents who reported health change had talked to a practitioner about their feelings, as had approximately two thirds of urban

respondents. Among persons who reported that their health status was about the same as the previous year only about half had communicated with a practitioner (Table 7).

Language in which the interview was conducted, education, income (measured as above or below \$20,000 per year) and number of persons in the respondent's family were not related to whether the individual would report having talked to a practitioner about feelings symptomatic of depression. Virtually all respondents who do not complete the NHIS in English do so in Spanish. We recognize that language is just one of many cultural factors that may affect reporting.



# **Chapter Three: Adjusted Analysis: Residence and Race Effects on the Prevalence, Consequences and Communication of Depression**

## **Method**

Logistic regression was used to determine factors affecting the prevalence of depression, the effects of depressive symptoms, and the likelihood that an individual would communicate about symptoms to a health professional, holding all characteristics of the person constant. An incremental modeling approach was used. In the first model, only core demographic characteristics are considered (race, residence, sex and age). The second model adds resources to the analysis (education, income, marital status, number of persons in the family, and English fluency). The final model adds health status factors (health status, change in health, chronic conditions, and BMI). In analysis of utilization among persons screening positive for depression, income and insurance status are added to the third model. Multivariate analysis allows us to separate specifically rural effects from the characteristics of rural residents, which generally differ from those of urban residents. To determine whether the effects of race were different for rural rather than urban residence, we tested for interaction terms (race\*residence) in our final model. As these interaction terms were not significant in any analyses, we present the models without such terms here.

## **Prevalence of depression**

In Model 1, controlling only for demographic characteristics, rural residence

was associated with increased odds for depression (OR 1.19, CI 1.03, 1.38; Table 8). The effect was relatively small, however, and declined as additional variables were accounted for in Models 2 and 3. Race effects were more persistent. Hispanics were less likely than whites to screen positive for depression, an effect that was present across all three models. African Americans did not differ from whites in the model that included only demographics, but as additional characteristics were added in subsequent models, African Americans also had reduced odds of depression compared to whites. There were no significant race/residence interactions. Men were at reduced risk of depression compared to women, and depression was more common among younger persons than among those 65 years and older.

## **Effects of depression**

Rural residence was not associated with increased odds that depressive symptoms would interfere with daily life, in any of the models (Table 9). African Americans were found to have reduced odds for effects from depressive symptoms in Models 2 and 3 (OR 0.64, CI 0.43-0.95), which controlled for health status and resources; Hispanics and other minorities did not differ from whites. There were no significant race/residence interaction effects.

While several demographic factors were associated with whether an individual would screen positive for depression, the experience of interference with daily activities was not associated with sex, age, English fluency, or income. Health status variables were associated with an increased likelihood of effects of depression. The odds that an individual would experience effects of depression were higher for persons in fair or poor health than for persons in excellent health, and higher for persons whose health status had changed during the

past year than for those whose health remained the same. Persons who reported limitations in their daily activities had higher odds for experiencing effects than persons without such limitations. The presence of a self-reported chronic condition (one or more of asthma, diabetes or hypertension), however, was not associated with higher odds for effects from depressive symptoms. Compared to persons with private insurance, uninsured (OR 1.79, CI 1.28-12.51) and publicly insured (OR 1.75, CI 1.15-2.68) respondents were more likely to report experiencing effects from depression.

### **Communicating depressive symptoms**

We examined two types of communication behavior in multivariate analysis: describing one's feelings to a doctor (Table 10) and describing them to any helping professional, either physician or non-physician (Table 11). As noted earlier, the population of persons with depression who report communicating with non-physician practitioners tended to overlap a good deal with the group of persons who reported talking to a physician.

When examining the joint effects of residence and race/ethnicity, rural residence was not significantly associated with the odds that an individual would communicate his/her feelings to a physician. Examining race/ethnicity effects, African Americans were found to have significantly reduced odds of telling a physician about their feelings when compared to whites (OR 0.47, CI 0.33, 0.68; Table 10); this effect persisted after other individual characteristics were introduced into the model (OR 0.44, CI 0.30, 0.64). African Americans reported lower symptom severity, which may be a factor in their lower odds for reporting symptoms to a practitioner. Hispanics did not differ from whites when only residence and

race/ethnicity were considered. However, when resources and health status were held equal, Hispanics were found to have lower odds of communicating depressive symptoms to a physician than were whites (OR 0.65, CI 0.44, 0.96). The reduced odds of communication among Hispanics cannot be attributed solely to language barriers, as English fluency was held constant in Model 3. In addition, Hispanics did not differ significantly with regard to the effects of their depressive symptoms (see preceding section).

We found that men were less likely to report having described their feelings to a physician when only demographic factors and need were considered, but this effect was no longer significant after facilitating and enabling factors, such as employment and health insurance type, were included in the model. Persons younger than 65 were generally more likely than those over 65 to have reported their feelings to a physician.

In general, persons with higher levels of overall health need, based on health status, change in health, or limitations in daily activities, were more likely to have communicated their symptoms to a physician than were their counterparts. The increased communication may stem from greater opportunity, as such persons may have had more practitioner visits; alternatively, practitioners may more aggressively inquire about mood when treating chronic patients or patients whose health status is changing. Although persons without any health insurance were less likely to have communicated with a physician than were the privately insured (OR 0.47, CI 0.33-0.66), publicly insured persons did not differ from the privately insured.

Effects when examining communication with any practitioner (physician or other professional), were generally similar to those found for

communicating with a physician. Rural residence did not affect the likelihood that an individual would report having told any professional about depressive feelings, in any model. When “any practitioner,” rather than just physicians, was considered, Hispanics were no longer less likely than whites to have told someone about their depressed feelings. African Americans, however, remained less likely to have communicated about the feelings they experienced than were whites (OR 0.51, CI 0.33, 0.78).

Other findings for an individual communicating with “any practitioner” paralleled those for communicating with a physician (Table 11). Younger individuals and those with higher health needs were more likely to have communicated about their depressive symptoms with some helping professional.



## Chapter Four: Discussion and Conclusions

### Prevalence of Depression

The prevalence of depression in the present study, 5.16% among urban populations and 6.11% among rural residents based on interviews conducted in 1999, is slightly higher than the 30-day prevalence of 4.9% found by the 1992-1993 National Comorbidity Survey (NCS; Blazer, Kessler, 1994), and slightly lower than 6.6% found by the NCS-Replication conducted in 2001 – 2002 (Kessler, Berglund et al, 2003). In general, the prevalence found through analysis of the 1999 National Health Interview Survey paralleled the rates identified by previous studies, while drawing on a much larger sample of US adults. The large sample size allowed for prevalence estimates within rural and minority populations.

The unadjusted population prevalence of depression was significantly higher among individuals living in rural areas than those living in urban areas. In contrast, the NCS-R found no difference in prevalence based on residence (Kessler, Berglund, 2003), while a Canadian study found a lower prevalence of depression among rural residents (Wang, 2004). The current finding of increased prevalence of depression among rural individuals does not appear to be a result of rural residence itself, as place of residence ceases to be significant after controlling for other characteristics. Rather, the rural population contains a higher proportion of persons who have characteristics, such as poor health, which make them vulnerable to depression. Nonetheless, the higher prevalence of depression suggests that rural areas should receive priority regarding resources for detection and treatment of MH disorders,

including increased numbers of MH professionals.

Examining race/ethnicity differences, we found clear race effects in urban areas, with whites having the highest unadjusted prevalence for depression. Rural Hispanics and African Americans, like their urban counterparts, had a lower unadjusted prevalence of depression, but differences were not statistically significant. The NCS-R also found a lower prevalence of depression among non-Hispanic blacks, although not among Hispanics (Kessler, Berglund et al, 2003). In contrast, the Study of Women's Health Across the Nation (SWAN), using the Center for Epidemiologic Studies – Depression Scale, found higher unadjusted prevalence for depression among African American and Hispanic women than among whites, although differences tended to be reduced in multivariate analysis (Bromberger, Harlow et al, 2004).

In multivariate analysis, Hispanics and African Americans were less likely than whites to screen positive for depression. Similar reduced odds for depression among African Americans were found by Dunlop, Song and Associates (2003), although not for Hispanics. Several reasons for a lower detected prevalence of depression among minority persons may be offered. African American and Hispanic respondents, even when fluent in English, may have been less comfortable reporting feelings of sadness or worry to an interviewer. Alternatively, persons of minority heritage may not respond in the same way or with the same intensity as whites to external factors associated with depression, such as low income or poor health. Previous research examining stress among rural women found a significant interaction between potential stressors and race, with African American and Hispanic rural women reporting less increased stress than white women in the

presence of stressors (Probst, Moore, Baxley, forthcoming). Lower prevalence of depression among African Americans has also been attributed to a higher prevalence of religious belief (Williams, 2000). Other explanations among this population include “weathering,” whereby psychological issues are suppressed and emerge as physical illness ((Hogue, 2002), and “John Henryism,” a form of hardiness that leads to increased internal strength ((Williams & Lawler, 2001).

### **Effects of Depression**

Individuals who *did* have a positive screen for depression almost uniformly reported the same effects: Rural residence was not related to the likelihood that one would experience disruptive effects from depressive symptoms. Further, very few demographic or resource variables were significantly associated with the degree to which depressive symptoms interfered with daily living, either in bivariate or multivariate analysis. However, African Americans with depressive symptoms were significantly less likely than whites to report interference with their life and activities. The concepts of weathering and hardiness, referenced in the preceding paragraph, may again be relevant here. Alternatively, for both African American and Hispanic adults, there may be barriers to communication with physicians that are not experienced by whites, or there may be a general cultural reluctance to share depressive feelings with professionals. Findings regarding the prevalence of depression and its effects reinforce the need for culturally appropriate approaches to mental health screening, prevention and treatment in both rural and urban areas (e.g., Duran et al., 2004; Roberts, 1999).

Insurance coverage influenced reported effects from depressive symptoms. Among rural residents with private

insurance, for example, only 36.52% of respondents experienced interference with life activities, versus 64.65% of those with public insurance and 56.31% of those with no insurance at all (Table 4). The correlation of effects with public insurance might be endogenous: mental illness and related disability may lead to public insurance coverage. The higher prevalence of depression among publicly insured adults than among privately insured persons (12.86% among rural publicly insured adults versus 4.96% among rural privately insured; Table 2) lends credence to this possibility. In this scenario, the higher prevalence of effects among publicly insured persons comes about because more severe symptoms make them eligible for this type of insurance, rather than because the care they receive is inadequate.

The greater effect of depressive symptoms among uninsured persons is consistent with previous research (Lennon, Blome, English, 2002; Glied, Little, 2003). We suggest that uninsured persons may be less likely than privately insured persons to obtain effective treatment. This hypothesis gets some support from the fact that uninsured rural respondents were less likely than the privately insured to report communicating their symptoms to a professional. Only 42.74% of uninsured rural residents with depression, versus 66.77% of similar, privately insured and 59.09% of publicly insured rural residents, reported communicating their symptoms to a physician (Table n).

### **Reporting of Symptoms**

Slightly more than half of rural residents with depression have reported their symptoms to a physician (56.41%), significantly more than among urban residents (50.29%;  $p = 0.0429$ ). Rural whites were more likely to report their

symptoms to a physician than were non-whites, a pattern also present in urban areas. Rural residence was not significant in multivariate analysis that held respondent characteristics constant. However, minority respondents remained less likely than whites to report that they had communicated to a physician. For African Americans, these differences remained when all practitioners, including clergy, were taken into consideration. Persons without insurance, as might be expected, were less likely to report having described their symptoms to a practitioner, in both unadjusted and multivariate analysis.

In summary, we found that the prevalence of depression was higher in rural than in urban areas. After controlling for other factors, rural residence per se was no longer an independent risk factor for depression. However, rural communities include larger proportions of people who are vulnerable to depression. Among depressed individuals, African Americans and Hispanics were less likely to report symptoms to their physician. Further, uninsured individuals were more likely to report adverse effects of depression on their quality of life. Uninsured individuals are more prevalent in rural than in urban areas. Further, it is well established that individuals living in rural areas often face greater barriers to receiving needed MH care than those in urban areas (e.g., Hartley, 1999; Robertson, 1997; Rocheford, 1997). Collectively, these findings highlight the need to focus more resources to address the MH needs of people living in rural areas.

## Conclusions

*Achieving the Promise: Transforming Mental Health Care in America*, the report of the President's New Freedom Commission on Mental Health, together with *Mental Health: Culture, Race and Ethnicity—A Supplement to Mental*

*Health: A Report of the Surgeon General* offer multiple recommendations regarding the delivery of health services for persons with mental illness. The conclusions offered below reflect the work of those commissions, as well as the analysis offered in the present report.

*In light of the prevalence of depression in rural areas, rural shortages of mental health personnel should be addressed.*

*Achieving the Promise* highlights the fact that “virtually all rural counties in America” have shortages of mental health personnel. In the general medical sector, family medicine has taken the lead by developing criteria for rural residency training, to increase the number of physicians willing and able to practice in rural areas. Other specialties need to be similarly proactive, developing mechanisms that allow specialists in the behavioral services, such as psychology and social work, to train in rural areas. Tele-supervision of trainees may offer a technological means of allowing education within rural settings.

*The ability of the medical care system to address mental health care through tele-education should be expanded.*

A considerable amount of mental health care has always been provided within the “medical” sector (Regier, Narrow, Rae, Manderscheid, Locke, Goodwin, 1993). In rural areas, primary care providers are and are likely to remain frequent providers of mental health services (Lambert and Hartley, 1998). Telecommunications and Internet-based methods also have the potential to expand the ability of rural providers to address mental health issues.

Telecommunications technologies have been recommended to extend mental

health services to remote populations. However, the goal of culturally competent care may be difficult to achieve when services are provided through this mechanism. Anecdotal success has been reported using telemedicine to care for low English proficiency Hispanic patients (Cerda, Hilty et al, 1999), though the literature is sparse for telemedicine delivery of mental health services to African Americans and minorities in general. Internet access and email reminders may have little relevance to a low-income rural minority family living in a house that does not have a telephone. On the other hand, telecommunications technology, from video-conferencing to Internet-based degrees, has a successful track record in the field of education. Accordingly, we conclude that distance education technologies could provide a means of developing mental health knowledge and skills among health care practitioners already in place in rural areas, to ensure that up-to-date, high quality services are available.

*The ability of rural first responders to recognize mental health problems needs to be addressed.*

First responders, such as police and emergency medical services personnel, should be included when deploying distance education in mental health topics. In both urban and rural areas, first responders deal with mental health issues and mental health crises as well as medical needs. Programs that help first responders understand the manifestations of mental illness and provide them with referral networks for handling patients are needed. Development of demonstration projects can assist by providing models for successful integration of first responders into mental health care networks, with ensuing advantages for quality of care.

*Rural safety net programs should cooperate with each other and with the community to provide access to mental health services.*

Looking beyond the traditional mental health system is essential if geographic and racial disparities in care for mental disorders are to be overcome. Research about the willingness of African Americans to seek mental health care within the mental health system has yielded contradictory findings (Neighbors, 1985; Broman, 1987; Diala, Muntaner, Walrath, Nickerson, LaVeist, Leaf, 2001). However, institutions in the African American community, notably churches, may provide parallel assistance. In the South, after controlling for budget, churches serving the African American community provide more programs that address mental health issues, such as alcohol and substance abuse and marriage counseling, than do churches with principally white congregations (Blank, Mahmood, Fox and Guterbock, 2002). However, churches serving African Americans were generally not linked with the mental health system through referrals. An absence of referral links could have detrimental health consequences; African Americans who contact clergy as their first source of help are less likely to seek other sources (Neighbors, Musick, Williams, 1998).

Schools offer another venue through which mental health screening and mental health services could be mobilized in rural communities. The School Mental Health Initiative in New Mexico (<http://www.nmsmhi.org/index.html>) is an example of a multi-faceted program that helps train educators to identify mental health problems and is demonstrating the provision of services at selected schools. Finally, collaborations and cooperative activities linking current safety net providers, including federally qualified

community health centers, rural health clinics, and state or local free or reduced cost clinics with community mental health centers should be encouraged as a means of ensuring that medically indigent rural residents obtain needed mental health care.

*Medicaid fosters access to mental health care among beneficiaries at a level paralleling private insurance.*

Although state budgets have been ailing for several years, Medicaid and other public programs can provide access to affordable medical care in rural areas. Our finding that publicly insured adults were as likely as privately insured to report their symptoms to a physician suggests that Medicaid and other programs for indigent care can provide effective access for mental health treatment. However, this conclusion is attenuated by the fact that the study could not distinguish between individuals whose private insurance included mental health services, and those for whom mental health conditions were excluded from coverage. Thus, the equal access recorded for publicly and privately insured persons does not imply that all needed care is provided for such persons. Further, uninsured persons had notably lower odds for communicating symptoms than did either publicly or privately insured individuals.

### **Issues for Future Research**

*Additional research is needed to define how rural minorities perceive mental health problems and access mental health or other support services.*

Both *Achieving the Promise*, the President's Commission report, and *Mental Health: Culture, Race and Ethnicity*, the report from the Surgeon General, call for further work to understand cultural differences in how mental distress is conceptualized, when a need for intervention is defined, and how that intervention is

defined (medical, religious, psychiatric). Because the culture of rural minorities is highly localized (African Americans in the South, Hispanics in the Southwest and West, American Indians in the West and Northwest) and may differ from urban culture within those regions, it is important to stress that such research must include rural populations.

We also do not understand the role of alternative and complementary mental health providers among different cultures. Some cultures may turn to religious counselors, while others may rely on family support. National surveys that measure use or expenditures should begin to include supplemental questions on complementary and alternative medicine in order to not only capture use of, but also attitudes toward, these types of treatment.

*Additional research is needed into factors that foster screening for depression in primary care.*

Family and internal medicine physicians are the principal source of medical care in rural areas and thus constitute frontline personnel for the detection as well as the treatment of depression. However, multiple barriers limit the ability of these practitioners to identify and address patient psychological distress, including gaps in training, absence of common protocols and guidelines, heavy patient loads, and lack of referral resources. The relative role of these barriers remains a fruitful topic for research, from several directions. Two questions have particular importance: First, what factors trigger primary care physicians to ask questions concerning patient mood? The communication of depressive symptoms studied in the preceding report could have been spontaneous on the part of patients, or elicited by physician query. Second, what organizational forms and procedures would

facilitate screening of all patients for mood and other mental health problems? For example, providing nursing and administrative staff with a screening checklist to be administered prior to the physician's visit with the patient might inexpensively improve detection of depression and other problems. Such time-saving techniques would be particularly important for rural practitioners.

*Research into the effect of mental health parity laws is essential.*

The Mental Health Parity Act of 1996 mandated parity of benefits between general health insurance benefits and mental health insurance benefits. However, two components of the statute exempt companies from having to provide these benefits: 1) it does not apply to companies with less than 51 employees, and 2) it only applies to companies that offer mental health benefits. In addition, the statute does not apply to individual insurance policies, which are regulated by the states (Centers for Medicare and Medicaid Services, 2002).

Rural residents are more likely to work at small employers, who may be exempt from the parity law. They are also more likely to hold individual private insurance which, depending upon state law, may not be required to provide parity in mental health benefits. Therefore, even rural privately insured residents may have less access to insured mental health care. In addition, companies can choose not to offer any mental health benefits in order to avoid the parity statute. Employees of those companies have no access to mental health benefits and cannot qualify for public coverage. A more detailed examination of how these conflicting pressures have played out in rural areas, as distinct from the heavily urban national environment, would help planners address the needs of rural communities.

## Appendix A: Method

### Design, Population and Data

We conducted a cross sectional examination of the prevalence of depression and GAD, and use of services among persons experiencing these problems. Data were drawn from the 1999 National Health Interview Survey (NHIS), which is representative of the non-institutionalized, civilian adult US population. The 1999 NHIS administered selected scales from the Composite International Diagnostic Interview (CIDI), the diagnostic instrument used by the NCS and WHO surveys. The NHIS assessed the presence and severity of symptoms (2 week and 12-month) for depression and generalized anxiety disorder (GAD). NHIS also inquired about the use of services for the problem.

### Analytic Approach

Prevalence. A positive finding for depression and GAD was defined based on CIDI cut points. Prevalence will be estimated by race/ethnicity, within rural and urban populations. Rural will be defined as residence outside a metropolitan statistical area, per data set limitations. Factors influencing prevalence will be explored. Potential factors, building from Egebe & Zheng, include sex, age (18-39; 40-64; 65+), race/ethnicity (white, non-Hispanic Black, Hispanic and other), education (HS, less), English fluency (fluent versus not fluent, defined as taking all or part of the NHIS in another language), poverty (using imputed income files), employment status, marital status, health status, obesity, and current smoking. Severity of symptoms, among persons having one of the two disorders, will be measured using NHIS questions regarding frequency and severity.

### Communication with a practitioner:

Assessment of utilization was restricted to persons with depression, and to the question of whether these persons informed a practitioner of the depressive feelings they were experiencing. We originally intended to explore self-reported communication with a physician, communication with another professional, and the self-reported use of drugs or alcohol to address the problem.

### Limitations

The principal limitation in the analysis is that prevalence estimates are based on answers to a screening instrument, rather than clinical diagnoses rendered by a mental health practitioner. However, absent extraordinary budgets, this limitation is unavoidable when examining a large population. Second, persons currently hospitalized for one of the conditions were excluded from the study universe, as would other individuals, such as nursing home residents, who live in institutional settings. The prevalence of depression and GAD among those populations may be considerably higher, and contribute to complete population prevalence. Finally, there are multiple limitations to the definition of rural used. A more informative approach would analyze prevalence and utilization using gradations of “rural.” However, both the project budget and the small number of observations that would result from subsetting to detailed types of rural community make this approach impractical.



## Appendix B: Tables

**Table 1. Demographic Characteristics of US Adults, 1999 NHIS, by residence**

	Total n=30,801 N=199,617,483 %(se)	Rural n=6,227 N=42,518,114 %(se)	Urban n=24,574 N=157,099,369 %(se)	p-value
<b>Race/Ethnicity</b>				
Hispanic	10.27 (0.27)	4.66 (0.66)	11.79 (0.29)	
White	74.64 (0.40)	85.00 (1.01)	71.83 (0.43)	
AA	11.25 (0.29)	7.67 (0.85)	12.22 (0.29)	
Others	3.84 (0.18)	2.66 (0.38)	4.15 (0.20)	0.0000
<b>Sex</b>				
Male	47.87 (0.34)	48.28 (0.68)	47.76 (0.39)	
Female	52.13 (0.34)	51.72 (0.68)	52.24 (0.39)	0.5127
<b>Age Categories</b>				
18-34	32.04 (0.38)	30.28 (0.93)	32.52 (0.41)	
35-49	31.96 (0.33)	30.44 (0.67)	32.37 (0.38)	
50-64	19.73 (0.26)	21.14 (0.56)	19.35 (0.30)	
>=65	16.27 (0.27)	18.14 (0.63)	15.76 (0.31)	0.0001
<b>Language of Interview</b>				
Fluent in English	95.72 (0.18)	98.35 (0.48)	95.00 (0.19)	
Not Fluent in English	4.28 (0.18)	1.65 (0.48)	5.00 (0.19)	0.0000
<b>Education</b>				
>=High School	82.13 (0.30)	77.64 (0.69)	83.35 (0.34)	
<High School	17.87 (0.30)	22.36 (0.69)	16.65 (0.34)	0.0000
<b>Marital status</b>				
Married	58.60 (0.41)	62.43 (0.96)	57.56 (0.45)	
Not married	41.40 (0.41)	37.57 (0.96)	42.44 (0.45)	0.0000
<b>Current Health Status</b>				
Excellent to Very Good	64.66 (0.38)	56.53 (0.96)	66.86 (0.40)	
Good	24.19 (0.30)	28.42 (0.73)	23.05 (0.33)	
Fair to Poor	11.15 (0.22)	15.05 (0.57)	10.09 (0.23)	0.0000
<b>Health Status Compared to Past 12 months</b>				
Better	17.29 (0.29)	16.87 (0.57)	17.41 (0.33)	
Worse	7.52 (0.18)	9.28 (0.40)	7.04 (0.20)	
Same	75.19 (0.32)	73.85 (0.69)	75.56 (0.36)	0.0000
<b>Obesity Status (kg/m2)</b>				
BMI<25	21.11 (0.29)	23.66 (0.68)	20.42 (0.32)	
BMI 25-30	35.26 (0.32)	35.01 (0.61)	35.33 (0.37)	
BMI >=30	43.63 (0.35)	41.33 (0.84)	44.25 (0.38)	0.0001

**Table 1, continued. Demographic Characteristics of US Adults, 1999 NHIS, by residence**

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Smoking Status				
Smoker	23.30 (0.32)	25.99 (0.72)	22.58 (0.35)	
Nonsmoker	76.70 (0.32)	74.01 (0.72)	77.42 (0.35)	0.0000
Employment				
Employed	65.60 (0.38)	61.04 (0.89)	66.83 (0.43)	
Not employed	34.40 (0.38)	38.96 (0.89)	33.17 (0.43)	0.0000
Income				
20,000 or more	79.03 (0.36)	71.75 (0.98)	81.00 (0.37)	
less than 20,000	20.97 (0.36)	28.25 (0.98)	19.00 (0.37)	0.0000
Insurance				0.0000
Private	73.44 (0.34)	70.07 (0.84)	74.35 (0.36)	
Public	6.07 (0.16)	7.72 (0.46)	5.63 (0.17)	
Not covered	15.90 (0.26)	18.06 (0.68)	15.32 (0.27)	
Medicare only	4.58 (0.16)	4.15 (0.26)	4.70 (0.18)	
Number of Persons in Family				0.0003
One	18.78 (0.31)	17.47 (0.76)	19.14 (0.34)	
Two	33.17 (0.32)	35.57 (0.74)	32.52 (0.35)	
Three	17.95 (0.25)	18.56 (0.56)	17.78 (0.28)	
Four or more	30.10 (0.41)	28.39 (0.86)	30.56 (0.46)	
Diabetes				0.0009
Yes	5.43 (0.15)	6.46 (0.35)	5.16 (0.17)	
No	94.57 (0.15)	93.54 (0.35)	94.84 (0.17)	
Hypertension				0.0000
Yes	22.58 (0.29)	25.76 (0.67)	21.73 (0.32)	
No	77.42 (0.29)	74.24 (0.67)	78.2790.32)	
Asthma				0.0228
Yes	8.49 (0.19)	9.32 (0.40)	8.27 (0.21)	
No	91.51 (0.19)	90.68 (0.40)	91.73 (0.21)	
Limitations to Activities				0.0000
Yes	28.08 (0.35)	34.00 (1.02)	26.47 (0.35)	
No	71.92 (0.35)	66.00 (1.02)	73.53 (0.35)	
Usual source of Care				0.0335
Yes	82.43 (0.27)	83.52 (0.56)	82.13 (0.31)	
No	17.57 (0.27)	16.48 (0.56)	17.87 (0.31)	

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**Table 2. Prevalence of major depressive disorder among US adults, 1999, by individual characteristics** (Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=6,227 N=42,518,114 %(se)	Urban n=24,574 N=157,099,369 %(se)	p-value for rural – urban comparison
Total	6.11(0.36)	5.16(0.17)	0.0171
<b>Race/Ethnicity</b>			
Hispanic	6.53 (1.70)	3.95 (0.32)	0.1420
White	5.92 (0.38)	5.43 (0.21)	0.2612
AA	6.88 (1.23)	4.99 (0.53)	0.1456
Others	<i>9.15 (1.86)</i>	4.50 (0.78)	0.0344
p-value within residence	0.4332	0.0032	
<b>Sex</b>			
Male	4.19 (0.43)	3.49 (0.20)	0.1425
Female	7.90 (0.49)	6.69 (0.25)	0.0265
p-value within residence	0.0000	0.0000	
<b>Age Categories</b>			
18-34	6.25 (0.60)	5.46 (0.33)	0.2463
35-49	7.32 (0.68)	5.96 (0.28)	0.0657
50-64	6.81 (0.88)	5.33 (0.40)	0.1190
>=65	3.02 (0.49)	2.71 (0.28)	0.5960
p-value within residence	0.0000	0.0000	
<b>Language of Interview</b>			
Fluent in English	6.17 (0.37)	5.20 (0.17)	0.0190
Not Fluent in English	<i>1.82 (1.04)</i>	3.57 (0.42)	0.1629
p-value within residence	0.0110	0.0006	
<b>Education</b>			
>=High School	5.88 (0.37)	5.15 (0.19)	0.0809
<High school	6.87 (0.85)	5.32 (0.34)	0.0896
p-value within residence	0.3933	0.3001	
<b>Marital status</b>			
Married	5.27 (0.46)	3.56 (0.20)	0.0008
Not married	7.52 (0.60)	7.34 (0.28)	0.7941
p-value within residence	0.0033	0.0000	
<b>Current Health Status</b>			
Excellent to Very Good	2.90 (0.26)	3.43 (0.17)	0.0880
Good	8.55 (0.82)	6.37 (0.38)	0.0158
Fair to Poor	13.61 (1.27)	13.92 (0.71)	0.8302
p-value within residence	0.0000	0.0000	

**Table 2, continued. Prevalence of major depressive disorder among US adults, 1999, by individual characteristics**

Health Status Compared to Past			
12 months			
Better	8.36 (1.06)	8.11 (0.53)	0.8319
Worse	17.27 (1.62)	17.18 (1.02)	0.9619
Same	4.18 (0.31)	3.37 (0.16)	0.0188
p-value within residence	0.0000	0.0000	
Obesity Status (kg/m <sup>2</sup> )			
BMI<25	6.40 (0.52)	4.91 (0.25)	0.8548
BMI 25-30	5.05 (0.57)	4.60 (0.27)	0.4833
BMI ≥30	7.14 (0.73)	6.99 (0.41)	0.0099
p-value within residence	0.0180	0.0000	
Smoking Status			
Smoker	10.58 (0.87)	9.00 (0.43)	0.1031
Nonsmoker	4.54 (0.39)	4.04 (0.17)	0.2441
p-value within residence	0.0000	0.0000	
Employment			
Employed	4.90 (0.45)	4.60 (0.21)	0.5427
Not employed	7.86 (0.64)	6.32 (0.29)	0.0282
p-value within residence	0.0004	0.0000	
Income			
20,000 or more	5.63 (0.44)	4.55 (0.20)	0.0270
less than 20,000	8.00 (0.67)	8.15 (0.38)	0.8449
p-value within residence	0.0029	0.0000	
Insurance			
Private	4.96 (0.39)	4.41 (0.20)	0.2036
Public	12.86 (1.76)	12.66 (0.81)	0.9164
Not covered	8.31 (0.95)	6.86 (0.46)	0.1168
Medicare only	3.39 (1.14)	2.64 (0.46)	0.5387
p-value within insurance	0.0000	0.0000	
Number of Persons in Family			
One	7.02 (0.59)	7.02 (0.39)	1.0000
Two	5.47 (0.56)	4.88 (0.27)	0.3418
Three	6.60 (0.92)	5.53 (0.41)	0.2910
Four or more	6.03 (0.72)	4.09 (0.31)	0.0135
p-value within residence	0.2097	0.0000	
Diabetes			
Yes	7.85 (1.59)	7.79 (0.83)	0.9735
No	5.91 (0.36)	4.98 (0.17)	0.0183
p-value within residence	0.2154	0.0009	
Hypertension			
Yes	8.23 (0.83)	6.90 (0.41)	0.1458
No	5.37 (0.38)	4.68 (0.18)	0.1063
p-value within residence	0.0015	0.0000	

**Table 2, continued. Prevalence of major depressive disorder among US adults, 1999, by individual characteristics**

Asthma			
Yes	11.81 (1.32)	9.22 (0.67)	0.0791
No	5.52 (0.35)	4.79 (0.16)	0.0572
p-value within residence	0.0000	0.0000	
Limitations to Activities			
Yes	11.10 (0.76)	10.16 (0.41)	0.2809
No	3.57 (0.33)	3.37 (0.16)	0.5887
p-value within residence	0.0000	0.0000	
Usual source of Care			
Yes	6.25 (0.39)	5.04 (0.46)	0.0050
No	5.39 (0.73)	5.72 (0.20)	0.6849
p-value within residence	0.2734	0.1069	

**Table 3. Proportion of adults with major depression reporting that symptoms interfered with life or activities, NHIS 1999.** (Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=408 N=2,598,035 %(se)	Urban n=1,415 N=8,098,610 %(se)	p-value for rural-urban comparison
Total	46.67 (2.57)	44.25 (1.41)	0.4101
<b>Race/Ethnicity</b>			
Hispanic	<i>49.42 (9.81)</i>	45.59 (3.37)	0.7880
White	47.27 (2.93)	44.90 (1.70)	0.4884
AA	<i>34.93 (7.50)</i>	39.63 (3.92)	0.5859
Others	<i>56.38 (11.85)</i>	<i>40.03 (8.09)</i>	0.2926
p-value within residence	0.4465	0.5679	
<b>Sex</b>			
Male	54.96 (4.46)	41.92 (2.55)	0.0145
Female	45.37 (1.83)	22.93 (1.70)	0.4405
p-value within residence	0.0289	0.2979	
<b>Age Categories</b>			
18-34	45.16 (4.87)	36.53 (2.84)	0.1227
35-49	49.92 (4.32)	48.17 (2.57)	0.7287
50-64	46.00 (5.65)	48.16 (3.11)	0.7421
>=65	<i>40.53 (7.59)</i>	49.38 (5.14)	0.3291
p-value within residence	0.6821	0.0122	
<b>Language of Interview</b>			
Fluent in English	47.09 (2.61)	44.46 (1.48)	0.3831
Not Fluent in English	<i>0.00 (0.00)</i>	46.90 (5.83)	0.1018
p-value within residence	0.1099	0.0150	
<b>Education</b>			
>=High School	47.69 (3.14)	43.49 (1.60)	0.2360
<High school	41.86 (4.21)	49.85 (3.72)	0.3820
p-value within residence	0.2630	0.6929	
<b>Marital status</b>			
Married	48.55 (3.89)	39.67 (2.45)	0.0601
Not married	47.72 (3.62)	47.06 (1.91)	0.5699
p-value within residence	0.4934	0.0273	
<b>Perceived Health</b>			
Excellent to Very Good	34.21 (4.60)	35.28 (2.44)	0.8376
Good	40.23 (4.96)	41.87 (2.70)	0.7723
Fair to Poor	64.00 (4.83)	61.06 (2.87)	0.6033
p-value within residence	0.0001	0.0000	

**Table 3, continued. Proportion of adults with major depression reporting that symptoms interfered with life or activities, NHIS 1999.**

Health Status Change			
Better	59.93 (5.72)	43.56 (3.00)	0.0174
Worse	60.93 (5.28)	55.59 (2.85)	0.3752
Same	32.92 (3.80)	39.28 (2.20)	0.1534
p-value within residence	0.0000	0.0001	
Obesity Status (kg/m <sup>2</sup> )			
BMI<25	50.69 (4.93)	45.26 (3.05)	0.3496
BMI 25-30	43.78 (5.36)	45.23 (2.85)	0.8102
BMI >=30	45.42 (4.30)	42.74 (2.46)	0.5901
p-value within residence	0.0016	0.0963	
Smoking Status			
Smoker	57.58 (4.69)	47.78 (2.65)	0.0692
Nonsmoker	37.77 (3.26)	41.95 (1.86)	0.2689
p-value within residence	0.0063	0.0000	
Employment			
Employed	39.01 (3.92)	38.22 (1.91)	0.8559
Not employed	54.57 (3.63)	53.19 (2.23)	0.7506
p-value within residence	0.0086	0.0000	
Income			
20,000 or more	42.88 (3.35)	40.40 (1.88)	0.5175
less than 20,000	54.74 (4.48)	53.13 (2.68)	0.7577
p-value within residence	0.0409	0.0004	
Insurance			
Private	36.52 (2.85)	37.92 (1.73)	0.6749
Public	64.65 (6.47)	61.55 (3.74)	0.6764
Not covered	56.31 (5.32)	52.63 (3.67)	0.5676
Medicare only	68.33 (13.89)	41.85 (8.60)	0.1840
p-value within residence	0.0003	0.0000	
Number of Persons in Family			
One	44.85 (4.43)	50.57 (2.44)	0.2678
Two	54.04 (5.68)	48.81 (2.60)	0.4111
Three	35.67 (5.14)	34.88 (3.66)	0.9016
Four or more	47.52 (5.85)	30.02 (3.53)	0.2179
p-value within residence	0.2192	0.0012	
Diabetes			
Yes	46.90 (8.66)	55.61 (5.65)	0.3984
No	46.02 (2.70)	43.20 (1.55)	0.3664
p-value within residence	0.9251	0.0496	
Hypertension			
Yes	49.65 (4.65)	48.65 (2.91)	0.8554
No	45.21 (3.24)	42.45 (1.87)	0.4641
p-value within residence	0.4419	0.1023	

**Table 3, continued. Proportion of adults with major depression reporting that symptoms interfered with life or activities, NHIS 1999.**

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Asthma				
	Yes	58.95 (7.03)	54.32 (3.89)	0.5669
	No	43.89 (2.60)	42.53 (1.66)	0.6600
	p-value within residence	0.0512	0.0111	
Limitations to Activities				
	Yes	55.11 (3.74)	53.25 (1.91)	0.6593
	No	33.11 (3.92)	34.61 (2.08)	0.7363
	p-value within residence	0.3633	0.1216	
Usual source of Care				
	Yes	46.36 (2.62)	44.71 (1.54)	0.5899
	No	48.56 (6.64)	42.40 (3.82)	0.4315
	p-value within residence	0.7467	0.5828.	

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**Table 4. Proportion of adults with major depression with alcohol or drug use.** (Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=408 N=2,598,035 %(se)	Urban n=1,415 N=8,098,610 %(se)	p-value
Total	23.24 (2.07)	26.88 (1.46)	0.1468
<b>Race/Ethnicity</b>			
Hispanic	<i>20.23 (10.20)</i>	23.17 (3.23)	0.7776
White	24.15 (2.39)	28.28 (1.73)	0.1590
AA	<i>17.56 (5.60)</i>	25.41 (4.47)	0.2785
Others	<i>20.46 (11.27)</i>	11.72 (3.79)	0.4607
	p-value	0.7468	0.0073
<b>Sex</b>			
Male	<i>24.51 (4.84)</i>	35.16 (2.71)	0.0618
Female	22.61 (2.57)	22.93 (1.70)	0.9157
	p-value	0.7484	0.0002
<b>Age Categories</b>			
18-34	25.73 (3.49)	28.48 (2.52)	0.5260
35-49	26.12 (4.10)	27.76 (2.34)	0.7256
50-64	<i>17.66 (5.50)</i>	27.54 (3.09)	0.1151
>=65	<i>17.57 (4.90)</i>	<i>14.73 (3.27)</i>	0.6290
	p-value	0.4908	0.0122
<b>Language of Interview</b>			
Fluent in English	22.61 (2.08)	27.57 (1.53)	0.0544
Not Fluent in English	<i>0.00 (0.00)</i>	8.09 (3.68)	0.1838
	p-value	0.1096	0.0000
<b>Education</b>			
>=High School	23.05 (2.39)	27.37 (1.66)	0.1354
<High school	<i>22.26 (5.33)</i>	23.90 (2.95)	0.7838
	p-value	0.8977	0.3134
<b>Marital status</b>			
Married	<i>17.87 (3.16)</i>	21.61 (2.06)	0.3050
Not married	29.71 (3.25)	30.11 (1.91)	0.9145
	p-value	0.0240	0.0027
<b>Perceived Health</b>			
Excellent to Very Good	<i>21.48 (3.78)</i>	27.56 (2.39)	0.1815
Good	23.29 (3.39)	25.98 (2.61)	0.5299
Fair to Poor	24.68 (4.29)	26.81 (2.33)	0.6574
	p-value	0.8753	0.8938

**Table 4, continued. Proportion of adults with major depression with alcohol or drug use.**

Health Status Change			
Better	28.41 (5.03)	29.69 (3.15)	0.7949
Worse	21.17 (4.50)	29.47 (2.90)	0.1193
Same	22.19 (2.85)	24.24 (1.79)	0.5429
p-value	0.5384	0.1793	
Obesity Status (kg/m2)			
BMI<25	19.47 (3.65)	27.80 (2.46)	0.0581
BMI 25-30	20.50 (4.32)	27.42 (2.60)	0.1810
BMI >=30	28.04 (3.51)	26.43 (2.24)	0.6996
p-value	0.2230	0.9111	
Smoking Status			
Smoker	30.88 (3.70)	36.58 (2.21)	0.1837
Nonsmoker	16.99 (2.66)	20.58 (1.69)	0.2495
p-value	0.0063	0.0000	
Employment			
Employed	24.89 (3.07)	27.38 (1.97)	0.4927
Not employed	21.59 (3.65)	26.11 (1.88)	0.2700
p-value	0.5359	0.6224	
Income			
20,000 or more	20.81 (2.80)	26.99 (1.77)	0.0595
less than 20,000	28.84 (3.38)	27.80 (2.37)	0.8014
p-value	0.0809	0.7763	
Insurance			
Private	20.25 (2.81)	23.76 (1.76)	0.2867
Public	31.73 (5.60)	28.78 (3.35)	0.6526
Not covered	24.04 (4.94)	37.10 (3.45)	0.0352
Medicare only	28.47 (14.81)	11.95 (6.14)	0.3103
p-value	0.3853	0.0009	
Number of Persons in Family			
One	25.61 (5.43)	33.34 (2.07)	0.1817
Two	27.46 (5.41)	26.69 (2.58)	0.8970
Three	19.03 (4.75)	27.92 (3.66)	0.1383
Four or more	19.75 (3.64)	19.39 (2.87)	0.9384
p-value	0.4363	0.0005	
Diabetes			
Yes	21.81 (8.70)	18.64 (4.25)	0.7408
No	23.39 (2.20)	27.54 (1.59)	0.1226
p-value	0.8619	0.0638	
Hypertension			
Yes	23.28 (3.77)	26.44 (2.52)	0.4804
No	23.28 (2.68)	27.11 (1.80)	0.2300
p-value	1.0000	0.8308	

**Table 4, continued. Proportion of adults with major depression with alcohol or drug use.**

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Asthma				
	Yes	21.00 (4.84)	33.44 (3.58)	0.0433
	No	23.76 (2.73)	25.59 (1.65)	0.5646
	p-value	0.6674	0.0513	
Limitations to Activities				
	Yes	21.41 (3.10)	28.93 (1.97)	0.0374
	No	26.16 (3.56)	24.33 (2.18)	0.6595
	p-value	0.3633	0.1216	
Usual source of Care				
	Yes	24.27 (2.31)	24.72 (1.52)	0.8702
	No	17.15 (4.73)	35.67 (3.26)	0.0041
	p-value	0.1997	0.0019	

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**Table 5. Proportion of adults screening positive for major depression who report communicating these feelings to a physician, NHIS 1999.** (Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=408 N=2,598,035 %(se)	Urban n=1,415 N=8,098,610 %(se)	p-value
Total	56.41(2.60)	50.29(1.47)	0.0429
<b>Race/Ethnicity</b>			
Hispanic	<i>40.74 (10.65)</i>	49.32 (3.76)	0.4088
White	59.39 (3.00)	52.65 (1.78)	0.0559
AA	<i>46.39 (9.00)</i>	33.23 (4.35)	0.1735
Others	<i>36.15 (10.37)</i>	59.11 (8.44)	0.0818
p-value within residence	0.0431	0.0007	
<b>Sex</b>			
Male	57.96 (4.54)	42.52 (2.86)	0.0056
Female	55.64 (3.08)	54.00 (1.82)	0.6466
p-value within residence	0.6664	0.0017	
<b>Age Categories</b>			
18-34	51.73 (4.21)	38.70 (2.56)	0.0100
35-49	62.99 (4.35)	53.82 (2.54)	0.0685
50-64	57.28 (6.00)	62.01 (3.70)	0.4964
>=65	<i>43.53 (8.19)</i>	54.02 (4.76)	0.2650
p-value within residence	0.1434	0.0000	
<b>Language of Interview</b>			
Fluent in English	56.70 (2.62)	50.73 (1.54)	0.0513
Not Fluent in English	<i>36.14 (29.50)</i>	50.09 (6.85)	0.6615
p-value within residence	0.5331	0.9284	
<b>Education</b>			
>=High School	57.71 (3.01)	50.93 (1.58)	0.0469
<High school	52.17 (4.94)	46.56 (3.50)	0.3587
p-value within residence	0.3357	0.2505	
<b>Marital status</b>			
Married	57.48 (4.03)	59.00 (2.63)	0.7523
Not married	54.94 (3.33)	44.60 (1.74)	0.0069
p-value within residence	0.6374	0.0000	
<b>Current Health Status</b>			
Excellent to Very Good	42.33 (5.05)	42.26 (2.37)	0.9913
Good	56.52 (4.46)	50.74 (2.83)	0.2806
Fair to Poor	67.79 (3.87)	62.88 (2.68)	0.3000
p-value within residence	0.0011	0.0000	

**Table 5, continued. Proportion of adults screening positive for major depression who report communicating these feelings to a physician, NHIS 1999.**

Health Status Compared to Past				
12 months				
Better				
Worse	71.29 (5.10)	57.03 (2.90)		0.0197
Same	70.70 (4.31)	57.81 (2.78)		0.0156
p-value within residence	41.98 (3.75)	42.79 (2.11)		0.8502
	0.0000	0.0000		
Obesity Status (kg/m2)				
BMI<25	63.79 (5.50)	54.54 (3.14)		0.1537
BMI 25-30	52.68 (5.62)	47.89 (3.40)		0.4662
BMI >=30	56.08 (3.80)	49.65 (2.43)		0.1642
p-value within residence	0.3439	0.3615		
Smoking Status				
Smoker	50.83 (4.03)	46.75 (2.29)		0.3828
Nonsmoker	60.98 (3.88)	52.59 (1.89)		0.0606
p-value within residence	0.0977	0.0511		
Employment				
Employed	53.55 (4.58)	43.68 (1.99)		0.0553
Not employed	59.81 (3.75)	59.89 (2.02)		0.9855
p-value within residence	0.3369	0.0000		
Income				
\$20,000 or more	57.65 (3.40)	51.52 (1.87)		0.1180
less than \$20,000	54.35 (3.55)	46.91 (2.36)		0.0841
p-value within residence	0.4902	0.1386		
Insurance				
Private	59.09 (3.07)	53.43 (1.83)		0.1182
Public	66.77 (5.97)	59.16 (3.67)		0.2792
Not covered	42.74 (5.66)	32.90 (3.18)		0.1314
Medicare only	62.91 (15.83)	63.83 (8.47)		0.9591
p-value within residence	0.0351	0.0000		
Number of Persons in Family				
One	53.10 (5.06)	48.82 (2.36)		0.4448
Two	62.87 (4.29)	53.26 (2.87)		0.0643
Three	54.92 (6.31)	50.57 (3.87)		0.5641
Four or more	52.91 (5.53)	47.88 (3.63)		0.4843
p-value within residence	0.3289	0.6134		
Diabetes				
Yes	57.96 (9.00)	68.22 (4.70)		0.3207
No	55.88 (2.71)	48.38 (1.54)		0.0186
p-value within residence	0.8247	0.0009		
Hypertension				
Yes	59.79 (4.74)	57.91 (2.74)		0.7327
No	54.50 (2.81)	47.10 (1.73)		0.0287
p-value within residence	0.3145	0.0011		

**Table 5, continued. Proportion of adults screening positive for major depression who report communicating these feelings to a physician, NHIS 1999.**

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Asthma				
	Yes	57.57 (6.38)	52.42 (3.89)	0.4919
	No	56.09 (2.87)	49.82 (1.59)	0.0577
	p-value within residence	0.8340	0.5384	
Limitations to Activities				
	Yes	62.44 (3.70)	58.60 (2.09)	0.3615
	No	46.74 (4.70)	41.11 (2.12)	0.2808
	p-value within residence	0.0162	0.0000	
Usual source of Care				
	Yes	62.40 (2.52)	56.52 (1.57)	0.0516
	No	21.18 (5.04)	25.04 (3.34)	0.5269
	p-value within residence	0.0000	0.0000	
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**Table 6. Proportion of adults screening positive for major depression who report their feelings to a non-physician health care provider or clergy, NHIS 1999.** (Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=408 N=2,598,035 %(se)	Urban n=1,415 N=8,098,610 %(se)	p-value
Total	38.92 (2.82)	34.69 (1.52)	0.1180
<b>Race/Ethnicity</b>			
Hispanic	<i>39.33 (7.06)</i>	39.69 (3.79)	0.7463
White	40.22 (3.34)	36.69 (1.93)	0.3584
AA	<i>31.33 (8.26)</i>	23.30 (3.75)	0.3630
Others	<i>28.03 (12.22)</i>	25.33 (9.86)	0.8630
p-value within residence	0.6108	0.0200	
<b>Sex</b>			
Male	41.94 (4.54)	30.11 (2.37)	0.0407
Female	37.43 (3.21)	36.89 (1.85)	0.8847
p-value within residence	0.6664	0.0215	
<b>Age Categories</b>			
18-34	39.95 (4.46)	30.92 (2.71)	0.0880
35-49	47.57 (4.67)	39.72 (2.43)	0.1299
50-64	28.27 (5.37)	36.27 (3.56)	0.2230
>=65	<i>28.19 (7.25)</i>	23.94 (4.49)	0.6263
p-value within residence	0.0264	0.0044	
<b>Language of Interview</b>			
Fluent in English	38.39 (2.84)	34.80 (1.61)	0.2689
Not Fluent in English	<i>36.14 (29.50)</i>	<i>34.34 (6.02)</i>	0.9525
p-value within residence	0.9396	0.9415	
<b>Education</b>			
>=High School	40.77 (3.08)	35.26 (1.71)	0.1131
<High school	34.74 (5.52)	32.16 (3.35)	0.6926
p-value within residence	0.3206	0.4178	
<b>Marital status</b>			
Married	36.83 (4.41)	32.81 (2.66)	0.4391
Not married	41.05 (3.39)	36.08 (1.80)	0.1928
p-value within residence	0.4560	0.3017	
<b>Perceived Health</b>			
Excellent to Very Good	30.80 (5.30)	33.00 (2.39)	0.7058
Good	40.56 (4.25)	33.30 (2.72)	0.1515
Fair to Poor	43.65 (4.61)	38.84 (2.66)	0.3690
p-value within residence	0.2099	0.1851	

**Table 6, continued. Proportion of adults screening positive for major depression who report their feelings to a non-physician health care provider or clergy, NHIS 1999.**

Health Status Change			
Better	43.05 (6.11)	42.42 (3.00)	0.9265
Worse	44.96 (5.06)	37.95 (3.47)	0.2481
Same	34.11 (3.55)	28.99 (1.92)	0.2103
p-value within residence	0.1245	0.0013	
Obesity Status (kg/m <sup>2</sup> )			
BMI<25	41.56 (5.27)	34.16 (2.88)	0.2166
BMI 25-30	41.56 (5.69)	34.90 (2.88)	0.2995
BMI >=30	37.03 (3.90)	34.95 (2.33)	0.6478
p-value within residence	0.6863	0.9742	
Smoking Status			
Smoker	38.88 (4.01)	35.63 (2.24)	0.4773
Nonsmoker	38.95 (3.80)	34.09 (1.98)	0.2540
p-value within residence	0.9898	0.5987	
Employment			
Employed	33.23 (3.79)	32.50 (1.94)	0.8639
Not employed	45.24 (3.94)	38.05 (2.22)	0.1145
p-value within residence	0.0333	0.0501	
Income			
20,000 or more	38.26 (3.76)	34.54 (2.01)	0.3861
less than 20,000	40.81 (4.23)	34.74 (2.27)	0.2114
p-value within residence	0.6517	0.9487	
Insurance			
Private	38.63 (4.55)	34.33 (1.89)	0.3852
Public	48.78 (5.63)	48.25 (3.84)	0.9379
Not covered	31.61 (5.49)	26.41 (3.00)	0.4043
Medicare only	54.46 (16.87)	36.73 (8.84)	0.4005
p-value	0.1536	0.0003	
Number of Persons in Family			
One	45.31 (4.36)	39.98 (2.34)	0.2814
Two	30.32 (4.79)	33.51 (2.61)	0.5562
Three	41.84 (6.64)	29.91 (3.53)	0.1225
Four or more	42.02 (5.62)	34.30 (3.69)	0.2605
p-value within residence	0.0907	0.0708	
Diabetes			
Yes	45.03 (8.86)	33.43 (5.58)	0.2751
No	37.38 (2.90)	34.57 (1.59)	0.3939
p-value within residence	0.4099	0.8429	
Hypertension			
Yes	42.59 (5.10)	30.26 (2.53)	0.0340
No	37.07 (3.20)	36.57 (1.81)	0.8897
p-value within residence	0.3437	0.0413	

**Table 6, continued. Proportion of adults screening positive for major depression who report their feelings to a non-physician health care provider or clergy, NHIS 1999.**

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Asthma				
	Yes	42.01 (6.28)	40.00 (3.91)	0.7876
	No	38.15 (3.20)	33.78 (1.55)	0.2193
	p-value within residence	0.5899	0.1231	
Limitations to Activities				
	Yes	42.76 (3.59)	39.12 (2.12)	0.3815
	No	32.77 (4.06)	29.66 (2.23)	0.5005
	p-value within residence	0.0579	0.0025	
Usual source of Care				
	Yes	41.80 (3.21)	39.12 (2.12)	0.3702
	No	21.97 (5.48)	29.66 (2.23)	0.6489
	p-value within residence	0.0047	0.0000	
<hr/>				

**Table 7. Proportion of adults screening positive for major depression who report communicating their feelings to any health care provider (physician or other) , NHIS 1999.**  
(Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

	Rural n=408 N=2,598,035 %(se)	Urban n=1,415 N=8,098,610 %(se)	p-value
Total	62.83 (2.46)	57.46 (1.46)	0.0622
<b>Race/Ethnicity</b>			
Hispanic	<i>51.27 (7.76)</i>	54.92 (3.76)	0.6737
White	65.67 (2.84)	60.33 (1.78)	0.1112
AA	<i>50.87 (9.20)</i>	40.10 (4.54)	0.2722
Others	<i>44.37 (10.25)</i>	<i>60.56 (8.38)</i>	0.2079
p-value within residence	0.0840	0.0010	
<b>Sex</b>			
Male	63.23 (4.56)	49.26 (2.92)	0.0106
Female	62.63 (2.94)	61.37 (1.71)	0.7124
p-value within residence	0.9129	0.0007	
<b>Age Categories</b>			
18-34	60.06 (4.35)	48.14 (2.79)	0.0242
35-49	68.85 (4.14)	62.01 (2.46)	0.1505
50-64	62.38 (5.91)	65.89 (3.69)	0.6098
>=65	<i>49.02 (8.05)</i>	55.21 (4.84)	0.5049
p-value within residence	0.1766	0.0005	
<b>Language of Interview</b>			
Fluent in English	62.69 (2.52)	57.93 (1.53)	0.1066
Not Fluent in English	<i>56.01 (29.50)</i>	53.66 (6.74)	0.5906
p-value within residence	0.4458	0.5425	
<b>Education</b>			
>=High School	65.07 (2.76)	58.42 (1.58)	0.0364
<High school	56.01 (4.97)	52.23 (3.77)	0.7454
p-value within residence	0.1059	0.1365	
<b>Marital status</b>			
Married	63.57 (3.83)	64.37 (2.59)	0.8612
Not married	61.77 (3.37)	52.96 (3.77)	0.0209
p-value within residence	0.7390	0.0005	
<b>Perceived Health</b>			
Excellent to Very Good	51.32 (5.52)	50.78 (2.48)	0.9283
Good	62.26 (4.46)	58.34 (2.85)	0.4619
Fair to Poor	72.97 (3.48)	67.43 (2.77)	0.2118
p-value within residence	0.0075	0.0001	

**Table 7, continued. Proportion of adults screening positive for major depression who report communicating their feelings to any health care provider (physician or other) , NHIS 1999.**

Health Status Change				
	Better	75.87 (5.19)	65.72 (2.83)	0.0916
	Worse	73.77 (3.88)	62.96 (2.81)	0.0278
	Same	51.00 (3.81)	50.13 (2.10)	0.8422
	p-value within residence	0.0000	0.0000	
Obesity Status (kg/m2)				
	BMI<25	69.41 (5.43)	60.63 (3.09)	0.1652
	BMI 25-30	58.11 (5.50)	55.97 (3.22)	0.7355
	BMI >=30	64.11 (3.53)	57.12 (2.41)	0.1129
	p-value within residence	0.3603	0.5867	
Smoking Status				
	Smoker	58.92 (3.85)	53.45 (2.35)	0.2264
	Nonsmoker	66.023.48)	60.06 (1.85)	0.1383
	p-value within residence	0.2005	0.0283	
Employment				
	Employed	59.12 (4.41)	52.05 (2.05)	0.1544
	Not employed	67.19 (3.61)	65.29 (1.96)	0.6430
	p-value within residence	0.0292	0.0000	
Income				
	20,000 or more	62.64 (3.34)	58.79 (1.94)	0.3235
	less than 20,000	63.21 (3.45)	54.23 (2.30)	0.0315
	p-value within residence	0.9049	0.1545	
Insurance				
	Private	65.38 (3.32)	60.06 (1.86)	0.1673
	Public	73.36 (5.47)	69.43 (3.46)	0.5440
	Not covered	49.05 (5.84)	40.26 (3.39)	0.1942
	Medicare only	72.29 (13.96)	65.67 (8.37)	0.6924
	p-value	0.0194	0.0000	
Insurance for Older Adults				
	Private	44.38 (10.46)	53.81 (6.30)	0.4425
	Public	0.00 (0.00)	52.57 (13.03)	0.0302
	Not covered	74.34 (14.04)	59.81 (9.57)	0.4226
	p-value within residence	0.0318	0.8583	
Number of Persons in Family				
	One	63.35 (4.40)	56.77 (2.29)	0.1818
	Two	67.35 (4.32)	61.62 (2.77)	0.2588
	Three	59.30 (6.65)	56.60 (3.89)	0.7293
	Four or more	59.82 (5.16)	53.58 (3.77)	0.3324
	p-value within residence	0.6483	0.3422	
Diabetes				
	Yes	71.57 (7.03)	71.76 (4.86)	0.9826
	No	61.38 (2.59)	55.91 (1.54)	0.0716
	p-value within residence	0.1754	0.0060	

**Table 7, continued. Proportion of adults screening positive for major depression who report communicating their feelings to any health care provider (physician or other) , NHIS 1999.**

Hypertension			
Yes	68.18 (4.59)	62.08 (2.67)	0.2485
No	59.88 (2.71)	55.53 (1.70)	0.1746
p-value within residence	0.1102	0.0351	
Asthma			
Yes	63.48 (4.46)	59.63 (3.76)	0.6068
No	62.63 (2.99)	56.99 (1.53)	0.0941
p-value within residence	0.9123	0.5029	
Limitations to Activities			
Yes	67.79 (3.50)	64.90 (2.11)	0.4751
No	54.88 (4.43)	49.24 (2.23)	0.2954
p-value within residence	0.0356	0.0000	
Usual source of Care			
Yes	68.62 (2.36)	63.78 (1.54)	0.0855
No	28.73 (5.75)	31.81 (3.50)	0.6502
p-value within residence	0.0000	0.0000	

**Table 8. Factors associated with a positive screening value for major depression among adults, NHIS 1999.**

Variable		Model 1 n=30,801 N=199,617,483	Model 2 n=28,056 N=183,190,728	Model 3 n=26,931 N=176,629,736
		OR (95% CI)	OR (95% CI)	OR (95% CI)
<i>Demographics</i>				
Race	Hispanic	0.72 (0.60, 0.88)	0.74 (0.59, 0.92)	0.73 (0.58, 0.92)
	Non-Hispanic White	1.00 (----)	1.00 (----)	1.00 (----)
	Non-Hispanic Black	0.90 (0.75, 1.07)	0.62 (0.51, 0.75)	0.59 (0.48, 0.72)
	Non-Hispanic Others	0.89 (0.66, 1.20)	0.75 (0.55, 1.03)	0.79 (0.57, 1.06)
Residence	Rural	1.19 (1.03, 1.38)	1.12 (0.97, 1.30)	0.99 (0.84, 1.16)
	Urban	1.00 (----)	1.00 (----)	1.00 (----)
Sex	Male	0.49 (0.44, 0.55)	0.53 (0.47, 0.60)	0.53 (0.47, 0.61)
	Female	1.00 (----)	1.00 (----)	1.00 (----)
Age	18-34	2.27 (1.83, 2.83)	3.74 (2.89, 4.85)	7.41 (5.53, 9.93)
	35-49	2.50 (2.07, 3.02)	5.31 (4.15, 6.80)	6.97 (5.34, 9.09)
	50-64	2.21 (1.74, 2.81)	4.02 (3.09, 5.23)	4.00 (3.02, 5.29)
	65+	1.00 (----)	1.00 (----)	1.00 (----)
<i>Resources</i>				
Education	High School Graduate		1.00 (----)	1.00 (----)
	Not High School Graduate		1.05 (0.89, 1.24)	0.90 (0.75, 1.08)
Income	\$20,000 or more		1.00 (----)	1.00 (----)
	Less than \$20,000		1.41 (1.24, 1.61)	1.07 (0.92, 1.24)
Employment	Employed		1.00 (----)	1.00 (----)
	Unemployed		1.91 (1.64, 2.22)	1.26 (1.06, 1.50)
Marital status	Married		1.00 (----)	1.00 (----)
	Not married		2.04 (1.73, 2.41)	1.87 (1.57, 2.22)
Number of persons in family	One		1.27 (1.01, 1.59)	1.30 (1.04, 1.64)
	Two		1.31 (1.08, 1.59)	1.22 (1.00, 1.49)
	Three		1.33 (1.11, 1.61)	1.28 (1.05, 1.56)
	Four or more		1.00 (----)	1.00 (----)
Language	Fluent in English		1.00 (----)	1.00 (----)
	Not Fluent in English		0.67 (0.49, 0.92)	0.82 (0.59, 1.14)

**Table 8. continued. Factors associated with a positive screening value for major depression among adults, NHIS 1999.**

<i>Health status</i>				
Health status change	Better			1.97 (1.67, 2.31)
	Worse			2.78 (2.31, 3.36)
	Same			1.00 (----)
Obesity	BMI >30			0.98 (0.82, 1.17)
	BMI 25-30			0.98 (0.84, 1.14)
	BMI <25			1.00 (----)
Diabetes	Yes			0.93 (0.72, 1.20)
	No			1.00 (----)
Hypertension	Yes			1.35 (1.14, 1.61)
	No			1.00 (----)
Asthma	Yes			1.17 (1.00, 1.38)
	No			1.00 (----)
Perceived health	Excellent, Very Good			1.00 (----)
	Good			1.85 (1.57, 2.18)
	Poor, Fair			2.81 (2.29, 3.45)
Limitations to activities	Limited			2.25 (1.90, 2.67)
	Not limited			1.00 (----)

\* The models originally had an interaction term for race and residence with p-value 0.1321 for model 1, 0.2173 for model 2, and 0.1850 for model 3.

**Table 9. Factors associated with the risk that depressive symptoms will interfere with life or activities, among persons screening positive for depression, adults, NHIS 1999.**

Variable		Model 1 n=1,819 N=10,673,866	Model 2 n=1,809 N=10,621,334	Model 3 n=1,680 N=9,856,844
<i>Demographic factors</i>		OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/Ethnicity	Hispanic	1.07 (0.80, 1.43)	0.94 (0.69, 1.29)	1.04 (0.72, 1.52)
	Non-Hispanic White	1.00 (----)	1.00 (----)	1.00 (----)
	Non-Hispanic Black	0.76 (0.56, 1.04)	0.68 (0.48, 0.97)	0.64 (0.43, 0.95)
	Non-Hispanic Others	0.96 (0.54, 1.67)	0.80 (0.43, 1.50)	0.78 (0.39, 1.58)
Residence	Rural	1.10 (0.87, 1.39)	0.96 (0.76, 1.23)	0.96 (0.74, 1.24)
	Urban	1.00 (----)	1.00 (----)	1.00 (----)
Sex	Male		0.98 (0.76, 1.25)	0.95 (0.73, 1.24)
	Female		1.00 (----)	1.00 (----)
Age	18-34		1.15 (0.72, 1.84)	1.17 (0.67, 2.05)
	35-49		1.38 (0.91, 2.11)	1.51 (0.89, 2.56)
	50-64		1.02 (0.68, 1.53)	1.10 (0.67, 1.80)
	64+		1.00 (----)	1.00 (----)
<i>Need</i>				
Health status	Excellent, Very Good		1.00 (----)	1.00 (----)
	Good		1.16(0.85, 1.57)	1.10 (0.80, 1.51)
	Fair, Poor		2.30 (1.60, 3.30)	2.00 (1.36, 2.94)
Health status change	Better		1.56 (1.17, 2.07)	1.49 (1.10, 2.03)
	Worse		1.56 (1.19, 2.05)	1.67 (1.26, 2.22)
	Same		1.00 (----)	1.00 (----)
Limitations to activities	Limited		1.62 (1.24, 2.11)	1.60 (1.21, 2.11)
	Not limited		1.00 (----)	1.00 (----)
Chronic conditions	Yes		0.96 (0.74, 1.25)	1.00 (0.76, 1.32)
	No		1.00 (----)	1.00 (----)
Smoking	Smoker		1.35 (1.04, 1.75)	1.21 (0.91, 1.61)
	Non smoker		1.00 (----)	1.00 (----)
<i>Facilitating</i>				
Education	High School Graduate			1.00 (----)
	Not High School Graduate			0.67 (0.49, 0.93)

**Table 9, continued. Factors associated with the risk that depressive symptoms will interfere with life or activities, among persons screening positive for depression, adults, NHIS 1999.**

Language	Fluent in English			1.00 (----)
	Not Fluent in English			0.79 (0.41, 1.52)
Marital status	Married			1.00 (----)
	Not married			1.08 (0.83, 1.40)
Employment	Employed			1.00 (----)
	Unemployed			1.22 (0.92, 1.61)
<i>Enabling</i>				
Income	\$20,000 or more			1.00 (----)
	Less than \$20,000			1.04 (0.77, 1.39)
Insurance	Private			1.00 (----)
	Public			1.75 (1.15, 2.68)
	Not covered			1.79 (1.28, 2.51)
	Medicare only			1.03 (0.41, 2.57)

\* The models originally had an interaction term for race and residence with p-value 0.6711 for model 1, 0.5620 for model 2, and 0.6064 for model 3.

**Table 10. Factors associated with communicating depressive symptoms to a physician, among persons screening positive for major depression, adults, NHIS 1999.**

Variable		Model 1 n=1,823 N=10,696,645	Model 2 n=1,813 N=10,644,113	Model 3 n=1,683 N=9,865,874
		OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/Ethnicity	Hispanic	0.79 (0.59, 1.07)	0.67 (0.49, 0.92)	0.65 (0.44, 0.96)
	Non-Hispanic White	1.00 (----)	1.00 (----)	1.00 (----)
	Non-Hispanic Black	0.47 (0.33, 0.68)	0.42 (0.29, 0.61)	0.44 (0.30, 0.64)
	Non-Hispanic Others	0.95 (0.53, 1.69)	0.81 (0.48, 1.35)	0.58 (0.33, 1.04)
Residence	Rural	1.24 (0.98, 1.58)	1.17 (0.89, 1.53)	1.17 (0.88, 1.54)
	Urban	1.00 (----)	1.00 (----)	1.00 (----)
Sex	Male		0.68 (0.53, 0.88)	0.78 (0.60, 1.02)
	Female		1.00 (----)	1.00 (----)
Age	18-34		1.18 (0.74, 1.89)	1.97 (1.05, 3.68)
	35-49		1.72 (1.12, 2.63)	2.41 (1.34, 4.35)
	50-64		1.67 (1.06, 2.65)	2.02 (1.10, 3.70)
	64+		1.00 (----)	1.00 (----)
<i>Need</i>				
Health status	Excellent, Very Good		1.00 (----)	1.00 (----)
	Good		1.33 (1.01, 1.75)	1.37 (1.03, 1.83)
	Fair, Poor		2.10 (1.49, 2.96)	2.22 (1.48, 3.33)
Health status change	Better		2.30 (1.76, 3.00)	2.20 (1.68, 2.88)
	Worse		1.58 (1.20, 2.06)	1.68 (1.25, 2.26)
	Same		1.00 (----)	1.00 (----)
Limitations to activities	Limited		1.45 (1.06, 1.83)	1.51 (1.14, 2.01)
	Not limited		1.00 (----)	1.00 (----)
Chronic conditions	Yes		1.09 (0.86, 1.38)	1.08 (0.83, 1.05)
	No		1.00 (----)	1.00 (----)
Smoking	Smoker		0.69 (0.55, 0.86)	0.82 (0.64, 1.05)
	Non smoker		1.00 (----)	1.00 (----)
<i>Facilitating</i>				
Education	High School Graduate			1.00 (----)
	Not High School Graduate			0.79 (0.56, 1.13)

**Table 10, continued. Factors associated with communicating depressive symptoms to a physician, among persons screening positive for major depression, adults, NHIS 1999.**

Language	Fluent in English			1.00 (----)
	Not Fluent			1.29 (0.63, 2.63)
Marital status	Married			1.00 (----)
	Not married			0.84 (0.64, 1.11)
Employment	Employed			1.00 (----)
	Unemployed			1.54 (1.12, 2.11)
<i>Enabling</i>				
Income	\$20,000 or more			1.00 (----)
	Less than \$20,000			0.79(0.59, 1.05)
Insurance	Private			1.00 (----)
	Public			1.06 (0.69, 1.62)
	Not covered			0.47 (0.33, 0.66)
	Medicare only			1.60 (0.66, 3.87)

\* The models originally had an interaction term for race and residence with p-value 0.0941 for model 1, 0.0595 for model 2, and 0.2183 for model 3.

**Table 11. Factors affecting the likelihood of communicating depressive symptoms to any practitioner, among persons screening positive for major depression, adults, NHIS 1999.**

(Values in italics are based on fewer than 30 unweighted observations and thus may be unreliable.)

Variable		Model 1 n=1,823 N=10,699,919	Model 2 n=1,813 N=10,647,387	Model 3 n=1,683 N=9,869,148
		OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/Ethnicity	Hispanic	1.00 (0.71, 1.39)	0.91 (0.64, 1.29)	0.86 (0.55, 1.35)
	Non-Hispanic White	1.00 (----)	1.00 (----)	1.00 (----)
	Non-Hispanic Black	0.55 (0.37, 0.82)	0.50 (0.23, 0.75)	0.51 (0.33, 0.78)
	Non-Hispanic Others	0.58 (0.25, 1.34)	0.50 (0.23, 1.08)	0.24 (0.10, 0.54)
Residence	Rural	1.18 (0.90, 1.55)	1.16 (0.87, 1.56)	1.23 (0.90, 1.67)
	Urban	1.00 (----)	1.00 (----)	1.00 (----)
Sex	Male		0.86 (0.67, 1.09)	1.02 (0.79, 1.32)
	Female		1.00 (----)	1.00 (----)
Age	18-34		2.00 (1.18, 3.37)	3.34 (1.78, 6.25)
	35-49		2.51 (1.58, 3.98)	3.82 (2.13, 6.86)
	50-64		1.61 (0.98, 2.64)	2.13 (1.20, 3.80)
	64+		1.00 (----)	1.00 (----)
<i>Need</i>				
Health status	Excellent, Very Good		1.00 (----)	1.00 (----)
	Good		1.08 (0.80, 1.47)	1.14 (0.83, 1.56)
	Fair, Poor		1.36 (0.94, 1.95)	1.21 (0.82, 1.80)
Health status change	Better		1.74 (1.31, 2.32)	1.78 (1.33, 2.39)
	Worse		1.34 (0.96, 1.88)	1.47 (1.02, 2.12)
	Same		1.00 (----)	1.00 (----)
Limitations to activities	Limited		1.52 (1.13, 2.03)	1.48 (1.08, 2.03)
	Not limited		1.00 (----)	1.00 (----)
Chronic conditions	Yes		0.91 (0.70, 1.18)	0.96 (0.73, 1.26)
	No		1.00 (----)	1.00 (----)
Smoking	Smoker		0.94 (0.75, 1.18)	0.92 (0.73, 1.17)
	Non smoker		1.00 (----)	1.00 (----)
<i>Facilitating</i>				
Education	High School Graduate			1.00 (----)
	Not High School Graduate			0.83 (0.59, 1.18)

**Table 11, continued. Factors affecting the likelihood of communicating depressive symptoms to any practitioner, among persons screening positive for major depression, adults, NHIS 1999.**

Language	Fluent in English Not Fluent			1.00 (----) 1.24 (0.60, 2.57)
Marital status	Married Not married			1.00 (----) 1.31 (0.97, 1.77)
Employment	Employed Unemployed			1.00 (----) 1.43 (1.07, 1.92)
<i>Enabling</i>				
Income	\$20,000 or more Less than \$20,000			1.00 (----) 0.91 (0.67, 1.23)
Insurance	Private Public Not covered Medicare only			1.00 (----) 1.47 (0.95, 2.28) 0.63 (0.44, 0.89) 2.31 (0.93, 5.73)

\* The models originally had an interaction term for race and residence with p-value 0.9527 for model 1, 0.9407 for model 2, and 0.4233 for model 3.



## Appendix C: References

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