

Psychiatric Disorders and Suicide in the Nation's Largest State Prison System

Jacques Baillargeon, PhD, Joseph V. Penn, MD, Christopher R. Thomas, MD, Jeff R. Temple, PhD, Gwen Baillargeon, MS, and Owen J. Murray, DO

This study examined the relationship between the overall rate of psychiatric disorders and suicides in the nation's largest state prison population. Data from 234,031 Texas Department of Criminal Justice inmates who were incarcerated for any duration between September 2006 and September 2007 were analyzed by Poisson regression, to assess the independent associations of major psychiatric disorders and demographic characteristics with suicide. Across the entire study cohort, 41 inmates (18 per 100,000) were reported to have committed suicide during the 12-month follow-up period; 21 of them had a diagnosis of a serious mental illness. An elevated risk of suicide was observed among inmates with major depressive disorder (relative risk [RR] = 5.1, 95% confidence interval [CI] = 1.9–13.8), bipolar disorder (RR = 4.6, CI = 1.3–15.9), and schizophrenia (RR = 7.3, CI = 1.7–15.9). The highest overall risk was present in those inmates with a nonschizophrenic psychotic disorder (RR = 13.8, CI = 5.8–32.9). These findings highlight the importance of maintaining suicide prevention programs in correctional settings, with particular emphasis on screening and monitoring of patients with severe psychiatric disorders.

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The widespread deinstitutionalization of mentally ill patients, coupled with the absence of appropriate community-based mental health programs, has contributed to an increase in the proportion of persons with severe mental illness who are incarcerated in U.S. correctional systems.^{1,2} Half of the U.S. prison population, representing over 1 million individuals, has at least one mental health condition³ and between 15 and 24 percent have a serious mental illness, such as major depressive disorder, bipolar disorder, or schizophrenia.^{4,5} In view of the sizable number of mentally ill inmates and the multitude of psychological stressors they are subjected to in the correctional setting,^{5–9} it is not surprising that suicide is one of the leading causes of death in U.S.

prisons, with rates (18–40 per 100,000 inmates)^{10–14} substantially exceeding those reported for the general U.S. population (11 per 100,000).¹⁵ Although several studies have been undertaken to examine the psychiatric profiles of inmates who have committed suicide,^{12,16,17} there have been no investigations of the relationship between the overall rates of psychiatric disorders and suicides in an entire prison population.

Understanding the extent to which serious psychiatric disorders, such as schizophrenia, bipolar disorder, and major depressive disorder, underlie suicide risk in prison inmates holds important relevance for the fields of correctional and community psychiatry. Consequently, we conducted a study to examine the association of psychiatric disorders and suicide in the prison population of the Texas Department of Criminal Justice (TDCJ), the largest state prison system in the United States.¹⁸

Methods

Subjects and Study Design

This was a retrospective cohort study of 234,031 inmates incarcerated in the TDCJ prison system for any duration between September 1, 2006, and September 1, 2007. The study was reviewed and ap-

Dr. Baillargeon is Associate Professor, Department of Preventive Medicine and Community Health, and Director of Research, Division of Epidemiology, Correctional Managed Care; Dr. Penn is Director of Mental Health, Correctional Managed Care; Dr. Thomas is Professor, Department of Psychiatry; Dr. Temple is Assistant Professor, Department of Obstetrics and Gynecology; Ms. Baillargeon is Biostatistician, Correctional Managed Care; and Dr. Murray is Assistant Vice President, Correctional Managed Care, University of Texas Medical Branch, Galveston, TX. The research described herein was coordinated in part by the Texas Department of Criminal Justice (TDCJ) research agreement (515-MR07). The contents of this manuscript reflect the views of the authors and not necessarily those of the TDCJ. Address correspondence to Jacques Baillargeon, PhD, Department of Preventive Medicine and Community Health, University of Texas Medical Branch, 301 University Boulevard, Mail Route 1007, Galveston TX 77555. E-mail: jbaillar@utmb.edu

Table 1 Prevalence of Psychiatric Disorders in TDCJ Inmates, September 1, 2006 to September 1, 2007

	Major Depressive Disorder	Bipolar Disorder	Schizophrenia	Nonschizophrenic Psychotic Disorder
Entire cohort (<i>n</i> = 234,031)	4.2 (4.1–4.3)	2.6 (2.5–2.7)	1.4 (1.4–1.5)	2.4 (2.3–2.5)
Sex				
Male (<i>n</i> = 210,501)	3.5 (3.4–3.6)	2.3 (2.2–2.4)	1.5 (1.4–1.5)	2.4 (2.3–2.5)
Female (<i>n</i> = 23,530)	10.3 (9.9–10.7)	5.7 (5.4–6.0)	0.9 (0.7–1.0)	2.2 (2.0–2.4)
Race/ethnicity				
Non-Hispanic Caucasian (<i>n</i> = 79,106)	6.3 (6.2–6.5)	5.4 (5.2–5.5)	1.0 (0.9–1.1)	2.3 (2.2–2.4)
African American (<i>n</i> = 85,294)	2.6 (2.5–2.7)	1.1 (1.0–1.2)	0.8 (0.7–0.9)	1.5 (1.4–1.6)
Hispanic Caucasian (<i>n</i> = 69,001)	3.6 (3.4–3.7)	1.3 (1.2–1.4)	2.3 (2.2–2.4)	3.1 (3.0–3.2)
Age (years)				
16–29 (<i>n</i> = 74,773)	3.2 (3.1–3.4)	2.3 (2.2–2.4)	0.7 (0.6–0.7)	1.6 (1.5–1.7)
30–49 (<i>n</i> = 128,242)	4.7 (4.6–4.8)	3.0 (2.9–3.1)	1.6 (1.5–1.7)	2.8 (2.7–2.9)
≥50 (<i>n</i> = 31,013)	4.5 (4.2–4.7)	1.9 (1.8–2.1)	2.3 (2.1–2.4)	2.7 (2.5–2.9)

Data are expressed as the percentage of the entire group (CI).

proved by the University of Texas Medical Branch Institutional Review Board. All TDCJ inmates undergo medical and psychiatric examinations during the intake process. The evaluation lasts approximately 60 minutes and consists of a detailed medical history, a mental health screening, a comprehensive physical examination, and laboratory tests that include a rapid plasma reagin and a Mantoux tuberculin skin test. Medical diagnoses are made by physicians, physician assistants, or nurse practitioners at the time of each inmate's initial evaluation and/or subsequent medical encounters and are classified according to the International Classification of Diseases (ICD-10) coding system.

The study was designed to compare the prevalence of suicide among inmates with any of four types of major psychiatric illness: major depressive disorder, bipolar disorder, schizophrenia, and nonschizophrenic psychotic disorders. Nonschizophrenic psychotic disorders included schizoaffective disorders, delusional disorders, substance-induced psychosis, and psychotic disorder not otherwise specified. The mental health screening at the time of the intake evaluation was conducted in a uniform fashion across all prison sites by mental health nurses or mental health paraprofessionals. This screening consists of a standardized diagnostic interview and includes assessment of the following: displayed symptoms of psychiatric disease, history of mental health treatment, current suicidal ideation, prior suicidal gestures, display of unusual behavior, affective distress, and unusual criminal offense. The purpose of the intake screening is to determine whether an offender should be referred for a formal mental health evaluation. If a referral is made, the evaluation is con-

ducted by Master's-level mental health professionals and follows a standardized structure. A diagnosis of a psychiatric disorder established during this evaluation is based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)¹⁹ guidelines and is recorded in the inmate's electronic medical record. All inmates who require psychotropic medication or are currently taking such medication are subsequently referred to a staff psychiatrist. All medical and demographic data are maintained in a system-wide electronic medical record that is routinely updated to ensure that the information reflects the inmates' current health status. All suicides were identified by referring to the TDCJ mortality database (classified using ICD-10 codes) and subsequently confirmed in a separate database maintained by the TDCJ Division of Mental Health.

Statistical Analysis

All statistical analyses were performed with the GENMOD procedure in SAS version 8 (SAS Institute, Cary, NC). Poisson regression analysis was used to examine differences in suicide prevalence across the subgroups and to calculate adjusted relative risk (RR) and corresponding 95 percent confidence interval (CI). Poisson regression analyses adjust for skewed distributions and are thus favored when studying relatively rare events. After exponentiation, the regression coefficients were interpreted in terms of relative rates.

Results

The prevalence of psychiatric disorders varied substantially according to demographic characteristics

(Table 1). Major depressive disorder, present in 4.2 percent of the entire study population, was more prevalent among females (10.3%) than males (3.5%), among non-Hispanic Caucasians (6.3%) than Hispanic Caucasians (2.6%) and African Americans (3.6%), and among inmates aged 30 to 49 years (4.7%) and ≥ 50 years (4.5%) than those aged 16 to 29 years (3.2%). Bipolar disorder, present in 2.6 percent of the study population, was more prevalent among females (5.7%) than males (2.3%), among non-Hispanic Caucasians (5.4%) than Hispanic Caucasians (1.1%) and African Americans (1.3%), and, among inmates aged 30 to 49 years (3.0%) than those aged 16 to 29 years (2.3%) and ≥ 50 years of age (1.9%). Schizophrenia exhibited an overall prevalence of 1.4 percent in the Texas prison system and was more prevalent among males (1.5%) than females (0.9%) and among African Americans (2.3%) than Hispanic Caucasians (0.8%) or non-Hispanic Caucasians (1.0%). The prevalence of schizophrenia increased in a stepwise fashion according to age (16–29 years: 0.7%; 30–49 years: 1.6%; and ≥ 50 years: 2.3%). Nonschizophrenic psychotic disorders were present in 2.4 percent of inmates and were more prevalent among African Americans (3.1%) than Hispanics (1.5%) or non-Hispanic Caucasians (2.3%), and among inmates aged 30 to 49 years (2.8%) and ≥ 50 years (2.7%) than those aged 16 to 29 years (1.6%).

Among the entire study cohort, 41 inmates (18 per 100,000) were reported to have committed suicide during the 12-month follow-up period. Suicide prevalence is reported according to demographic characteristics and presence or absence of the four major psychiatric disease categories in Table 2. Overall, the prevalence of suicide was higher among males (19 per 100,000) than females (0 per 100,000), higher among non-Hispanic Caucasians (21 per 100,000) and Hispanic Caucasians (22 per 100,000) than African Americans (10 per 100,000), and higher among inmates aged 30 to 49 years (23 per 100,000) than inmates aged 16 to 29 years (12 per 100,000) or ≥ 50 years (10 per 100,000). As expected, the prevalence of suicide among inmates in each of the four psychiatric disorder groups was substantially higher than that in the overall prison population (major depressive disorder: 61 per 100,000; bipolar disorder: 49 per 100,000; schizophrenia: 91 per 100,000; nonschizophrenic psychotic disorders: 144 per 100,000).

Table 2 Prevalence of Suicide Among TDCJ Inmates, September 1, 2006 to September 31, 2007

	n/100,000 (CI)	Adjusted RR (CI)
Entire cohort (n = 234,031)	18 (13–24)	—
Sex		
Male (n = 210,501)	19 (14–26)	(Undefined)
Female (n = 23,530)	0 (undefined)	(Undefined)
Race/ethnicity		
Non-Hispanic Caucasian (n = 79,106)	21 (13–34)	1.0 (referent)
African American (n = 85,294)	10 (6–20)	0.4 (0.5–0.9)
Hispanic Caucasian (n = 69,001)	22 (13–36)	0.8 (0.4–1.7)
Age (years)		
18–29 (n = 74,773)	12 (6–23)	1.0 (referent)
30–49 (n = 128,242)	23 (16–32)	0.9 (0.5–1.8)
≥ 50 (n = 31,013)	10 (3–28)	0.5 (0.1–1.7)
Major depressive disorder		
No (n = 224,167)	16 (11–22)	1.0 (referent)
Yes (n = 9,868)	61 (28–133)	5.1 (1.9–13.8)
Bipolar disorder		
No (n = 227,879)	17 (12–23)	1.0 (referent)
Yes (n = 6,156)	49 (17–143)	4.6 (1.3–15.9)
Schizophrenia		
No (n = 230,730)	16 (12–23)	1.0 (referent)
Yes (n = 3,305)	91 (31–267)	7.3 (1.7–31.5)
Nonschizophrenic psychotic disorders		
No (n = 228,476)	14 (10–20)	1.0 (referent)
Yes (n = 5,559)	144 (73–284)	13.8 (5.8–32.9)

Poisson regression was used to calculate adjusted odds ratios, to assess whether these associations persisted after simultaneous adjustment for all of the study covariates. Of the demographic factors examined, several associations emerged. African Americans had a reduced risk of suicide (RR = 0.4, CI = 0.5–0.9) in comparison to the reference group (non-Hispanic Caucasians). None of the three age groups exhibited a statistically significant association with the risk of suicide, and sex was undefined. (No female inmates committed suicide during the study period.) Inmates in each of the four psychiatric disorder subgroups exhibited elevated risks of suicide. Although statistically significant elevated risk ratios were observed among inmates with major depressive disorder (RR = 5.1, CI = 1.9–13.8), bipolar disorder (RR = 4.6, CI = 1.3–15.9), and schizophrenia (RR = 7.3, CI = 1.7–31.5), the highest overall risk of suicide was found among inmates with a nonschizophrenic psychotic disorder (RR = 13.8, CI = 5.8–32.9).

Discussion

The overall prevalence of suicide in our cohort of Texas prisoners (18 per 100,000) was higher than that reported for the general U.S. population (11 per 100,000),¹⁵ and was consistent with the low end of the range reported in previous studies of prison populations (18–40 per 100,000 inmates).^{10–14} In terms of demographic factors, the prevalence of suicide in the TDCJ population was reduced among African Americans and elevated among males. Both of these findings are consistent with studies of the general U.S. population^{15,20} and other prison populations.^{16,17,21} The factors underlying racial and ethnic differences in suicide risk are unknown.²⁰ Some investigators have speculated that the elevated rate of suicide among males, persistent across multiple geographic locations and cultures, may be related to males' comparatively higher rates of aggressive behavior and alcoholism, both of which are independent risk factors for suicide.^{20,22}

Our finding that inmates with diagnoses of each of the four types of psychiatric disorders exhibited a strikingly elevated risk of suicide is generally consistent with other studies that have reported elevated rates of mental health problems among inmates who commit suicide.^{12,16,17} However, because these earlier studies focused exclusively on numerator data (i.e., inmates who committed suicide), it was not possible for investigators to determine whether the rate of psychiatric disorders among inmates who commit suicide exceeds the rate among the entire inmate population. To the best of our knowledge, this is the first study to examine the association of psychiatric disorders and completed suicide in an entire state prison population.

In a study of 25 suicides that occurred in the Texas prison system in 1996 to 1997, He *et al.*¹⁶ reported that 44 percent of the suicide victims had a psychotic disorder diagnosed while they were incarcerated, and 64 percent had a mood disorder; 24 percent had no history of a psychiatric disorder. In our study of the 41 Texas inmates who committed suicide within a one-year period, 22 percent had a psychotic disorder, 23 percent had a mood disorder, and 49 percent had no major psychiatric disorder. Comparing the results of these two studies is problematic, however, because of differences in study design and methods. Our investigation, which focused on population-based rates, was restricted to an analysis of four major cat-

egories of serious mental illness. In contrast, the previous study,¹⁶ which focused exclusively on the characteristics of the inmates who committed suicide, included a description of a much broader range of psychiatric disorders (e.g., anxiety, impulse control, and personality disorders).

It is unclear why inmates with nonschizophrenic psychotic disorders had a higher risk of suicide than inmates in any of the other three subgroups, particularly those with mood disorders. General population-based studies have consistently reported that persons with major depressive disorder and bipolar disorders have a considerably higher risk of suicide than do persons with other psychiatric disorders.^{22,23} It is possible that inmates classified as having nonschizophrenic psychotic disorders were misdiagnosed and possibly were suffering from depressive disorder not otherwise specified or major depressive disorder with psychotic features (i.e., psychotic depression), both of which are associated with an increased risk of suicide.^{24,25} It is also possible, albeit unlikely, that the prison staff were more aware of the increased suicide risk associated with depression and schizophrenia and thus were more proactive in initiating suicide prevention measures for inmates with these disorders.

It is noteworthy that 20 (49%) of the 41 inmates who committed suicide did not have a diagnosis of any of the four classes of severe psychiatric disorders under study. There is a broad consensus within the psychiatric community that suicide is a complication of psychiatric illness. Three studies have reported that approximately 90 percent of suicide victims had a psychiatric disorder at the time of the suicide.^{20,26,27} While the Texas prison system provides rigorous mental health screening, it is possible that some inmates who committed suicide had a psychiatric disorder that was not diagnosed. It is important that future investigations examine whether this finding persists in populations in other states.

A major objective of this study was to describe the distribution of psychiatric disorders that contribute to suicide among prison inmates. Our findings indicate that Texas prison inmates have rates of psychiatric disorders that are higher than those in the general U.S. population, but comparable to those in other prison populations. The Epidemiologic Catchment Area study,²⁸ conducted in the 1980s, estimated the prevalence of psychiatric disorders in the general U.S. population. Compared with these estimates (major depressive disorder, 2.7%; bipolar dis-

order, 0.7%; schizophrenia, 1.0%), most of the psychiatric disorders in our study cohort were substantially elevated, even after adjustment for the high proportion of males in the prison population. The rates of schizophrenia (1.4%) and major depressive disorder (4.2%) observed in our cohort were within the range of estimates reported in other incarcerated populations (schizophrenia, 0.8%–3.0%; major depressive disorder, 3.5%–9.2%), but the rate of bipolar disorder (2.6%) was somewhat higher than that reported in previous prison studies (0.7%–2.1%).^{4,5,7,29} However, it is difficult to draw direct comparisons from study to study because previous studies may have evaluated populations with different distributions of sex, race, and substance abuse and may have employed different assessment methods.

Several limitations of the present study should be noted. First, as with all prison studies, comparisons to population-based samples should be interpreted cautiously, given that prison populations are not representative of the general population (e.g., disproportionate representation of males, younger individuals, and racial/ethnic minorities). Second, because relatively less severe psychiatric disorders such as anxiety disorders and Axis II disorders are not rigorously evaluated in the TDCJ, either at the inmate's initial screening or during subsequent medical encounters, we restricted our study to four broad categories of severe psychiatric disorders. In addition, information about a prisoner's history of substance abuse is maintained in a separate, confidential TDCJ database that was not available for analysis. Consequently, our ability to assess the extent to which either less severe psychiatric conditions or substance use disorders contributed, either independently or comorbidly, to suicides was limited. Third, our findings are highly dependent on the reliability and validity of the screening measures, the diagnoses of mental health professionals, and the accuracy of data entry into the electronic medical record. Although TDCJ has standardized mental health screening policies that are universally applied during the intake process, as well standardized and validated data entry procedures, it is likely that some inmates were misclassified or misdiagnosed and that some data were entered incorrectly. Fourth, it is possible that the high rate of incarceration in Texas³⁰ relative to that in other states, limits the generalizability of our findings to other prison systems.

It should also be noted that a direct comparison of our investigation's findings with study results focusing on other populations, such as jails or noncorrectional settings, may be limited due to variability in the underlying person-time structure of each population. The TDCJ, like all U.S. prison systems, is characterized by a high degree of population turnover. Therefore, the most precise way to account for such instability would be to measure the amount of time each inmate was observed during the study period. Unfortunately, we were unable to calculate a person-time denominator because the dates of diagnosis of mental illness, suicide, incarceration, and release were unavailable for a substantial proportion of our study population. In a comparison of the results of investigations that are unable to account for the person-time contribution of each subject, the stability of each cohort must be considered. For example, relative to the present investigation, a study of jail detainees may have a higher degree of population movement, whereas a population-based study would be likely to have considerably less.

Despite these limitations, this study is the first to examine variation in the rate of suicide according to psychiatric diagnosis within an entire state prison population. Because this investigation was carried out in the nation's largest state prison system, these findings have a high degree of statistical power. The high prevalence of psychiatric disorders and suicide holds important implications for both correctional and community psychiatry. In particular, these results highlight the need to explore the development of alternative facilities for inmates with severe psychiatric disorders. Ideally, such facilities would provide a more appropriate clinical environment for inmates suffering from severe mental illness, including expanded opportunities for treatment, and monitoring.^{14,31} Given that the number of inmates who commit suicide represents an exceedingly small proportion of the overall prison population, it is difficult, particularly in the short term, to determine whether such interventions would effectively reduce the number of prison suicides. Nevertheless, because most prison inmates are incarcerated for less than three years,³² long-term effects of such programs would extend far beyond prison walls and yield more directly observable outcomes. Most notably, inmates with psychiatric disorders who are appropriately screened and managed during incarceration will be more likely to seek treatment and adhere to clinical

regimens after their release from prison. It is possible that such enhanced correctional mental health programs would result in reduced criminal activity, substance abuse, and recidivism and would ultimately increase the likelihood of the released inmates' successful reintegration into their home communities.

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