Geographical Distribution of Insanity in America: Evidence for an Urban Factor

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Abstract

The geographic distribution of insanity and schizophrenia in the United States is examined for 9 separate years between 1880 and 1963. A concentration of these conditions in Northeastern and Pacific Coast States was remarkably consistent over the 83 years. States with a high prevalence rate had approximately three times more insanity and schizophrenia than those with a low prevalence rate. There is a direct regional correlation of insanity/schizophrenia with urbanization, which is consistent with previous studies. There is also a direct regional correlation of schizophrenia with socioeconomic status, which contradicts previous studies carried out in large cities in which the schizophrenic rates were inversely correlated with socioeconomic status. The apparent discrepancy can be explained by postulating that the direct regional correlations are due to correlations of urbanization and socioeconomic status (cities have higher mean incomes than rural areas) whereas, within a particular city, schizophrenia is more prevalent among lower socioeconomic groups because of drift and other factors. Social, stress and crowding, genetic, and biological factors are discussed as possible explanations for the urban factor associated with insanity/schizophrenia.

The greatest proportion of insanity is in the northeast, in the New England and Middle States, of which New Hampshire, Vermont, Massachusetts, Connecticut and New York all have one insane person to less than 400 of the population. If from this center of greatest prevalence of insanity we draw a line in any direction—west, south, or southwest—we see that no matter which way we go we find a steady decrease until we strike the Pacific slope. [White 1903, p. 259]

It has been consistently observed over the past 150 years that seriously mentally ill individuals are not uniformly distributed throughout the United States. As early as 1840, in the first census of the insane in America, it was found that Northeastern States had an insanity rate approximately four times that of Midwestern and Southern States (Gorwitz 1966). Later American studies among groups from the rural Amish and Hutterites to residents of inner cities also suggested a three- to fourfold difference in prevalence rate for psychoses (Torrey 1987). Most recently, the National Institute of Mental Health (NIMH) five-site Epidemiologic Catchment Area survey reported that the 6-month prevalence rate of schizophrenia varied almost threefold between Los Angeles, California (lower) and New Haven, Connecticut; Baltimore, Maryland; and Piedmont, North Carolina (higher); this variation was greater than that for affective disorders, substance abuse disorders, anxiety/somatoform disorders, or antisocial personality disorders (Burnam et al. 1987).

The most complete analysis of geographical differences in the prevalence of insanity in America was published in 1903 by Dr. William A. White. He noted "a condition of affairs which is so well marked that when I first saw it I was very much surprised" (White 1903, p. 259). The Northeastern States and those on the Pacific Coast had the highest prevalence of insanity, and, White observed, "the decrease of insanity as we go from the northeastern part of

the United States south, west, or southwest must strike you as being remarkably uniform and constant" (p. 259). White considered several possible explanations—including climatic conditions—for the varied distribution, but he found the highest correlations with the density of population ("we have an almost exact parallel with the distribution of insanity" [p. 264]) and with the percentage of the population in cities of 8,000 or more ("here again we see the same parallelism" [p. 264]). White concluded that "insanity is the result of the stresses incident to the progressive civilized state" (p. 263), especially "the stresses incident to active competition" (p. 276). He further noted, "If [the numbers] do not prove that insanity is the necessary result of civilization, they at least prove that the civilized state offers those conditions in greater number which bring it about, and so if the connection be not one of necessity it is at least one of fact" (p. 269).

Given such evidence for a nonrandom distribution of insanity in the United States, the authors undertook an analysis of prevalence data over an 83-year time period to test Dr. White's observations and, if those observations were found to be valid, to look for correlations that might explain them.

Method

The rate of insanity or schizophrenia was calculated for each State for nine periods from 1880 to 1963. Census enumerations of the insane in the United States before 1880 were said to be "entirely worthless. . . . [T]he number of insane returned in these censuses was certainly less than half the number actually present" (U.S. Bureau of the Census 1895, p. 7).

After 1967, the National Institute of Mental Health (NIMH) ceased collecting prevalence data from all States on the mentally ill and began a system of sampling instead. All rates were calculated per total State population aged 15–45 for the closest census decennial year and are summarized in table 1. The rate for 1963 is for individuals with schizophrenia residing in public mental hospitals.

The epidemiologic relationship between prevalence and incidence is described by the equation $P = I \times D$, where D equals the duration of the disease. In the case of chronic schizophrenia, in which the duration is lifelong and does not differ appreciably by location, the substitution of incidence for prevalence should not affect the geographic distribution of the disease.

A more detailed account of the data base and diagnostic criteria for each of the nine periods follows.

1880 (U.S. Bureau of the Census 1888): This census of the insane was the most complete count of the mentally ill ever done in the United States. As part of the decennial census, all institutions in which "defective, dependent and delinquent classes" (p. ix) might reside were carefully surveyed; the institutionalized patients constituted 45 percent of the total. For those mentally ill persons residing outside institutions and comprising 55 percent of the total, census enumerators made inquiries and, if replies were positive, asked "certain definite questions" (p. ix). To supplement the information on any individual cited as possibly being insane, the enumerator "was instructed to counsel with [local] physicians upon this point, to make inquiries of neighbors, and to report all [insane persons] whether the information respecting them should be derived from the family to which they belonged or to other sources" (p. ix). In addition, all 100,000 physicians in the United States were asked to "report to the Census Office all idiots and lunatics within the sphere of their personal knowledge" (p. x), with an 80-percent physician response rate. All duplication of names between physicians and enumerators were deleted "by employing a sufficient

Table 1. Data for insanity and schizophrenia rates

Year	Total patients	Description of patients
1880	91,959	Insane individuals living in hospitals, in other
1890	106,485	institutions, or in the community
1903	150,151	Insane individuals living in public or private
1910	187,791	mental hospitals
1923	114,240	Resident patients with schizophrenia in public or private mental hospitals
1933	21,442	First admissions with schizophrenia to public mental hospitals
1943	17,335	
1953	28,371	
Year	Total patients	Description of patients
1963	243,138	Resident patients with schizophrenia in public mental hospitals

were taken with this branch of the work" (p. x).

The insane were counted separately from idiots and tabulated under seven forms of insanity, a division arrived at "on consultation with the members of the New England Psychological Association and with other expert scientists" (p. xli). These forms of insanity, with the percentage for each of the total insane, were as follows:

1. Mania (38%): "a state of nervous, intellectual, and emotional exaltation and excitement"
2. Melancholia (19%): "a state of depression"
3. Monomania (2%): "fixed delusions on a particular subject"
4. Dementia (29%): "the condition of imbecility into which mania and melancholia ultimately degenerate"
5. Paresis (2%): "general paralysis of the insane"
6. Dipsomania (1%): "alcoholic insanity"
7. Epilepsy (9%): not defined

Thus, the categories of mania, melancholia, monomania, and dementia comprised 88 percent of the insane; these included patients who today would be diagnosed with schizophrenia and bipolar disorder.

(Note: Data for the Oklahoma Territory were missing, and the Dakotas were reported as a single entity.)

1890 (U.S. Bureau of the Census 1895): This census was similar to that done in 1880 except that the physician solicitation was not included. Since physician reports had accounted for 17 percent of the insane in the community in 1880 and since State hospitals were rapidly increasing and enlarging, the total

insane population in institutions increased from 45 percent in 1880 to 70 percent in 1890 while those enumerated in the community decreased from 55 percent to 30 percent. The same categories of insanity were used as in the 1880 survey except that both mania and melancholia were subdivided into acute and chronic forms; these categories, plus monomania and dementia, constituted 96 percent of the total insane population.

1903 (U.S. Bureau of the Census 1906): Since the insane had not been included in the decennial census of 1900, a special census was undertaken to count all insane patients in either public ($n = 226$) or private ($n = 102$) mental hospitals as of December 31, 1903. There was widespread concern in the United States that the number of insane patients was increasing rapidly, as evidenced by 34 new State hospitals that had opened between 1890 and 1904. The definition of insane appears to have been similar to that used in the 1880 and 1890 censuses. The total number of resident insane persons was found to be 150,151, said to be a phenomenal accumulation of insane in hospitals compared with the 74,028 insane patients reported in all institutions (including jails and almshouses) in 1890. Data were also collected on all admissions (first and readmissions) to the hospitals, which totaled 49,622.

1910 (U.S. Bureau of the Census 1914): As part of the decennial census, a special study of all insane and feeble-minded in institutions was undertaken. A total of 187,791 resident insane persons were counted, of which 159,096 were in State hospitals, 21,146 in county or city hospitals, and 7,549 in private hospitals. The definition of insane appears to

have been similar to that used in the previous surveys except that epileptics were excluded; the categories of alcoholic psychosis and general paralysis together comprised approximately 16 percent of the total. As in 1903, the total number of admissions was also counted; they numbered 60,769.

1923 (U.S. Bureau of the Census 1923–63): The next census of mental patients in the United States was carried out in 1923 and covered all patients resident on January 1, 1923, and all first admissions for 1922. This was the first time that first admissions were enumerated separately, and it reflected a continuing concern that the incidence of mental diseases was increasing. The 1923 survey also provided a more precise diagnostic breakdown than had been used in previous surveys, incorporating the new classification of mental diseases published by the American Psychiatric Association (APA) in 1917. Dementia praecox (schizophrenia) was defined as including such symptoms as delusional and illogical thinking, thought insertion, and blunted or inappropriate affect; it was differentiated in the survey from manic-depressive psychoses, paranoid conditions, and psychoses with psychopathic personality, mental deficiency, epilepsy, syphilis, alcoholism, or other organic conditions.

The 1923 survey appears to have been a complete inventory of all hospitals for mental diseases, including 165 State hospitals (which accounted for 86% of all patients); 4 State psychopathic hospitals; 148 city, county, and Veterans Administration hospitals; and 213 private hospitals. Between 1910 and 1923, 23 new State mental hospitals had opened. The total number of resident patients diagnosed with schizophrenia was

114,240, and the number of first admissions with this diagnosis was 15,526. Data for Montana were not available.

1933 (U.S. Bureau of the Census 1923–63): Beginning in 1926, the U.S. Bureau of the Census began an annual enumeration of patients in public hospitals for mental disease, inaugurated in response to the urgent request of the APA, the National Committee for Mental Hygiene, and other organizations interested in the development of more adequate social statistics. The 1917 APA definition of schizophrenia continued to be used. The 1933 survey included 170 State, 1 Federal (St. Elizabeths Hospital), 6 psychopathic, and 69 county and city mental hospitals. Although data were missing for 4 other county and city hospitals, data were collected from 37 general hospitals that had psychiatric ("psychopathic") wards. Data were collected on both resident patients and first admissions (defined as those admitted to hospitals for mental disease for the first time). The total number of patients diagnosed with schizophrenia residing in State hospitals was 150,092, and the number of first admissions with this diagnosis was 21,442. For first admissions to the six psychopathic hospitals no diagnostic breakdown was given, so it was assumed to be the same percentage (schizophrenia/total admissions) as in the State mental hospitals in that State.

1943 (U.S. Bureau of the Census 1923–63): The 1943 census of mental hospitals had to be modestly reduced in scope because of wartime shortages in resources. Schizophrenia continued to be defined as it had been since 1917, with minor revisions that had been incorporated in 1934 under the Standard Nomenclature of Dis-

eases. Data were collected on first admissions to 188 State, 8 psychopathic, and 75 county and city mental hospitals. A diagnostic breakdown was given for the State hospitals (comprising 95 percent of the 17,335 total first admissions for schizophrenia) and was estimated from other data in the survey for the psychopathic and county and city hospitals. Data for Montana, Nevada, and New Mexico State hospitals were missing in the 1943 survey, so data for these States were obtained from the 1942 (Nevada and New Mexico) or 1941 (Montana) surveys.

1953 (U.S. Bureau of the Census 1923–63): In 1947, the responsibility for the annual census of mental hospitals was transferred from the Bureau of the Census to NIMH. In 1952 a new nomenclature for mental disorders, the *Diagnostic and Statistical Manual of Mental Disorders (DSM-I;* American Psychiatric Association 1952) was published. In it, the criteria for the diagnosis of schizophrenia was almost identical to that which had been in use since 1917. In the 1953 census, data were collected for 205 State, 14 psychopathic, and 112 county mental hospitals. However, State hospital data were not available that year for Indiana, Mississippi, Montana, South Carolina, South Dakota, and Massachusetts, so 1954 data were used for those States except for Massachusetts, which did not provide data for any close years. The total number of State hospital first admissions for schizophrenia was 28,371. Diagnostic data on resident patients were so deficient that they were unusable.

1963 (U.S. Bureau of the Census 1923–63): The 1963 census of mental hospitals was virtually identical to

that done in 1953 except that the data for State, psychopathic, and county and city mental hospitals were merged under a single category of State and county mental hospitals. First admissions were also more strictly defined as no prior admission to any inpatient psychiatric facility. Data were collected for a total of 284 State and county mental hospitals, which included 24,929 first-admission and 243,138 resident patients diagnosed with schizophrenia. Data for Indiana and Massachusetts were missing; 1964 data were used for Indiana but no relevant data were available to use for Massachusetts.

Results

The results for the continental United States are presented in figures 1–9, which show the rate of individuals with insanity or schizophrenia per 10,000 population aged 15–45. In general, it can be seen that the Northeastern and Pacific Coast States have consistently high rates of insanity and schizophrenia over the 83-year period compared with the Southeastern and South Central States; the Midwestern and Mountain States fall between these two extremes. The overall pattern is remarkably similar to that described by Dr. White in 1903. The relative constancy of the pattern over time is striking despite changes in both diagnosis (insanity or schizophrenia) and patient population (hospitalized plus in the community, hospitalized only, first admissions only).

It is instructive to look at the variability of the rates over time. Since individual States may vary widely in any single year due to idiosyncratic factors (e.g., the opening of a new State hospital with the transfer of patients being boarded in a neighbor

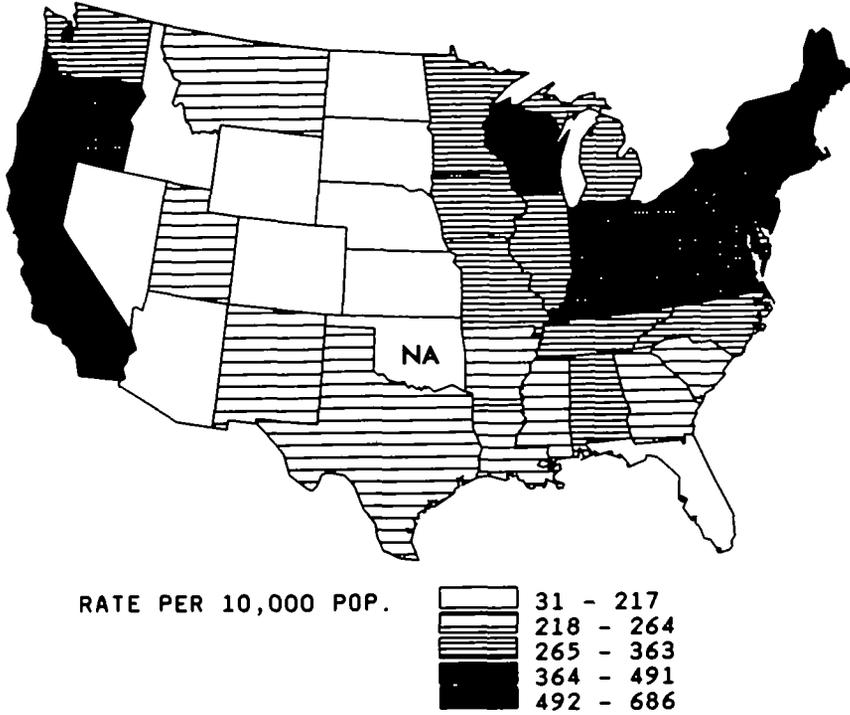**Figure 1. 1880: Rate of insane, hospitalized and in the community**

RATE PER 10,000 POP.

	31 - 217
	218 - 264
	265 - 363
	364 - 491
	492 - 686

Figure 2. 1890: Rate of insane, hospitalized and in the community

RATE PER 10,000 POP

	24 - 186
	187 - 235
	236 - 332
	333 - 441
	442 - 762
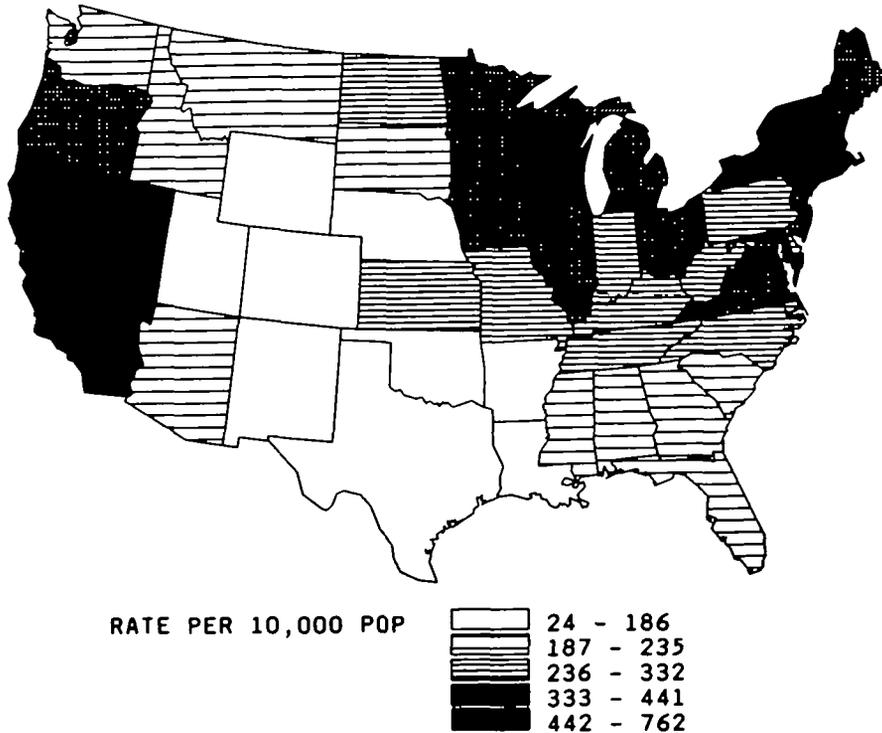
Figure 3. 1903: Rate of hospitalized insane

RATE PER 10,000 POP.
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115 - 217
218 - 305
306 - 378
379 - 492
493 - 952
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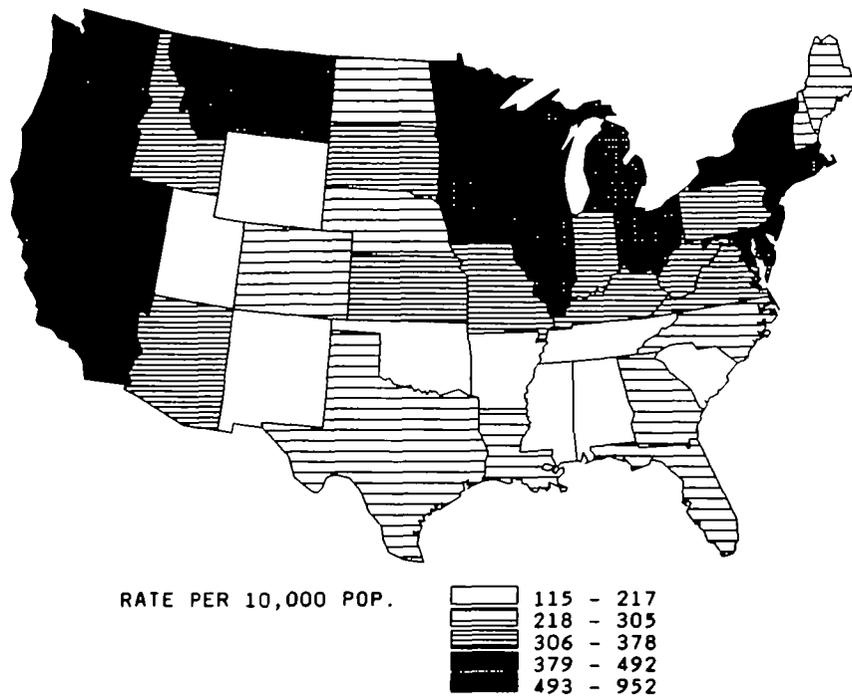
Figure 4. 1910: Rate of hospitalized insane

RATE PER 10,000 POP.
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143 - 223
224 - 302
303 - 387
388 - 489
490 - 676
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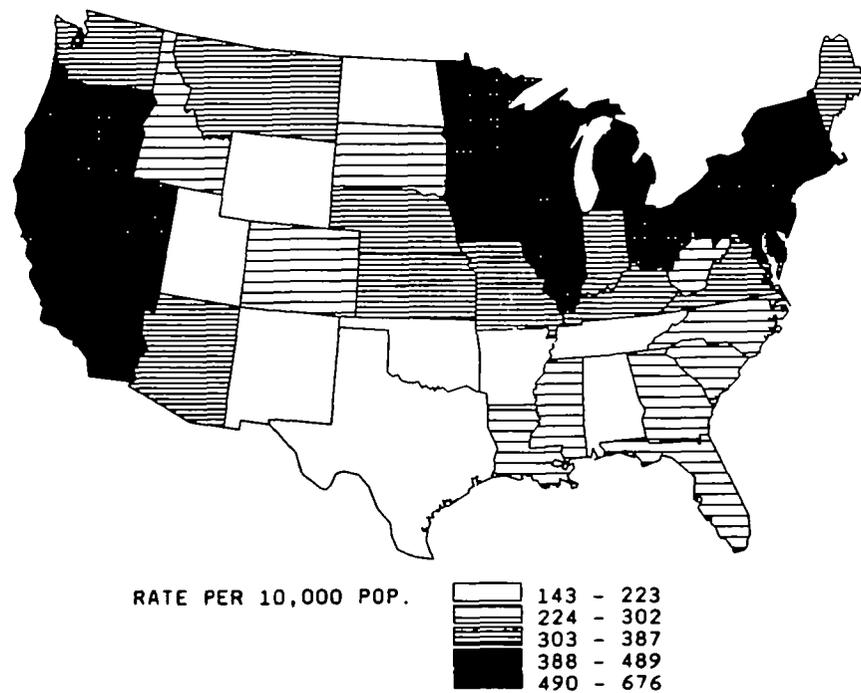
Figure 5. 1923: Rate of schizophrenia, resident patients in all hospitals for mental disease

RATE PER 10,000 POP.

	58 - 102
	103 - 145
	146 - 207
	208 - 263
	264 - 493
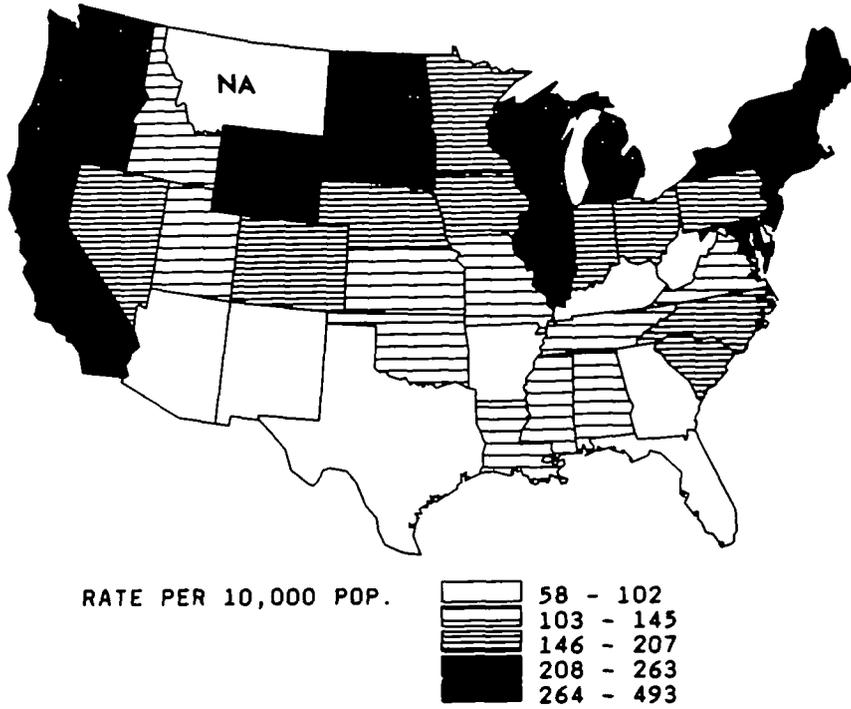
Figure 6. 1933: Rate of first admissions for schizophrenia to public mental hospitals

RATE PER 10,000 POP.

	10 - 18
	19 - 20
	21 - 26
	27 - 33
	34 - 96
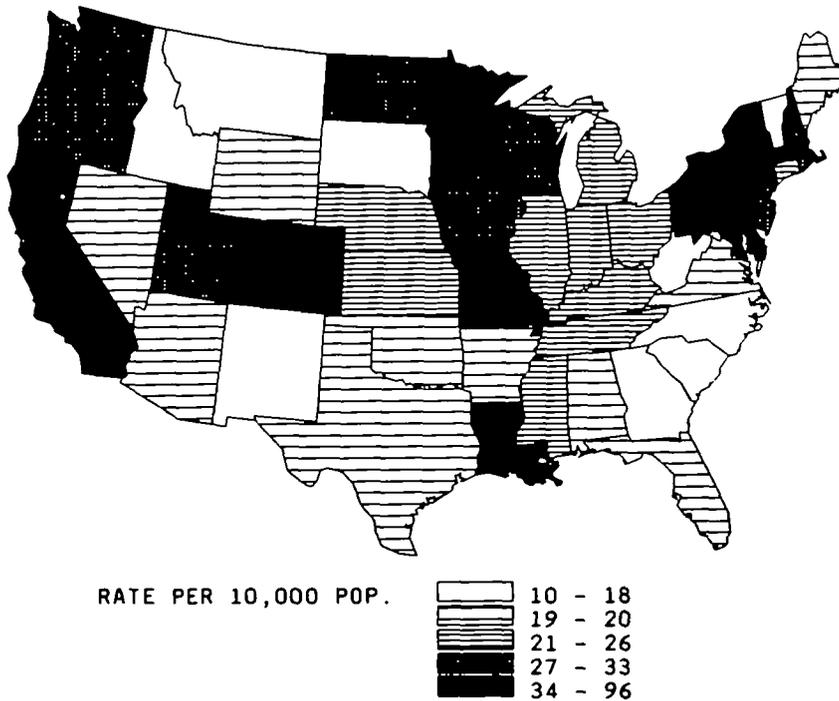
Figure 7. 1943: Rate of first admissions for schizophrenia to public mental hospitals

RATE PER 10,000 POP.

4 - 15
16 - 19
20 - 24
25 - 30
31 - 47
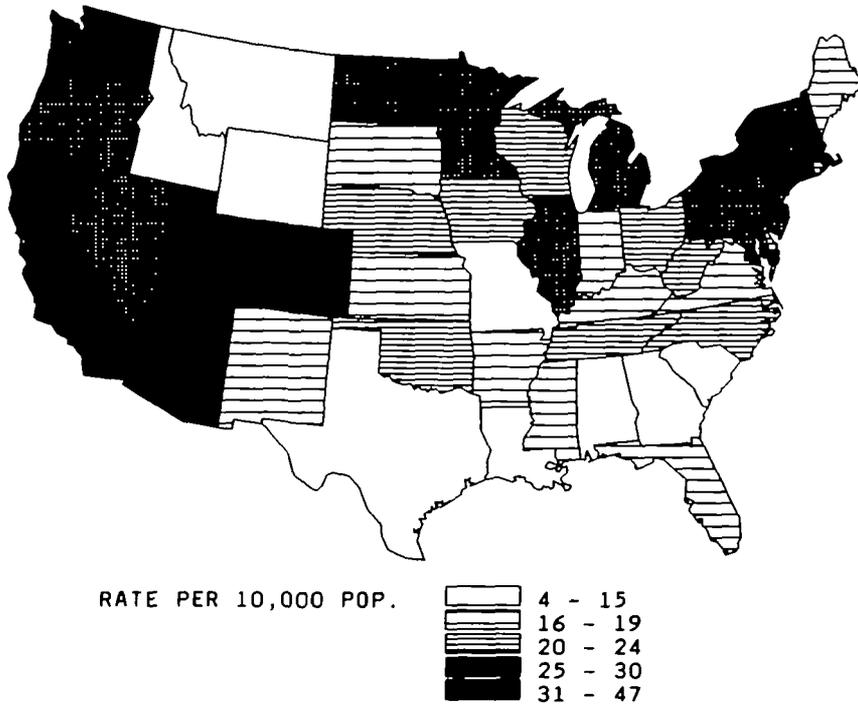
Figure 8. 1953: Rate of first admissions for schizophrenia to public mental hospitals

RATE PER 10,000 POP.

16 - 27
28 - 36
37 - 41
42 - 52
53 - 70
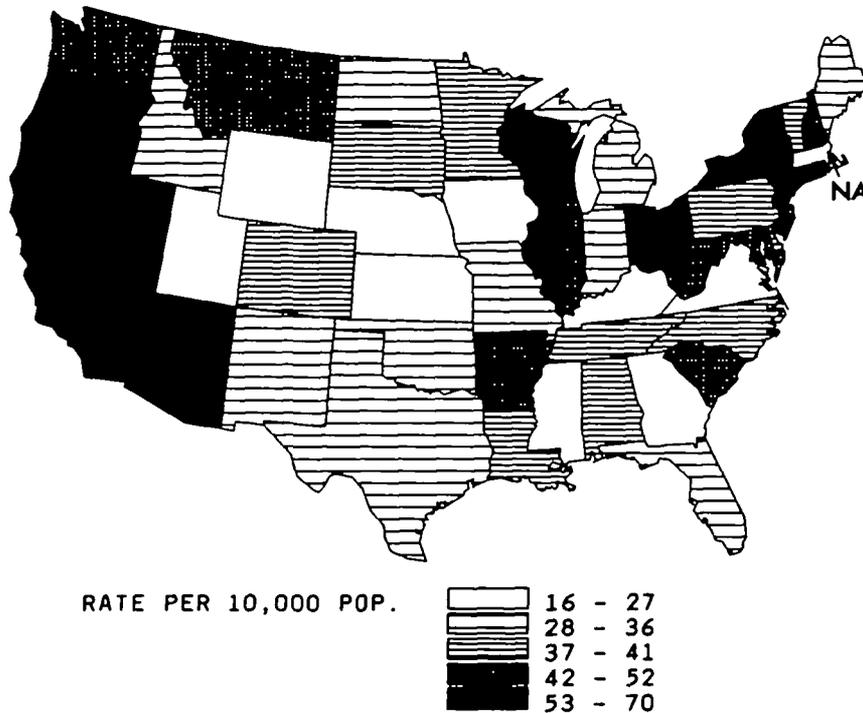
Figure 9. 1963: Rate of schizophrenia, resident patients in public mental hospitals

RATE PER 10,000 POP.

☐	68 - 201
☰	202 - 267
▤	268 - 317
▨	318 - 386
■	387 - 762
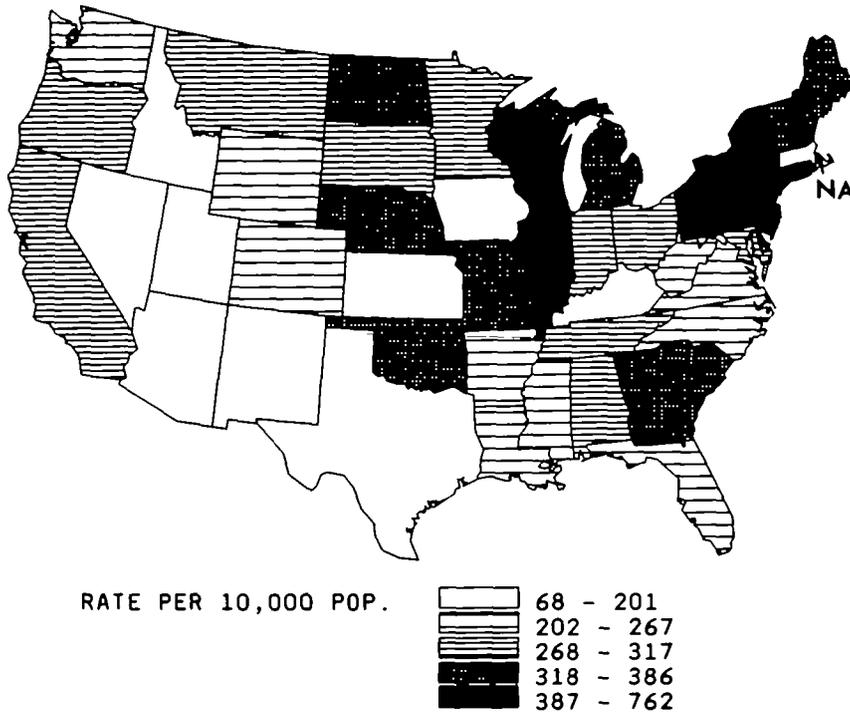
Table 2. Ratio of high prevalence States to low prevalence States

Year	Ratio
1880	4.7
1890	4.1
1903	3.8
1910	3.1
1923	4.5
1933	3.2
1943	3.3
1953	2.5
1963	3.2

ing State) and thus may appear to have unusually high or low rates, for each map the rates in States with the highest prevalence (black on the maps) were aggregated and compared with the aggregated rate in the States with the lowest prevalence (white on the maps). This ratio indicates the magnitude of difference in prevalence between the high States and the low States (see table 2). There appears to have been a progressive decrease in that magnitude between 1880 and 1910 and, with the exception of 1923 and 1953, a leveling off thereafter.

What are the possible explanations for this geographical pattern in the rates of insanity and schizophrenia? Methodological artifacts must be considered, such as regional differences in diagnostic practices or in predilection for hospitalizing seriously mentally ill individuals. Regarding the first, one would have to postulate remarkably consistent diagnostic differences over a long period of time for this to be explanatory. Furthermore, the official diagnostic

criterion for schizophrenia was virtually unchanged in the United States between 1917 and 1963, and there is no evidence for major regional differences in how it was applied.

Regarding regional differences in predilection for hospitalization, there is no question that availability of State psychiatric hospital beds, State philosophy regarding hospitalization, availability of private and/or general hospital psychiatric beds, and stigma all play a role in determining the admission of seriously mentally ill patients to State and county mental hospitals. Since deinstitutionalization got fully under way in the 1960's, such factors have varied considerably among States. Before deinstitutionalization, however, State and county mental hospitals were the only resource for most seriously mentally ill patients, and regional hospitalization factors probably varied much less than is currently the case. Furthermore, the 1880 survey, the most complete census of the mentally ill ever carried out in the United States, and the 1890 survey included patients in the community as well as those in public and private institutions, with a resulting regional distribution of insanity that was remarkably similar to the pattern in later years for hospital admissions only.

A related possibility is that regional differences in availability of psychiatric services might account for at least some of the regional variation in insanity and schizophrenia. To test this possibility, the per capita distribution of psychiatrists by States for 1940 (as measured by membership in the APA) was compared with the rate of first admissions for schizophrenia. A high correlation was found between the two (0.92, Pearson correlation coefficient); however, the direction of causation is less clear since, before World War II,

a large proportion of psychiatrists were employed by State mental hospitals. It is also known that psychiatrists are more likely to practice in urban States; as will be shown below, insanity and schizophrenia rates are also higher in urban States although these two facts are not necessarily related.

To look for other possible explanations for geographical distribution of insanity and schizophrenia, data were collected on urbanicity (percent of population living in towns of 2,500 people or more; U.S. Bureau of the Census 1975). To minimize fluctuations in individual states, the data were aggregated by the nine census regions. Using Pearson correlation coefficients, urban/rural ratios were compared with rates of insanity/schizophrenia for the 9 years studied (table 3), resulting in high levels of correlation for all years except 1963.

To look for further explanations for the geographical findings and also for the high levels of correlations between schizophrenia and urbanicity, data were collected on socioeconomic status (mean per capita income; U.S. Bureau of the Census,

Table 3. Correlation coefficients for rates of insane/ schizophrenia and urbanicity by census region

Year	Regional level correlations[1]
1880	$r = 0.77$
1890	$r = 0.84$
1903	$r = 0.74$
1910	$r = 0.88$
1923	$r = 0.97$
1933	$r = 0.62$
1943	$r = 0.73$
1953	$r = 0.86$
1963	$r = 0.52$

[1] $p < 0.002$.

unpublished data 1989), ethnicity (percent of nonwhites in population; U.S. Bureau of the Census 1975), and temperature (mean annual; National Climatic Data Services 1987). These variables were available by State for only four of the years studied (1933, 1943, 1953, and 1963). Using Pearson correlation coefficients, these rates were compared with first-admission rates (1933, 1943, and 1953) and with the resident hospitalization rate (1963) for schizophrenia. Table 4 shows that along with the significant positive correlation with urbanicity, schizophrenic hospitalization rates also correlate significantly and positively with socioeconomic status. Conversely, neither ethnicity nor temperature correlates significantly with the schizophrenia hospitalization rate.

The finding of a direct correlation between high schizophrenia hospitalization rates and urbanicity is consistent with the observations of Dr. White's 1903 study as well as with several State studies. In a 1915-20 study in New York State, Pollock and Noland reported that the first-admission rate for dementia praecox was 2.7 times higher for large cities (over 175,000 people) than for rural areas (Pollock and Noland 1921). In two studies done in New York State in 1929-31 and 1949-51, Malzberg (1935, 1955) found that the age-standardized first-admission rate for dementia praecox (in the former) and schizophrenia (in the latter) was 1.8 times and 2.3 times higher, respectively, in urban areas than in rural areas. In both studies, Malzberg (1955) noted that "there was a general progressive increase in rates from the rural areas through the urban groupings" (p. 232)—that is, the larger the city, the higher the schizophrenia first-admission rate.

Frumkin (1954) carried out a study of first admissions to Ohio State mental hospitals in 1949 and reported that the urban rate was 1.9 times higher than the rural rate. Jaco (1960) did a 1-year incidence study for Texas in 1951-52 and found that the age-standardized incidence of schizophrenia was 2.4 times higher in urban than in rural areas. Eaton (1974), using first admissions for schizophrenia from the Maryland Psychiatric Care Register for 1961-68, reported a rate for central city Baltimore 2.6 times higher than for rural areas of Maryland. The single study that did not find a clear urban excess of schizophrenia was one done by Lemert (1948) in Michigan in 1938-42, in which Detroit had a high rate for hospital admissions for schizophrenia but several rural counties did also.

The direct correlation between higher socioeconomic status (as measured by per capita income) and higher schizophrenia hospitalization rates was unexpected, given previous studies that have linked *lower* socioeconomic indicators to higher schizophrenic prevalence rates. It should be noted, however, that the present study looked at large, diverse regions of the country whereas previous studies looked within specific cities. Furthermore, in the present study, high regional correlations were found between the two variables of urbanicity and socioeconomic status (table 4). It is probable, therefore, that the regional correlations between socioeconomic status and schizophrenia might be due primarily to a confounding effect between the two descriptive variables.

A review of past studies linking *lower* socioeconomic status to higher schizophrenia prevalence rates in specific cities is consistent with this in

Table 4. Correlation coefficients of demographic variables based on mean values per census region

Demographic variable	1933	1943	1953	1963
Schizophrenia and urbanicity (% in towns >2,500 population)	0.62[1]	0.73[1]	0.86[1]	0.52[1]
Schizophrenia and socioeconomic status (per capita income)	0.55[1]	0.76[1]	0.74[1]	0.53[1]
Schizophrenia and ethnicity (% nonwhite)	−0.37	−0.22	−0.35	−0.12
Schizophrenia and temperature (mean normal)	−0.33	−0.42	−0.35	−0.38
Urbanicity and socioeconomic status	0.82[1]	0.69[1]	0.76[1]	0.79[1]

[1]$p < 0.0002$.

terpretation. The 1930–31 Chicago study by Faris and Dunham (1939) found that more hospital admissions for schizophrenia came from poorer areas in the central city. In a subsequent study in Detroit, Michigan, Dunham (1965) reported more hospital admissions for schizophrenia from class V, the lowest socioeconomic class, but little difference in classes I–IV. Dunham concluded that schizophrenia itself caused the person to drift to the lowest socioeconomic class rather than low socioeconomic class causing the disease, and that "there is no basis for asserting that one social class is likely to produce more schizophrenics than another social class" (1965; p. 252).

Other studies, including Schroeder's analysis (1942) of five Midwestern cities, Bodian et al.'s work (1963) in Rochester, New York, and Hollingshead and Redlich's study (1958) in New Haven, Connecticut, all found a higher prevalence of schizophrenia in the poorest sections of the cities. The New Haven study, like Dunham's study in Detroit, found the excess schizophrenia prevalence virtually confined to individuals in the lowest socioeconomic class. In reviewing these studies, Kohn (1968) noted that "the larger the city, the stronger the correlation between rates of schizophrenia and . . . indices of social class" (p. 157).

The above studies compared socioeconomic status within large cities. When studies were carried out in small cities such as Pueblo, Colorado (Bloom 1968), or Hagerstown, Maryland (Clausen and Kohn 1959), or in suburban areas such as Rockland County, New York (Goodman et al. 1983), there was no reported correlation between socioeconomic factors and schizophrenia prevalence. No studies were found that compared socioeconomic status and schizophrenia prevalence rates in both rural and urban areas.

In summary, the present study found that regional hospitalization rates for schizophrenia are correlated with urbanicity, consistent with previous State studies. The present study also found that regional hospitalization rates for schizophrenia are directly correlated with socioeconomic status. Past studies of cities have found schizophrenia prevalence

rates to be inversely correlated with socioeconomic indices; however, this relationship has been demonstrated only within large cities and is at least partially explained by a drift of individuals with schizophrenia into the lowest socioeconomic class of a specific metropolitan area.

The apparent disparity in the relationship between socioeconomic status and schizophrenia can be resolved if it is assumed that the direct regional correlations between socioeconomic status and hospitalization for schizophrenia found in this study are primarily due to the known high correlations between socioeconomic status and urbanicity; that is, the per capita income of people living in cities is higher than it is for those living in rural areas. Within any given city, however, there may be more schizophrenia in lower socioeconomic areas due to drift or other factors.

Discussion

Although social drift may explain the concentration of schizophrenic individuals in the poorer parts of large cities, it is very unlikely that such drift can explain the State and regional differences in hospitalization for schizophrenia found in the present study over 83 years. Individuals with schizophrenia may be selectively attracted to States like New York and California, but it is unlikely that such individuals would be selectively attracted to other States with a high schizophrenia prevalence, such as Connecticut, Rhode Island, Pennsylvania, New Jersey, Maryland, and Wisconsin. Furthermore, the 1880 survey took account of such drift by ascertaining and assigning mentally ill individuals to their home county and State, yet

the regional geographical pattern still held. There is apparently an urban factor other than socioeconomic drift involved in producing the geographical disparity in insanity and schizophrenia rates.

What might constitute such a factor? The following should be considered.

Social Factors. Stewart (1953), in a study of mental illness in rural Arkansas, speculated that community pressure in rural areas makes it more difficult to commit individuals involuntarily to State mental hospitals. He also asserted that the nuclear family is stronger in rural areas than in urban ones and that rural families are more likely to have an extra room in which to keep a psychotic family member. Such social and familial factors could theoretically explain the lower hospitalization rate for schizophrenia in rural areas.

As far as is known to the authors, Malzberg (1955) is the only researcher who has actually tested this hypothesis. He assumed that such social and familial factors would cause a delay in the hospitalization of schizophrenic individuals from rural areas compared with those from urban areas. In examining the New York State hospital admission data for 1949–51, however, Malzberg found no difference in the duration of illness before hospitalization for schizophrenic individuals from rural and urban areas, and he concluded that "a person developing a mental illness in a rural environment will, on the average, be admitted to a mental hospital just as promptly as one from an urban environment" (pp. 217–218). Malzberg (1955) also questioned the widely accepted belief that eccentric and/or bizarre persons are more easily accepted in rural than in urban areas:

"Any observant person must be familiar with the many psychopathic types in the city who also manage not to be admitted to a hospital" (p. 217).

Stress and Crowding Factors. Theories linking increased mental illness to crowding and resultant stress were popular in the 19th century. Thus, when Dr. William A. White speculated that the geographical disparities in insanity described in his 1903 study were consequent to "the stresses incident to active competition" (p. 276), he was reflecting a currently popular belief.

The concepts of urban stress and crowding must be clearly defined. If it is density of population (inhabitants per acre), then in studies to date "the balance of evidence appears not to support any simple causal relationship between density and socio- or psychopathology" (Lawrence 1974, p. 712). Another measure of urban crowding is rooms per housing unit, which Galle et al. (1972) in one study found to be "the most important component of density as a predictor of admissions to mental hospitals" (p. 28). It appears, however, that the researchers were simply showing that more seriously mentally ill individuals live in single-room occupancy hotels that have a high number of rooms per housing unit.

The most interesting study on urban density and hospitalization rates for serious mental illness was carried out by Schweitzer and Su (1977) in Brooklyn, New York. They compared the hospitalization rate in homogeneous boroughs with persons per acre, structures per acre, persons per household, and persons per room, and they concluded that "measures of household and family contact were found to be significantly correlated to four rates of

hospital utilization. . . . If density does produce mental illness its likely mechanism of action will be routed through household contact" (p. 1165).

Genetic Factors. It is currently popular to combine genetic factors (i.e., a genetic predisposition) with stress factors to explain schizophrenia (Kohn 1972). If such a model accounts for the geographical distribution of insanity and schizophrenia in the present study, then it is necessary to postulate either a selective migration of genetically predisposed individuals to Northeastern and Pacific Coast States or an urban stress factor that elicits the disease in genetically predisposed individuals. The authors are not aware of any research that bears directly on this question.

Biological Factors. As early as 1852, Dr. Isaac Ray noted in Massachusetts that insanity was more common in manufacturing and mercantile communities than in farming areas (Ray 1856). Biological factors connected with urban living must be considered as having a possible bearing on the geographical distribution of schizophrenia. Examples include nutritional factors such as exposure to lead or other heavy metals; environmental contaminants such as air-polluting gases, toxic waste sites, and industrial water withdrawal, which Foster (1988) linked to schizophrenia hospitalization rates in one study; and exposure to infectious diseases, which occurs more readily in urban areas, especially in situations with many persons per household and/or room. Regarding the last, one is reminded of Schweitzer and Su's (1977) findings in their Brooklyn study. Also pertinent is Hollingshead and Redlich's (1958) description of the living

conditions of socioeconomic class V individuals in New Haven, where the excess prevalence of schizophrenia was found in individuals living in tenements of "from 10 to 50 families" in which "there may be only two toilets in a twenty-family tenement or five toilets if it is a fifty-family tenement" (p. 120). Under such circumstances it is not difficult to imagine infectious agents being transmitted more readily to pregnant women, infants, children, or adults.

Research Implications. Research is needed to identify more clearly any urban factors that are found to be associated with the inequitable distribution of schizophrenia in the United States. The implications of such research are important, for if living in more urban areas (2,500 people or more) is a risk factor for schizophrenia, then developing nations that are currently undergoing rapid urbanization may experience a rising prevalence of schizophrenia. The authors would be glad to share with other researchers their computerized data base for insanity/schizophrenia by State for the nine time periods described in this article.

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