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DO RACIAL AND ETHNIC DIFFERENCES EXIST IN HOSPITAL UTILIZATION AND  
CONCURRENT PSYCHIATRIC DIAGNOSES FOR SUICIDE ATTEMPTS?

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Honors Thesis

Appalachian State University

Submitted to the Department of Psychology  
and the Honors College  
in partial fulfillment of the requirements for the degree of

Bachelor of Science

May 2019

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## Abstract

This thesis examines the potential differential rates of admission and rates of serious mental illness diagnoses based on race/ethnicity and rurality for cases of self-harm in inpatient hospital settings. The Health Care Utilization Project's National Inpatient Sample was utilized to conduct binomial regression analyses on the main effects of and interactions between race and rurality for both rate of admission and rate of SMI diagnoses. ICD-10 codes were used to define cases of self-harm and were compared with DSM-V diagnoses to define SMI diagnoses. Results demonstrate a significantly increased odds of urban residents being admitted to inpatient units ( $p < .001$ ,  $OR = 1.104$ ), and urban minorities being significantly less likely to be admitted ( $p < .001$ ,  $OR = .753$ ). There was no significant main effect of race here ( $p = .222$ ,  $OR = .965$ ). Regarding rates of SMI diagnoses, Whites ( $p < .001$ ,  $OR = .748$ ) and urban residents ( $p < .001$ ,  $OR = 1.129$ ) were significantly more likely to be diagnosed while rural minorities ( $p < .001$ ,  $OR = 1.315$ ) were the least likely. The results suggest disparities in access to care for minorities and rural residents along the lines of insurance and hospital location, which may explain the rates of admission and rate of SMI diagnoses in urban areas.

Permission is granted to Appalachian State University and the Department of Psychology to display and provide access to this thesis for appropriate academic and research purposes.

### **Acknowledgements**

Thank you to the Office of Student Research at Appalachian State University for providing funding to purchase the data for this research project. Dr. Jameson, thank you for your unending support during this process; you coached me through this entire process and dealt with my general cluelessness on how to conduct research. I would also like to thank Dr. Hege for providing critiques on my writing and helping to plan the study. To my family, thank you for encouraging me to follow my aspirations which led to this invaluable opportunity.

Do racial and ethnic differences exist in hospital utilization and concurrent psychiatric diagnoses for suicide attempts?

### **Introduction**

Approximately one in six people in globally have a diagnosable mental illness at some point in their lives, and 24.8% to 32.4% of adults in the United states have a mental illness within a given 12-month period (Bagalman & Napili, 2014; Ritchie & Roser, 2018). Risk factors for mental illness include physical illness, substance abuse, neglect and abuse, poverty, persistent high stress levels, discrimination, and exposure to war or disasters (World Health Organization, 2012). Mental illness accounts for 12.96% of the total burden of disease in the United States, placing the U.S. among the countries with the highest burden of mental illness (Ritchie & Roser, 2018). The presence of a mental illness is also considered one of the major risk factors for attempted and completed suicide, with as many as 90-95% of those who die by suicide having a diagnosable mental illness at the time of death, though this estimation is based on retrospective psychological autopsies and thus is subject to hindsight bias (Nock et al., 2012). While suicide may not always be the result of mental illness, the DSM-V explicitly states that mood, anxiety, psychotic, and personality disorders have a high risk for suicidality, and Ferrari et al. (2014) determined that mental and substance abuse disorders accounted for 62.1% of total suicide disability adjusted life years. Thus, mental illnesses and suicide are linked and should be researched in the context of each other.

As the 10<sup>th</sup> leading cause of adult deaths in the United States in 2016, suicide and suicidal behavior is a major public health concern as supported through Surgeon General publications and the funding of programs such as SAMSHA (Centers for Disease Control and Prevention, & National Center for Health Statistics, 2017; HHS Office of the Surgeon

General & NAASP,2012). Rates of death by suicide vary greatly by race, with White and Native American adults 20 years old and older having the highest rates in 2016 (19.9 &17.9), and Asian/Pacific Islander, African American, and Hispanic/Latino adults having remarkably lower rates at 8.3, 7.9, & 9.0 per 100,000 deaths (CDC & NCHS, 2017). There is some evidence that suicidality is experienced differently among races/ethnicities. African American suicide decedents have been found to be less likely to report depression, be receiving mental health care before their death, or to have a family history of suicide (Abe, Mertz, Powell & Hanzlick, 2006). Suicidal ideation in the year prior to an attempt is marginally higher in White and Hispanic young adults than African American young adults (Lorenzo-Luaces & Phillips, 2014). One study determined that economic disadvantage directly increases young White male suicide and indirectly increases young African American male suicide through increased access to firearms (Kubrin & Wadsworth, 2009). Choice of method seems to vary little between races and ethnicities, however Hispanics have been noted to have above average use of firearms, while Asian and Native Americans had below average usage of firearms in their suicide attempts, with Whites and African Americans at average (Spicer & Miller, 2000). These differences are limited in number, indicating either a relative homogeneity in the experience of suicide or a lack of research into the issue.

Rural areas have consistently been associated with a higher risk of suicide than more urban areas (Spoont et al., 2011). When considering rurality, there is a drastic variation among races and ethnicities as well. Native Americans die by suicide at a rate of 9.3 in the most urban areas to 36.6 in the most rural areas, Asian and Pacific Islanders from 7.5 to 16.9, White from 16.5 to 25.5, and Hispanic/Latino from 7.9 to 12.9 (CDC & NCHS, 2017).

African Americans do not follow this trend however, demonstrating smaller differences between areas and an inverted U-curve with their completed suicide rates: 7.9 in the most urban areas, 8.6-8.9 in the middle areas along the rural-urban continuum, and 5.7 in the most rural. Regardless of the apparent protective factor rurality serves for African Americans, the mental health and suicidality of rural residing minorities should be a priority considering they are the fastest growing population in rural areas, accounting for 82.7% of the increase in non-metropolitan populations (Bolin et al., 2015).

Disparities in mental health care have been well documented along several demographic variables, including minority status and rurality of residence. Ethnic and racial minorities are significantly less likely to receive mental health care than White individuals, even when symptom levels are similar (Alegria et al., 2008). Furthermore, when minorities do receive mental health treatment the quality of such treatment tends to be significantly poorer which can be attributed to mistrust of provider and cultural insensitivity (Maura & de Mamani, 2017; Meyer, Saw, Cho, & Fancher, 2015; Alegria et al., 2008). Low rates of insurance coverage and high rates of poverty among minorities further impede access to care (Meyer, Saw, Cho, & Fancher, 2015; James et al., 2018; Peterson, Williams, Hauenstein, Rovnyak, & Merwin, 2009; Smalley et al., 2010; Nguyen-Feng, Beydoun, McShane, & Blando, 2015). A consequence of poor access to care is that African American and Hispanic individuals do not seek mental health treatment when symptoms start presenting, resulting in them being more likely to receive mental health treatment through acute care or emergency services when symptoms are at their worst (Delphin-Rittmon et al., 2015; Maura & de Mamani, 2017). Furthermore, non-Hispanic blacks have been shown to have higher rates of mental health related visits to the emergency department and have the highest rates of suicide



related visits to the emergency department compared to Whites (Larkin, Smith, & Beautrais, 2008; Larkin, Claassen, Emond, Pelletier, & Camargo, 2005; Ting et al., 2012). While emergency departments are an important initial crisis response to suicide attempts by treating the physical injuries from the attempts, admittance to inpatient services allows for suicidal individuals to receive appropriate care that emergency departments do not administer, which is evident in the emergency department's frequent use of no-harm contracts (Ronquillo, Minassian, Vilke, & Wilson, 2012). Fortunately, emergency departments provide access to inpatient care, and the path to inpatient care from emergency departments is used more by minorities than Whites (Delphin-Rittmon et al., 2015; Maura & de Mamani, 2017).

Living in rural areas poses its own problems with access to mental health care. Residents of rural areas are significantly less likely to have health insurance, and if they do have health insurance the copays for mental health services are high enough to discourage many from seeking care (Douthit, Kiv, Dwolatzky, & Biswas, 2015; Peterson, Williams, Hauenstein, Rovnyak, & Merwin, 2009). It should also be noted that many states with a high number of low-income rural areas have not implemented the Affordable Care Act, which included mental health services as an essential part of health and health care (Douthit et al., 2015). Two-thirds of rural counties in the United States have poverty rates at or above the national average, which would prevent individuals from seeking care early on if they have no insurance and must pay out of pocket (Bolin et al., 2015). There is also a lack of mental health services in rural areas, with 85% of the mental health professional shortage areas being rural (Smalley et al., 2010; Douthit et al., 2015). Low insurance rates, high poverty, and a lack of professionals to provide mental health services results in lowered access to care in rural areas. Consequences of such impeded care can be seen in the higher rates of rural

residents utilizing emergency services for mental health issues compared to urban residents (Matsu et al., 2013; Onoye et al., 2013; Spont et al., 2011).

Combining minority status and rurality inflates the severity of the poor access to care that comes with being a minority or a rural resident. Rural minorities are even more likely to live in poverty and have no health insurance, preventing their access to care (Bolin et al., 2015; Smalley et al., 2010; Peterson et al., 2009). They are more likely to self-report poor mental health than non-Hispanic White rural residents but are still less likely to receive any treatment (James et al., 2018; Cohen, Cook, Sando, & Sabik, 2018; Peterson et al., 2009). Furthermore, while rural residents tend to use primary care for mental health services, rural minorities are less likely than Whites to have a regular health care provider which indicates they do not utilize primary providers for such purposes (Kozhimannil & Henning-Smith, 2018; Cherry, Albert, & McCaig, 2018).

While rates of diagnosis are not known to differ by level of rurality, there is some evidence that mental health diagnoses differ by race and ethnicity. African Americans have been shown to be more likely to be diagnosed with conduct disorder, schizophrenia, psychotic disorder, behavioral disorder, and schizoaffective disorder, and are less likely than Whites to be diagnosed with depression, anxiety, panic disorder, bipolar disorder or mood disorders (Bao, Fisher, & Studnicki, 2008; Hamilton et al., 2018; Strakowski et al., 1996; Blow et al., 2004; Muroff, Edelson, Joe, & Ford, 2008; Maura & de Mamani, 2017; Gibbs et al., 2013; Baglivio, Wolff, Piquero, Greenwald, & Epps, 2017). One study did find that White patients in an emergency department were twice as likely to be diagnosed with any psychosis, however further investigation revealed African Americans were more likely to be diagnosed with schizophrenia and Whites were more likely to be diagnosed with organic

psychosis (Kunen, Niederhauser, Smith, Morris, & Marx, 2005). This could indicate that White patients have more head trauma that induces a form of psychosis, or that emergency department doctors fail to investigate African American patients for organic means of psychosis. For Hispanic and Latino individuals, they are more likely to receive a diagnosis of “other” and to be diagnosed with behavior or psychotic disorders, including schizophrenia, than White Americans (Blow et al., 2004; Hamilton et al., 2018; Delphin-Rittmon et al., 2015). The research is mixed on affective disorder diagnoses however, with some studies showing comparable rates between Hispanics/Latinos and Whites, while others point towards less affective diagnoses for Hispanics/Latinos (Hamilton et al., 2018; Blow et al., 2004). These differential rates of diagnoses have been reported in both emergency services and inpatient settings, meaning it is more than mental health incompetence and bias in emergency department doctors. Explanations for this are varied and include unconscious bias, more severe symptom presentation in minorities, or culturally insensitive diagnostic tools (Peltier, Cosgrove, Ohayagha, Crapanzano, & Jones, 2017; Strakowski et al., 1996; Bao, Fisher, & Studnicki, 2008). Some researchers have even suggested that disparate diagnosis of schizophrenia is due purely to differences in socioeconomic status, however recent analysis shows that while odds of schizophrenia diagnosis increases as SES decreases, it does not mediate the relationship between race and a diagnosis of schizophrenia (Blow et al., 2004).

There is a paucity of research around suicidality and the medical field’s response to it, whether it be general medicine or psychiatric. Currently, there is no published research regarding mental health diagnoses given when individuals receive medical care for suicide attempts. Thus, the demographic differences for post-suicide attempt diagnoses are also missing from the literature. There is a consensus among the literature that there are no rural-

urban differences in mental disorder prevalence, however we do not know whether rural-urban differences may show when race and ethnicity is considered (Brossart et al., 2013; Spooont et al., 2011). Most studies on suicidality and mental health in general tend to exclude or report non-significant results for minorities other than African Americans due to small participant numbers and subsequent small effect sizes from utilizing a geographically limited area for participant recruitment. There is some research on Hispanics and Latinos, however a significant number of them are left out of studies due to a lack of bilingual instruments and/or researchers, greatly reducing the sample sizes and generalizability (Alegria et al., 2007). Asian American, Pacific Islanders, Native Americans and other ethnic groups in the United States are consequently left out of much of the suicide research that goes beyond the death statistics.

The current paper seeks to improve the paucity of suicide research by addressing the shortcomings identified earlier. The Health Care Utilization Project's (HCUP) National Inpatient Sample will be used as a data source due to the high rate of transfers from emergency departments to inpatient units (Owens et al., 2017). The first aim of this study is to determine whether rate of admission to inpatient units varies by race/ethnicity, and I predict that racial/ethnic minorities will have higher rates of inpatient admission for suicide attempts than White patients. This assumption is supported by Ting et al.'s (2012) finding that African Americans had higher rates of presentation to emergency departments for suicide attempts than Whites and considering around 70% of suicidal ideation presentations to the emergency department are transferred to inpatient units, the more severe action of a suicide attempt should warrant high inpatient admission rates (Owens et al., 2017). There is some evidence that inpatient admissions are decreasing in rural areas, which is likely due to

the shortage of hospitals in rural areas, but a recent study found that rural areas had higher rates of hospital admissions which was attributed to the scarcity of outpatient psychiatric care (Spoont et al., 2011; Douthit et al., 2015; Reno, Bonham, Faulkner, 2018). Considering this, I predict that rural areas will have slightly higher rates of inpatient admissions for suicidality. Another aim of this study is to examine whether any racial disparities found in inpatient admission rates for suicide attempts vary by patient rurality. Death statistics show that rural areas have significantly higher rates of suicide deaths than urban areas for all races except for African Americans, with White and Native American deaths being the highest in rural areas (CDC & NCHS, 2017). African Americans also seem to seek medical care for suicide attempts more than Whites, which could indicate more attempts being made or more severe methods being used (Ting et al., 2012). Based on this, I expect that rural-residing racial/ethnic minorities will show slightly higher rates of inpatient admissions for suicidality.

A fourth aim of this study is to determine if there are racial disparities in psychiatric diagnoses given to individuals admitted to inpatient units for suicide attempts. I expect that racial/ethnic minorities in inpatient units for suicide attempts will receive significantly higher rate of serious mental illness (SMI) diagnoses than White inpatients, due to the observed tendency for African Americans to receive significantly higher rates of schizophrenia and for both Hispanics/Latinos and African Americans to have lower rates of mood disorder diagnoses than Whites when the reason for seeking care is not specified nor limited by researchers (Blow et al., 2004; Strakowski et al., 1996; Hamilton et al., 2018). Determining whether there is variation in diagnoses given based on patient rurality will also be explored, however no variation is expected because the literature is clear that rural and urban areas have the same rates of diagnosis and there is nothing to suggest that including suicidality

would alter this (Smalley et al., 2010). Another research aim is to find out if there is an interaction between race and rurality regarding psychiatric diagnoses. I do not expect to find a significant variation because rural areas are becoming more racially diverse, and this is unlikely to alter the comparable rates of diagnosis between rural and urban areas (Bolin et al., 2015; Smalley et al., 2010).

## **Method**

### **Source of Data**

This study analyzed data from the Healthcare Cost and Utilization Project's (HCUP) 2016 National Inpatient Sample (NIS). The NIS is a nationally representative database of inpatient hospital records from community hospitals, which encompasses non-federal, public, general and specialty hospitals in 46 states and the District of Columbia. HCUP estimates that the NIS covers approximately 96% of discharges from inpatient settings in U.S. community hospitals. Long-term, rehabilitative, and psychiatric hospitals are not included in the dataset, but patients from specialty units within a community hospital are still included; thus, psychiatric discharges from community hospitals are available for analysis. A total of 7,135,090 records are included in the 2016 dataset. It is important to note that each record in the NIS is a discharge record rather than a patient record, meaning there could be repeated visits by the same patient within the dataset.

The NIS draws from statewide data-organizations which collect information necessary for billing purposes from individual hospitals. Up to 30 ICD-10 diagnostic codes, 4 external cause of morbidity codes, and 15 procedure codes for each discharge record are included in the NIS. Length of stay, patient insurance status, and total charges are also provided in the NIS. The average age of patients was 49 years-old, approximately 56.7% of

the sample was female, and 62% were White (14.4% African American, 11.6% Hispanic, 2.9% Asian/Pacific Islander, 0.6% Native American). Patient rurality was collected using the NCHS Urban-Rural Code, which is a 6-category classification scheme for counties; 84% of cases were urban residing.

### **Self-Harm and Mental Health Diagnoses**

Self-harm was used as a proxy for suicidality considering the ICD-10 code for suicide attempts (T14.91) is non-billable and is rarely used by providers. Cases were defined as self-harm admissions if one or more diagnostic (T36-T65 & T71) or external cause codes reflected self-harm (X71-X820). Using this metric, a total of 41,208 cases included self-harm; 59.1% were female, the average age was 36 years old, and 68.4% of this subset was White (10.5% African American, 9.1% Hispanic, 1.6% Asian or Pacific Islander, 1.1% Native American).

Cases were classified as receiving a mental health diagnosis if they had the ICD-10 codes corresponding to the DSM-V diagnoses. Schizophrenia spectrum and other psychotic disorders (F20-F29), bipolar and related disorders (F31), depressive disorders (F32-F34), anxiety disorders (F40-F41), obsessive compulsive disorder (F42), trauma-related disorders (F43), substance related disorders (F10-F19), and feeding and eating disorders (F50) are coded as mental health diagnoses. Using this criterion there are a total of 2,331,554 cases (33%) of inpatient discharges with at least one mental health diagnosis in the 2016 NIS. For the self-harm subset 39,264 cases (95%) had at least one mental health diagnosis.

### **Analyses**

As this is a first look into the relationships between self-harm, diagnoses, race, and rurality in inpatient settings, these variables were simplified into dichotomous variables to

probe the potential significance. Self-harm was either present or not, and the basis for what counted as self-harm is described above. Mental health diagnoses were separated into those with a diagnosis of an SMI (which encompasses schizophrenia spectrum disorders, bipolar disorder, and major depression with psychotic features) and those without. Race was separated into White and racial/ethnic minorities. Rurality was encoded as urban and rural with the first four NCHS classifications coded as urban and the last two as rural.

A binary logistic regression was run to determine if there are differences in admission for self-harm between Whites and ethnic/racial minorities, and between rural and urban residents. The interaction between race and rurality for self-harm admissions was also determined using a binary logistic regression. The difference in the prevalence of severe mental illnesses versus other mental health diagnoses for Whites and ethnic/racial minorities admitted for self-harm was explored using a binary logistic regression. Rural and urban residing cases with self-harm were also analyzed using a binary logistic regression to determine the differences in mental health diagnoses. The interaction between race and rurality for mental health diagnoses in cases of self-harm was also explored using a binary logistic regression.

### **Results**

Of the total sample, 84% of cases were of urban residing patients. One-third of the total sample had a mental health diagnosis, 15% of which were SMI diagnoses. Most cases used Medicare, and self-pay was the least used insurance type (see Figure 1). Approximately 41,200 (.6%) of all inpatient cases received a self-harm diagnosis, 77% of which involved drugs or poisoning and 25% of which involved external injuries. Regarding this subset, 95% had a mental health diagnosis, of which 31% were SMI diagnoses. Around 83% of the self-



harm subset lived in urban areas. Type of insurance used by this subset differed from the original dataset with the majority using either Medicaid or private insurance (see Figure 1). Rurality did not differ for this subset, with 83.8% of cases regarded as urban residing. For more descriptive information see Table 1 and Table 2.

A binary logistic regression model was run to test the hypotheses that racial/ethnic minorities and rural residents were more likely to be admitted to inpatient settings for self-harm, and that rural minorities were even more likely to be admitted for self-harm than other populations. Self-harm was the outcome variable, White served as the referent category for the race variable, and rural was the reference for patient rurality. The model was statistically significant,  $\chi^2(3, N = 7,101,905) = 800.582, p < .001$  and correctly predicted 99.4% of cases. Contrary to the hypothesis, Whites were slightly more likely to be admitted to inpatient admissions for self-harm than racial/ethnic minorities, but this difference was not significant (see Table 3). A main effect of rurality was found, with urban cases being 10% more likely to be admitted to an inpatient setting for self-harm when compared to rural cases (see Table 3). The interaction between race and rurality suggest that urban residing minorities were the least likely to be admitted for self-harm (.5%) while urban Whites, rural minorities, and rural Whites were equally likely (.6%) to be admitted to inpatient units for self-harm (see Table 3 and Figure 2).

A binary logistic regression model was also used to test the hypotheses that racial/ethnic minorities had higher rates of SMI diagnoses than Whites when admitted to inpatient settings for self-harm, that rurality does not affect rates of SMI diagnoses, and that there was not a significant interaction between race and rurality here. Only cases that involved self-harm were used for this analysis. White and rural served as the referent

categories for the predictor variable and the presence of a SMI diagnoses on the case record was the dependent variable. The model was significant  $\chi^2(3, N = 40,871) = 54.138 p < .001$ , and correctly predicted 70.2% of cases. There was a main effect of race, but it did not follow the hypothesis with minorities having been 25% less likely to be diagnosed with an SMI than Whites (see Table 4). Rurality also showed a significant main effect opposite to the hypothesis with urban cases having been 13% more likely to be diagnosed with an SMI than rural (see Table 4). Results of the interaction suggest that urban Whites were most likely to receive an SMI diagnosis when admitted to an inpatient unit for self-harm and that rural minorities were the least likely (see Table 4 and Figure 3).

### **Discussion**

Results of the analyses did not provide support for the hypotheses that rural residents, minorities, and rural-residing minorities would be more likely to be admitted for self-harm, and that minorities would have higher rates of SMI diagnoses but there would be no difference for rural residents and rural residing minorities. In general, minorities and rural residing individuals are less likely to be admitted to inpatient hospitals for self-harm and are less likely to have a diagnosis of a SMI during such admissions. The analyses had exceedingly small effect sizes making it difficult to claim that they provide support for Whites and urban residents being more likely to be admitted and receive a SMI diagnosis.

### **Rates of Admission**

I hypothesized that minorities would be more likely to be admitted to an inpatient unit for self-harm than Whites. However, the results of the analyses showed a nonsignificant increase in odds for Whites to be admitted for self-harm than minorities, indicating no difference in rates of inpatient admissions. Previous research has found that minorities have

higher rates of emergency department presentations for suicide attempts and some minorities tend to reach inpatient care through emergency departments (Ting et al., 2012; Delphin-Rittmon et al., 2015). Owens et al., (2017) noted that 70% of ED admissions for suicidal ideation resulted in inpatient hospitalization. A logical conclusion from these studies is that minorities would have higher rates of inpatient admissions, which is not what the results suggest. A potential reason for this lack of support is that emergency departments do not serve as a pathway to further care for minorities. Minorities have been noted to receive poorer quality of care than their White counterparts in both overall health and specifically depression and schizophrenia treatment (American College of Physicians, 2010; Alegria et al., 2008; Maura & de Mamani, 2017). In emergency departments minorities are more likely to have a longer length of stay when controlling for all other factors, which provides basis for the decision for minorities to not seek further treatment on grounds of inadequate care (Mostajabi, 2018). A study examining racial disparities in discharges against medical advice (DAMA) revealed that while African Americans and Hispanics were more likely to leave against medical advice, the type of insurance and which hospital they are admitted to are the primary risk factors for DAMA, not race (Franks, Meldrum & Fiscella, 2006). Thus, structural factors such as insurance, which disproportionately affect minorities, could be preventing them from accessing inpatient care for self-harm.

It was also hypothesized that rural residents would have higher rates of inpatient care admission for self-harm than urban residents, but the results of the analyses revealed that urban residents were significantly more likely to be admitted than rural residents. There is mixed support for this result in the research with some older studies finding low rates of inpatient admissions due to hospital bed shortages (Spoont et al., 2011; Douthit et al., 2015).

However, a newer study found higher rates of inpatient admissions in rural areas due to a shortage of community mental health practices (Reno, Bonham, & Faulkner, 2018). Several potential reasons might explain the lack of differences in hospitalization rates for rural and urban patients. Firstly, urban residents have easier access to care than rural residents in terms of proximity to hospitals and ability to travel to hospitals with available mental health beds (Douthit et al., 2015). Rural residents may have to travel over an hour just to reach a hospital for initial medical care regarding self-harm and may have to travel several more hours just to reach a hospital that has space reserved for mental health thus reducing the likelihood that rural residents will wait for an inpatient admission. Urban residents on the other hand may have several hospitals within close proximity of each-other and it may not take long to travel to a hospital with an available mental health bed. Secondly, rural residents have been noted to use more lethal means for suicide attempts (e.g., firearms), thus it is possible that they more frequently die in transit to or in the emergency department, and never reach inpatient units to receive care for self-harm (McCarthy et al., 2012; Miller, Azrael, & Hemenway, 2002; Nestadt, Triplett, Fowler, & Mojtabai, 2017). Research is needed that explores patient residence and proximity to hospitals and subsequent deaths by suicide in transit to or in the hospital in order to determine the validity of this possible explanation.

It was hypothesized that rural minorities would be the most likely to be admitted on the basis of compounded stressors of minority and rural status as discussed earlier, as well as evidence indicating rural minorities reporting worse mental health than others (Peterson et al., 2009). Contrary to the hypothesis, the results showed that urban minorities were the least likely to be admitted for self-harm and that all other groups were admitted at equal rates. Prosser, Perrone and Pines (2007) found that minorities have lower rates of self-harm

poisonings and intentional overdose than Whites, which could account for the low rate of self-harm in urban minorities considering over three-fourths of the self-harm cases are coded as involving drugs or poisoning and minorities were concentrated in urban areas in this data set.

### **SMI Diagnoses in the Context of Self-Harm Admissions**

Regarding diagnoses of serious mental illnesses in the context of self-harm admissions, it was hypothesized that minorities would be more likely to receive such diagnoses than Whites. Contrary to the hypothesis, the results demonstrated significantly lower odds of SMI diagnoses for minorities. These results may be due to the aggregation of the separate racial/ethnic categories into one minority status, since recent literature supports that minorities receive higher rates of schizophrenia diagnoses despite similar symptomology (Schwartz, Docherty, Najolia, & Cohen, 2019). A recent meta-analysis has suggested that the geographic setting and proportion of White participants may influence the rate of schizophrenia in minorities by reflecting a lack of cultural diversity and cultural awareness in clinicians which may lead to disparate diagnoses (Olbert, Nagendra & Buck, 2018). Should the location of studies that have found higher rates of schizophrenia in minorities prove to be a significant factor in those results, then this analysis may be revealing that in the U.S. as a whole, minorities are not diagnosed with SMIs more than Whites and that it is a location-restricted phenomenon. More research needs to be conducted on a national scale to determine whether this is the case and to identify the common aspects of regions that do show disparate diagnoses.

It was hypothesized that there would be no difference in rural or urban residents in rates of SMI diagnoses, but the results of analyses once again did not support this notion.

Urban residents had higher odds of being diagnosed with an SMI than rural residents despite the literature declaring that there is no systematic difference in the rates of severe mental disorders between rural and urban areas (Smalley et al., 2010). There is evidence that rural areas have less specialized and potentially less qualified health care providers, meaning that it is possible that inpatient doctors in rural areas are not psychiatrists and are not familiar with the DSM-V (Spont et al., 2011). Lack of familiarity with the DSM-V could may be a potential reason for the lower odds of SMI diagnoses in rural areas and further analysis may reveal more diagnoses of ‘other’ or ‘not otherwise specified’ in rural cases than urban ones. Research has also revealed a migratory pattern of individuals with SMIs moving from the most rural areas and the most urban areas to moderately sized urban areas with high proportions of health care providers (Dembling, Rovnyak, Mackey, & Blank, 2002). Such migration patterns could be a factor behind the greater odds of SMI diagnoses in urban residing cases, but it cannot be replicated using the current dataset. Future research should investigate the potential connection between inadequate mental health care in rural areas and subsequent migration towards urban areas by individuals with SMIs.

The last hypothesis of this study was that there would not be a significant interaction between race and rurality regarding SMI diagnoses. Analyses did not support this hypothesis, instead suggesting that rural minorities are the least likely to be diagnosed, and that urban Whites and minorities are the most likely to be diagnosed. I considered the possibility that these results could be due to differences in the specific SMI diagnosis given, as there is evidence that African Americans are diagnosed with schizophrenia more often and that Whites are diagnosed with bipolar disorder more often, but that would not explain why rural minorities are diagnosed considerably lower, but urban minorities have a rate comparable to

urban Whites (Blow et al., 2004). I also explored the idea that it is an access to care issue, but the rates of mental health diagnosis in the total population were comparable to the racial distribution of rural and urban areas. There are no additional data or literature to help explain why rural minorities are the least likely to receive a diagnosis of an SMI.

There were some noticeable findings in the characteristics of the cases. Regarding insurance, those in the self-harm subset had higher usage of Medicaid, private insurance and self-pay than cases in the full dataset. Most notable, Medicare usage dropped by more than half from the full dataset to the self-harm subset (see Figure 1). This can be attributed to the difference in average age for each dataset, as the full dataset has an average age of 49 years-old and the self-harm subset averaged at 36 years-old. Medicare is generally only available for those who are over 65 years-old, thus those in the self-harm subset are more likely to be eligible to Medicaid or private insurance through employers (U.S. Department of Health and Human Services, 2017). Interestingly, household income based on ZIP code did not seem to vary significantly between those in the full dataset and those in the self-harm dataset (see Figure 4). This suggests that self-harm is a concern for people of all income levels and that service utilization for self-harm does not differ from general inpatient service use.

### **Limitations**

The results of this study should be considered under several limitations. One is the decision to aggregate all minority races/ethnicities into one category, creating a dichotomous variable. Minority races and ethnicities do not have universal experience and display differing rates of suicide, access to mental health treatments, and other such variables that can influence the results of related analyses (CDC & NCHS, 2017; Alegria et al., 2008). African Americans have the most researched increased odds of schizophrenia diagnosis

whereas Hispanics shift between mirroring the health trends of Whites and displaying higher odds of schizophrenia and ‘other’ diagnoses (Hamilton et al., 2018). Future research needs to parse out racial minorities in order to gain a clearer picture on trends specific to certain races/ethnicities.

The NIS utilizes the NCHS Urban-Rural code which is a six-categorization of urbanicity. This poses an issue with parsing out large counties that contain one large city and surrounding more isolated and sparsely inhabited areas from more uniformly populated counties. This can provide an inaccurate picture, and this was further exacerbated by converting the scale to a dichotomous urban/rural variable. As a result, analyses cannot pick out differences in trends in the most urban areas, moderately urban areas, and the most rural areas. Future research should try to utilize the 12-point Urban Influence codes for a more nuanced picture.

Finally, the definition of self-harm utilized for this study encompassed all ICD-10 codes that indicated intentional self-harm, but there was no way of determining if the self-harm was suicidal in nature. There may be differences in symptom presentations between people engaging in non-suicidal self-injury that requires medical care and those engaging in a suicide attempt, which could affect psychiatric diagnoses given. Relatedly, a Canadian study found that the intentional self-harm codes have poor sensitivity in regard to identifying cases that are suicide attempts (Randall, Roos, Lix, Katz, & Bolton, 2016). As such, the results may not provide a completely accurate picture on suicide related inpatient admissions.

### **Conclusion**

Suicidality is an under-researched field of study, and consequently this study is the first to use a national dataset of inpatient hospital records to analyze admission and mental



health diagnosis rates for cases of self-harm while also looking at patient race and urban/rural status. The results of this study tended to go against prior research regarding admission rates which tended to use emergency department settings rather than inpatient hospital settings, suggesting that EDs may not function as a pathway to further care for high-risk populations. Minorities and rural residents were the least likely to receive inpatient care despite research showing higher ED usage by them, (Ting et al., 2012; Matsu et al., 2013; Onoye et al., 2013; Spont et al., 2011). Considering emergency departments are not equipped to deal with suicidality, researchers and policy makers should investigate issues with accessing inpatient services such as patient distances to hospitals and insurance coverage issues so that populations at highest risk can receive the care they need (Ronquillo, Minassian, Vilke, & Wilson, 2012). Results regarding SMI diagnoses provide support for relocation to urban areas by rural residents with SMIs and that White provider to minority patient ratios or geographic location could account for racial differences (Dembling et al., 2002; Olbert, Nagendra & Buck, 2018). Considering funding for services is based on previous usage and need patterns, the pulling of funding from rural areas will only increase as more seriously mentally ill individuals move to urban areas for treatment services (Dembling et al., 2002). The literature's inability to explain why rural minorities are the least likely to receive a SMI diagnoses highlights the paucity of research into diverse rural populations which will become increasingly important as rural areas become more racially/ethnically diverse (Bolin et al., 2015). As such, future research should focus on rural minorities and how their experiences differ from their urban and White counterparts.

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## Appendix

Table 1

## Descriptive Characteristics of Cases

	Number of Cases	Percentage
<b>2016 NIS</b>	7,135,090	
Race/Ethnicity		
White	4,425,832	62%
African American	1,029,307	14.4%
Hispanic	830,225	11.6%
Other	482,615	6.7%
Missing	367,111	5.1%
Mental Health Diagnosis		
Total	2,331,554	32.7%
SMI	359,922	15.4%
Other	1,971,632	84.6%
Geographic Residence		
Urban Residing	5,963,661	83.6%
Rural Residing	1,138,244	16.0%
Median Household Income based on Zip Code		
1-42,999	2,152,900	30.2%
43,000-53,999	1,783,192	25%
54,000-70,999	1,677,599	23.5%
71,000+	1,399,948	19.6%
Insurance		
Medicare	2,823,533	39.6%
Medicaid	1,648,294	23.1%
Private Insurance	2,144,140	30.1%
Self-Pay	275,610	3.9%

Table 2

## Descriptive Characteristics of Self-Harm Cases

	Number of Cases	Percentage
<b>Self-Harm Subset</b>	41,208	.6% <sup>a</sup>
Race/Ethnicity		
White	28,178	68.4%
African American	4,346	10.5%
Hispanic	3,738	9.1%
Other	1,109	2.7%
Missing	337	0.8%
Method of Self-Harm		
Drugs/Poisoning	31,995	77.6%
External Injuries	10,368	25.2%
Mental Health Diagnosis	39,158	95%
SMI	28,909	70.2%
Other	12,299	29.8%
Geographic Residence		
Urban Residing	34,263	83.1%
Rural Residing	6,608	16%
Median Household Income based on Zip Code		
1-42,999	12,652	30.7%
43,000-53,999	10,708	26%
54,000-70,999	9,695	23.5%
71,000+	7,151	17.4%
Insurance		
Medicare	6,887	16.7%
Medicaid	14,936	36.2%
Private Insurance	12,846	31.2%
Self-Pay	4,076	9.9%

*Note.*

<sup>a</sup>This is the percentage of self-harm cases present within the entire 2016 NIS data set

Table 3

## Binary Logistic Regression for Self-Harm Admissions

	Wald	p	Odds Ratio	95% CI
Race	1.494	.222	.965	(.911, 1.022)
Rural/Urban	40.805	< .001	1.104	(1.071, 1.138)
Race x Rural	80.850	< .001	.753	(.708, .80)

*Note.* White and rural served referent groups

Table 4

## Binary Logistic Regression for Rates of SMI in Self-Harm Cases

	Wald	p	Odds Ratio	95% CI
Race	17.641	< .001	.748	(.653, .857)
Rural/Urban	12.423	< .001	1.129	(1.055, 1.207)
Race x Rural	13.844	< .001	1.315	(1.138, 1.518)

*Note.* White and rural served as referent groups

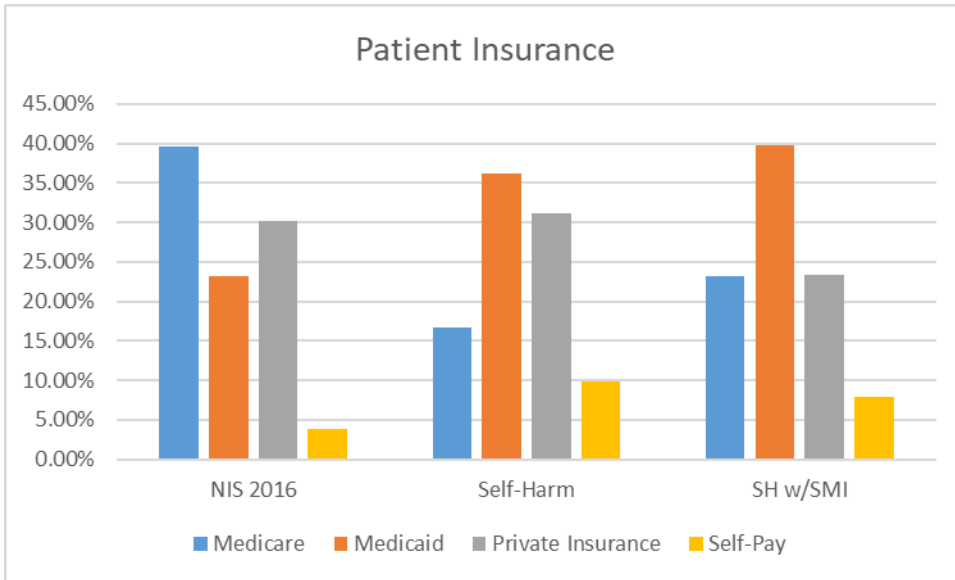


Figure 1. Expected primary payer for cases in the full dataset and subpopulations

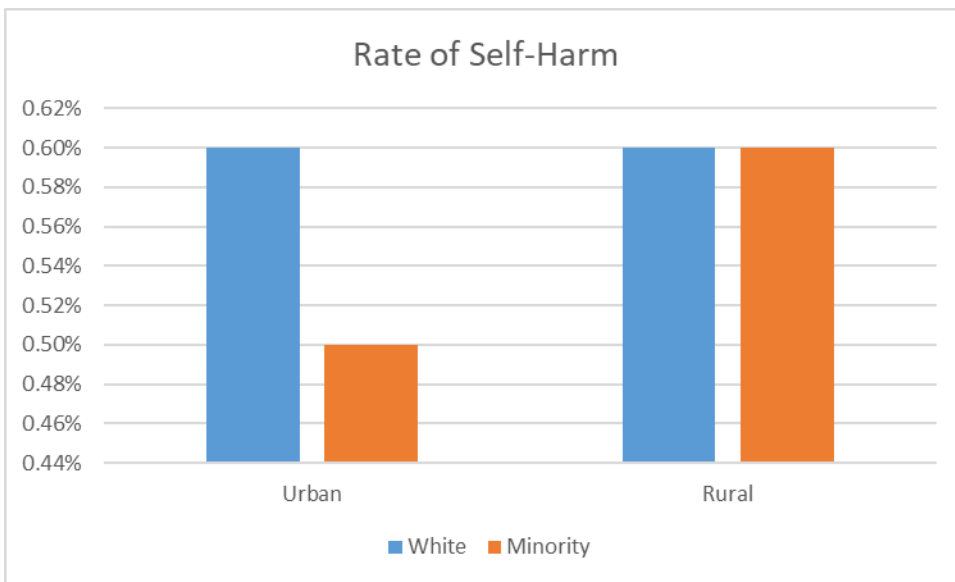


Figure 2. Rates of self-harm for urban-residing Whites and minorities, and rural-residing Whites and minorities

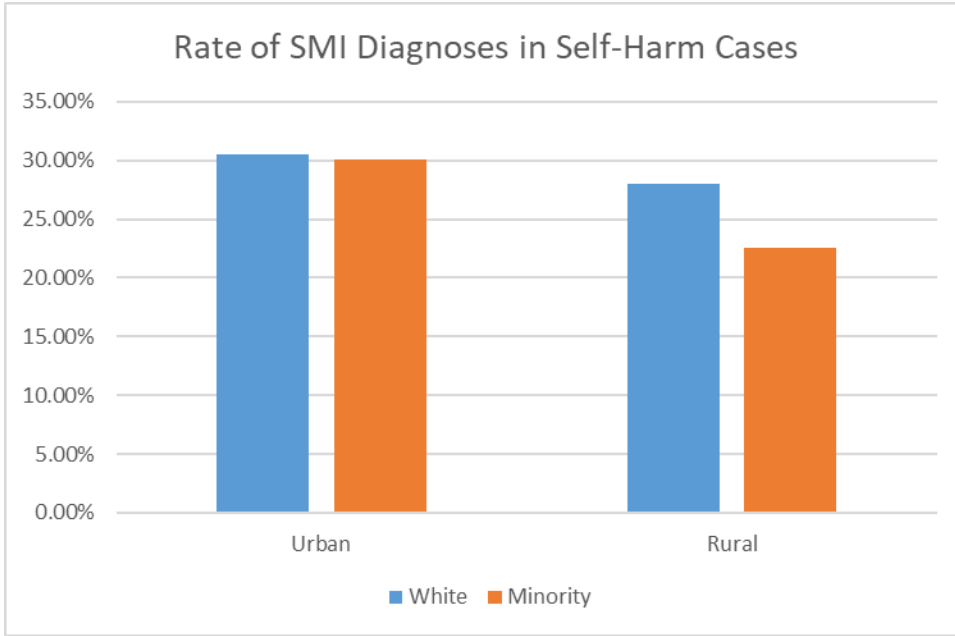


Figure 3. Rates of SMI diagnoses for urban-residing Whites and minorities, and rural-residing Whites and minorities admitted for self-harm

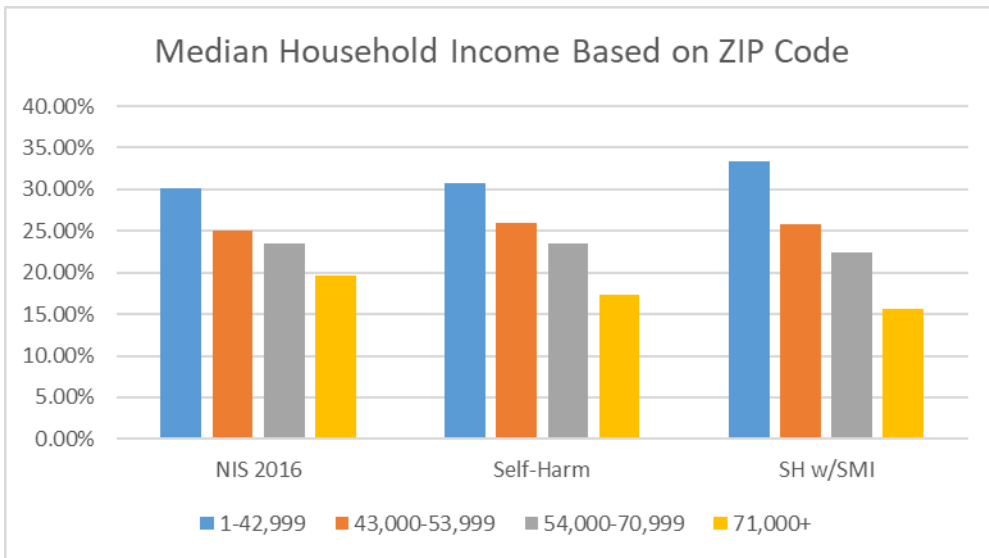


Figure 4. Median household incomes for cases in the full dataset and subpopulations



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**To:** Shayla Moniz  
Psychology ,  
CAMPUS EMAIL

**From:** IRB Administration

**Date:** 1/17/2019

**RE:** Determination that Research or Research-Like Activity does not require IRB Approval

**STUDY #:** 19-0214

**STUDY TITLE:** Do racial and ethnic differences exist in hospital utilization and concurrent psychiatric diagnoses for suicide attempts?

The IRB determined that the activity described in the study materials does not constitute human subject research as defined by University policy and the federal regulations [45 CFR 46.102 (d or f)] and does not require IRB approval.

This determination may no longer apply if the activity changes. IRB approval must be sought and obtained for any research with human participants.

If you have any questions about this determination, please contact Robin Tyndall at 262-2692; or [irb@appstate.edu](mailto:irb@appstate.edu). Thank you.



HCUP-CDOW-OrderID: 020519006MONIZSHAYL20496\_NIS Applicant: Shayla Moniz



**DATA USE AGREEMENT for the  
Nationwide Databases from the  
Healthcare Cost and Utilization Project  
Agency for Healthcare Research and Quality**

This Data Use Agreement ("Agreement") governs the disclosure and use of data in the HCUP Nationwide Databases from the Healthcare Cost and Utilization Project (HCUP) which are maintained by the Center for Delivery, Organization, and Markets (CDOM) within the Agency for Healthcare Research and Quality (AHRQ). The HCUP Nationwide databases include the National (Nationwide) Inpatient Sample (NIS), Kids' Inpatient Database (KID), Nationwide Emergency Department Sample (NEDS), and Nationwide Readmissions Database (NRD). Any person ("the data recipient") seeking permission from AHRQ to access HCUP Nationwide Databases must read and accept this Agreement electronically, and complete the online Data Use Agreement Training Course at [www.hcup-us.ahrq.gov](http://www.hcup-us.ahrq.gov), as a precondition to the granting of such permission.

Section 944(c) of the Public Health Service Act (42 U.S.C. 299c-3(c)) ("the AHRQ Confidentiality Statute"), requires that data collected by AHRQ that identify individuals or establishments be used only for the purpose for which they were supplied. Pursuant to this Agreement, data released to AHRQ for the HCUP Databases are subject to the data standards and protections established by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) (P.L. 104-191) and implementing regulations ("the Privacy Rule"). Accordingly, HCUP Databases may only be released in "limited data set" form, as that term is defined by the Privacy Rule, 45 C.F.R. § 164.514(e). HCUP data may only be used by the data recipient for research which may include analysis and aggregate statistical reporting. AHRQ classifies HCUP data as protected health information under the HIPAA Privacy Rule, 45 C.F.R. § 160.103. By executing this Agreement, the data recipient understands and affirms that HCUP data may only be used for the prescribed purposes, and consistent with the following standards:

*No Identification of Persons*—The AHRQ Confidentiality Statute prohibits the use of HCUP data to identify any person (including but not limited to patients, physicians, and other health care providers). The use of HCUP Databases to identify any person constitutes a violation of this Agreement and may constitute a violation of the AHRQ Confidentiality Statute and the HIPAA Privacy Rule. This Agreement prohibits data recipients from releasing, disclosing, publishing, or presenting any individually identifying information obtained under its terms. AHRQ omits from the data set all direct identifiers that are required to be excluded from limited data sets as consistent with the HIPAA Privacy Rule. AHRQ and the data recipient(s) acknowledge that it may be possible for a data recipient, through deliberate technical analysis of the data sets and with outside information, to attempt to ascertain the identity of particular persons. Risk of individual identification of persons is increased when observations (i.e., individual discharge records) in any given cell of tabulated data is  $\leq 10$ . This Agreement expressly prohibits any attempt to identify individuals, including by the use of vulnerability analysis or penetration testing. In addition, methods that could be used to identify individuals directly or indirectly shall not be disclosed, released, or published. Data recipients shall not attempt to contact individuals for any purpose whatsoever, including verifying information supplied in the data set. Any questions about the data must be referred exclusively to AHRQ. By executing this Agreement, the data recipient understands and agrees that actual and considerable harm will ensue if he or she attempts to identify individuals. The data recipient also understands and agrees that actual and considerable harm will ensue if he or she intentionally or negligently discloses, releases, or publishes information that identifies individuals or can be used to identify individuals.

*Use of Establishment Identifiers*—The AHRQ Confidentiality Statute prohibits the use of HCUP data to identify establishments unless the individual establishment has consented. Permission is obtained from the HCUP data sources (i.e., state data organizations, hospital associations, and data consortia) to use the identification of hospital establishments (when such identification appears in the data sets) for research, analysis, and aggregate statistical reporting. This may include linking institutional information from outside data sets for these purposes.

Such purpose does *not* include the use of information in the data sets concerning individual establishments for commercial or competitive purposes involving those individual establishments, or to determine the rights, benefits, or privileges of establishments. Data recipients are prohibited from identifying establishments directly or by inference in disseminated material. In addition, users of the data are prohibited from contacting establishments for the purpose of verifying information supplied in the data set. Any questions about the data must be referred exclusively to AHRQ. Misuse of identifiable HCUP data about hospitals or any other establishment constitutes a violation of this Agreement and may constitute a violation of the AHRQ Confidentiality Statute.

By checking the Acknowledgment box or accessing or using any part of the HCUP Nationwide databases, data recipients agree to provide the following affirmations concerning HCUP data:

#### Protection of Individuals

- I will not release or disclose, and will take all necessary and reasonable precautions to prohibit others from releasing or disclosing, any information that directly or indirectly identifies persons. This includes attempts to identify individuals through the use of vulnerability analysis or penetration testing.
- I acknowledge that the release or disclosure of information where the number of observations (i.e., individual discharge records) in any given cell of tabulated data is  $\leq 10$  can increase the risk for identification of persons. I will consider this risk and avoid publication of a cell containing a value of 1 to 10.
- I will not attempt to link, and will prohibit others from attempting to link, the discharge records of persons in the data set with individually identifiable records from any other source.
- I will not attempt to use and will take all necessary and reasonable precautions to prohibit others from using the data set to contact any persons in the data for any purpose.

#### Protection of Establishments

- I will not publish or report, through any medium, data that could identify individual establishments directly or by inference.
- When the identities of establishments are not provided in the data sets, I will not attempt to use and will take all necessary and reasonable precautions to prohibit others from using the data set to learn the identity of any establishment.
- I will not use and will take all necessary and reasonable precautions to prohibit others from using the data set concerning individual establishments: (1) for commercial or competitive purposes involving those individual establishments; or (2) to determine the rights, benefits, or privileges of individual establishments.
- I will not contact and will take all necessary and reasonable precautions to prohibit others from contacting establishments identified in the data set to question, verify, or discuss data in the HCUP databases.
- I acknowledge that the HCUP NIS, KID, and NRD may contain data elements from proprietary restricted computer software (e.g., 3M™ APR DRGs) supplied by private vendors to AHRQ for the sole purpose of supporting research and analysis with the HCUP NIS, KID, and NRD. While I may freely use these data elements in my research work using the HCUP NIS, KID, and NRD I agree that I will not use and will prohibit others from using these proprietary data elements for any commercial purpose. In addition, I will enter into a separate agreement with the appropriate organization or firm for the right to use such proprietary data elements for commercial purposes. In particular, I agree not to disassemble, decompile, or otherwise reverse-engineer the proprietary software, and I will prohibit others from doing so.

#### Limitations on the Disclosure of Data and Safeguards

- I acknowledge and affirm that I am personally responsible for compliance with the terms of this Agreement, to the exclusion of any other party, regardless of such party's role in sponsoring or funding the research that is the subject of this Agreement.

- I will only allow access to HCUP Nationwide data to those who have become authorized users of the HCUP data by signing a copy of this Data Use Agreement and completing the online Data Use Agreement Training Course at [www.hcup-us.ahrq.gov](http://www.hcup-us.ahrq.gov). Before granting any individual access to the data set, I will submit the signed data use agreements to the address at the end of this Agreement.
- I will not use or disclose and I will prohibit others from using or disclosing the data set, or any part thereof, except for research, analysis, and aggregate statistical reporting, and only as permitted by this Agreement.
- I will not redistribute HCUP data by posting on any Website or other publicly-accessible online repository.
- I will ensure that the data are kept in a secured environment and that only authorized users will have access to the data.
- I acknowledge and affirm that interpretations, conclusions, and/or opinions that I reach as a result of my analyses of the data sets are my interpretations, conclusions, and/or opinions, and do not constitute the findings, policies, or recommendations of the U.S. Government, the U.S. Department of Health and Human Services, or AHRQ.
- I agree to acknowledge in all reports based on these data that the source of the data is the "National Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality." Substitute "Nationwide Inpatient Sample (NIS)" (if using data prior to 2012), "Kids' Inpatient Database (KID)," "Nationwide Emergency Department Sample (NEDS)," or "Nationwide Readmissions Database (NRD)" as appropriate.
- I will indemnify, defend, and hold harmless AHRQ and the data organizations that provide data to AHRQ for HCUP from any or all claims and losses accruing to any person, organizations, or other legal entity as a result of violation of this Agreement. This provision applies only to the extent permitted by Federal and State law.
- I agree to report the violation or apparent violation of any term of this Agreement to AHRQ without unreasonable delay and in no case later than 30 calendar days of becoming aware of the violation or apparent violation.

#### Terms, Breach, and Compliance

Any violation of the terms of this Agreement shall be grounds for immediate termination of this Agreement. AHRQ shall determine whether a data recipient has violated any term of the Agreement. AHRQ shall determine what actions, if any, are necessary to remedy a violation of this Agreement, and the data recipient(s) shall comply with pertinent instructions from AHRQ. Actions taken by AHRQ may include but not be limited to providing notice of the termination or violation to affected parties and prohibiting data recipient(s) from accessing HCUP data in the future.

In the event AHRQ terminates this Agreement due to a violation, or finds the data recipient(s) to be in violation of this Agreement, AHRQ may direct that the undersigned data recipient(s) immediately return all copies of the HCUP Nationwide Databases to AHRQ or its designee without refund of purchase fees.

Acknowledgment

I understand that this Agreement is requested by the United States Agency for Healthcare Research and Quality to ensure compliance with the AHRQ Confidentiality Statute. Checking the Acknowledgment box or accessing or using any part of the HCUP Nationwide databases indicates that I understand the terms of this Agreement and that I agree to comply with its terms. I understand that a violation of the AHRQ Confidentiality Statute may be subject to a civil penalty of up to \$14,140 under 42 U.S.C. 299c-3(d), and that deliberately making a false statement about this or any matter within the jurisdiction of any department or agency of the Federal Government violates 18 U.S.C. § 1001 and is punishable by a fine, up to five years in prison, or both. Violators of this Agreement may also be subject to penalties under state confidentiality statutes that apply to these data for particular states.

Signed: Digitally Acknowledged on Order 20496 02/05/19 Date: 02/05/19

Print or Type Name: Shayla Moniz

Title: \_\_\_\_\_

Organization: Appalachian State University

Address: 222 Joyce Lawrence Lane

Address: \_\_\_\_\_

City: Boone State: North Carolina ZIP Code: 28608

Phone: 8282628950 Fax: \_\_\_\_\_

E-mail: monizsr@appstate.edu

The information above is maintained by AHRQ only for the purpose of enforcement of this Agreement and for notification in the event data errors occur.

Note to Purchaser: Shipment of the requested data product will only be made to the person who executes this Agreement, unless special arrangements that safeguard the data are made with AHRQ or its agent.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0935-0206. The time required to complete this information collection is estimated to average 30 minutes per response, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments concerning the accuracy of the time estimate(s) or suggestions for improving this form, please write to: Agency for Healthcare Research and Quality, Attn: Reports Clearance Officer, 5600 Fishers Lane, Rockville, Maryland 20857.

OMB Control No. 0935-0206 expires 01/31/2019.