

## Regional Variations in Hospitalization for Psychosis in New Mexico, 2013

Mental disorders cause changes in thinking, mood, and behavior and can affect decision-making and quality of life. Psychotic mental disorders cause serious functional impairment and include dementias, alcohol- and drug-induced mental disorders, transient or persistent hallucinations and delirium, schizophrenic disorders, episodic mood disorders (such as bipolar disorder and major depression), pervasive developmental disorders (such as autism), and delusional disorders. According to a 2008-2012 study, 17 million adults in the United States (7.4% of total adult population) suffered from an episodic mood disorder over five years, and 0.6% of adults experienced psychotic symptoms including hallucination or delusion<sup>1</sup>. Adults experiencing a debilitating mental illness are more likely to report poor physical health, lower socioeconomic status, and being victims of violence<sup>2</sup>. These individuals are also at increased risk of substance abuse<sup>3</sup>. Acute episodes of psychosis often result in hospitalization.

In 2013, the Southeast region of New Mexico had a hospitalization rate for psychosis that was more than 80% higher than any other region. The relatively high rate of hospitalizations in the Southeast region raised three questions: 1) was the psychosis-related hospitalization rate in the Southeast region truly higher than the rest of the state when accounting for multiple hospital discharges and secondary diagnoses; 2) what populations are experiencing a disproportional burden of psychosis-related hospitalization in this region; and 3) what categories of psychosis are responsible for the highest burden of psychosis-related hospitalizations?

### Methods

This analysis utilized Hospital Inpatient Discharge Data (HIDD), a dataset maintained by the New Mexico Department of Health (NMDOH), and included inpatient discharges from hospitals located in New Mexico<sup>4</sup>. Inpatient discharges were defined as departures from a hospital after overnight stay, regardless of the destination after departure. Data were generated and

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reported by the discharging hospital. Discharges from federal hospitals were not available. Duplicate records, records with out-of-state or unknown zip codes, records with unknown age, records with unknown gender, and records with unknown or invalid primary diagnosis codes were excluded from this analysis.

Discharges occurring in 2013 were included in this analysis. Records included a primary diagnosis and up to 17 secondary diagnoses, which were coded using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). Psychotic mental disorders included ICD-9-CM codes 290-299. Records for patients with multiple hospitalizations in 2013 were de-duplicated using first name, last name, middle initial, social security number, date of birth, gender, and Medicaid number using The Link King v7.1.21, which utilizes probabilistic and deterministic linking algorithms<sup>5</sup>. Statistical analysis was performed using SAS v.9.3. Z-scores were calculated to determine statistical significance ( $\alpha=0.05$ ).

### Results

In 2013, there were 8,529 hospitalizations of New Mexico residents with a primary diagnosis of psychosis, or 40.7 hospitalizations per 10,000 population. Most of these hospitalizations were due to episodic mood disorders (52.6%), schizophrenic disorders (16.4%), and alcohol-induced mental disorders (12.7%). The rate of psychosis-related hospitalization ranged geographically from 29.9 per 10,000 population in the Northwest region of New Mexico to 68.5 in the Southeast region (Figure 1). When hospitalizations with a secondary diagnosis of psychosis were included, the rate of hospitalization was 124.1 per 10,000 person-years and ranged from 104.6 in the Northwest to 143.4 in the Southeast.

After accounting for multiple hospital discharges by the same person, rates of hospitalization for primary diagnosis of psychosis were recalculated. The rate for New Mexico was 30.9 per 10,000 population, ranging from 23.2 in the Northwest region to 50.3 in the Southeast region. The rate of in the Southeast was 80.9% higher than the rest of the state ( $p<0.05$ ). Adjusting hospitalization rates for age using the 2000 U.S. standard population did not change regional rates significantly. The remainder of the results presented reflect hospitalizations with primary diagnosis of psychosis, and count each person only once.

The rate of psychosis-related hospitalization for New Mexico was 17.3% higher among males than females ( $p<0.05$ ). This disparity was largest in the Northwest region (30.6%) and smallest in the Southeast region (4.8%).

The majority of psychosis-related hospitalizations were attributable to episodic mood disorders (17.5 per 10,000 population), followed by schizophrenic disorders (5.0) and alcohol-induced mental disorders (4.3) (Table 1). Compared to the rest of the state, the Southeast region had a significantly higher rate of hospitalization for episodic mood disorders (127.4% higher,  $p<0.05$ ), schizophrenic disorders (90.2% higher,  $p<0.05$ ), persistent mental disorders (66.3% higher,  $p<0.05$ ), and other organic psychoses not classified elsewhere (57.7% higher,  $p<0.05$ ). The Metropolitan region had the highest rate of hospitalization for alcohol-induced mental disorders (34.4% higher than the rest of the state,  $p<0.05$ ).

For all age groups above 14 years, the Southeast region had the highest rate ( $p<0.05$ ) (Figure 2). The largest disparity occurred in the 25 to 44 age group, where the Southeast region's incidence was 127.6% higher than the rest of the state. The rate of hospitalization for episodic mood disorders peaked in the 25 to 44 years age group in the Southeast; however, in the rest of the state, this rate peaked in the 15 to 24 years age group (not shown).

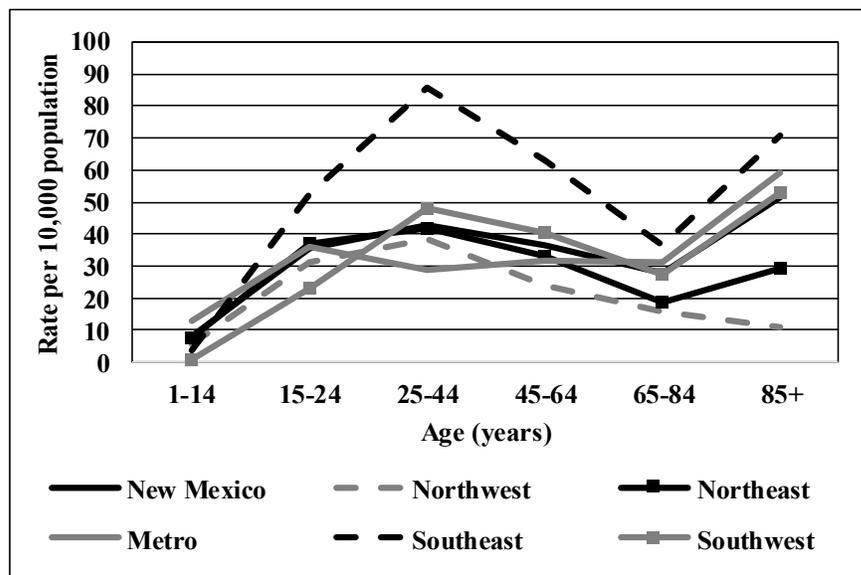
## Discussion

This analysis supports the observation that the Southeast region of New Mexico had a significantly higher rate of psychosis-

related hospitalizations compared to the rest of the state in 2013. This difference has been supported by accounting for secondary diagnoses not previously reported as well as multiple hospitalizations per person. The increased burden of psychosis requiring hospitalization in this region appears to have fallen largely on the age group of 25 to 44 years in the form of episodic mood disorders.

The burden of acute psychosis in the working-age group suggests two potential factors. First, regional employment differences and changes over time should be considered. Several environmental factors related to employment – such as housing, interpersonal interactions, poverty, work stress, and unemployment – can adversely affect mental health<sup>6</sup>. According to the Bureau of Labor Statistics, more than half of the natural resources and mining workforce (including agriculture, forestry, fishing, hunting, mining, quarrying, and oil and gas extraction) in New Mexico is employed in the Southeast region, an area where only 14% of the state population resides<sup>7</sup>. It would be beneficial to better understand the quality of life experienced by these workers and their unique public health needs. Second, regional differences and changes in behavioral health care may impact overall rates of hospitalization for psychosis. In 2013, only 4.0% of psychiatric hospitalizations in the Southeast occurred in a specialized psychiatric facility, compared to 13.1% in the rest of the state. This raises the question of availability of inpatient and outpatient treatment to treat and prevent acute

**Figure 2. Rate of Patient-Level Primary Psychosis Hospitalizations by Region and Age, New Mexico, 2013**



psychotic episodes<sup>8</sup>. Similar to conclusions drawn from studies of asthma care in the Southeast region, health care providers may not be providing adequate care for chronic mental illness resulting in patients being hospitalized more frequently. This could be due to a lack of provider availability or a lack of education about mental illness<sup>9</sup>.

There are limitations to the conclusions that can be drawn from the 2013 HIDD dataset. First, federal hospitals are not required to report hospital discharge data to NMDOH. Due to these missing data, it is reasonable to assume that the hospitalization rates are underestimated. Hospitalization rates in the Northwest and Metropolitan regions are more likely to be underestimated compared to other regions due to the location of Veterans Affairs and Indian Health Services hospitals. Second, hospital discharges of New Mexico residents from out-of-state hospitals are not available to NMDOH. This is particularly a concern for the southern regions, which are largely within driving distance of the cities of El Paso, TX or Lubbock, TX and the hospitals located there. It should be noted that, similar to the Southeast region, the Southwest region also had relatively high rates of hospitalization in the 25 to 44 years age group in 2013. Third, in 2013, two psychiatric hospitals located in the Southwest region did not report hospital discharges to NMDOH. Presumably, the hospitalization rates (particularly for psychosis) would be higher than reported if these data were available. Finally, regional differences by race and ethnicity were not evaluated because the HIDD currently does not include this information for a large proportion of the hospitalizations.

In conclusion, the Southeast region of New Mexico experienced a relatively high rate of acute episodes of psychosis requiring inpatient treatment, but 96% of these discharges occurred at general hospitals instead

of specialized psychiatric facilities. Access to both inpatient and outpatient treatment should be assessed throughout the state in order to ensure that residents have adequate access to treatment to prevent future psychotic episodes. In addition, the quality of life among those working in the natural resources and mining industry should be assessed for potential public health needs.

### Acknowledgements

The author would like to acknowledge the work of the Health Systems Epidemiology Program for assisting with HIDD analysis; Ervin J. Garcia, the Southeast Region Community Epidemiologist, for guidance; Chris Wenker of the Community Health Assessment Program for creating figures; and Dan Green for editing.

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**Table 1. Rate of Patient-Level Primary Psychosis Hospitalizations by Region and Selected Mental Disorders, New Mexico, 2013**

Region	Rate per 10,000 population			
	All Psychotic Disorders	Episodic Mood Disorders	Schizophrenic Disorders	Alcohol-Induced Mental Disorders
New Mexico	30.9	17.5	5.0	4.3
Northwest	23.2	14.6	2.7	4.2
Northeast	28.8	14.4	5.8	4.9
Metropolitan	27.9	13.7	4.0	5.0
Southeast	50.3	33.8	8.5	2.8
Southwest	29.5	18.1	5.4	3.1

The New Mexico Epidemiology Report

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The New Mexico Epidemiology Report  
(ISSN No. 87504642) is published monthly

by the  
Epidemiology and Response Division  
New Mexico Department of Health  
1190 St. Francis Dr.  
P.O. Box 26110, Santa Fe, NM 87502

24-Hour Emergency Number:  
(505) 827-0006  
www.health.state.nm.us

**Figure 1. Rate of Record-Level Primary Psychosis Hospitalizations by County, New Mexico, 2013**

