Short-term Suicide Risk After Psychiatric Hospital Discharge

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Abstract

IMPORTANCE—Although psychiatric inpatients are recognized to be at increased risk for suicide immediately after hospital discharge, little is known about the extent to which their short-term suicide risk varies across groups with major psychiatric disorders.

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OBJECTIVE—To describe the risk for suicide during the 90 days after hospital discharge for adults with first-listed diagnoses of depressive disorder, bipolar disorder, schizophrenia, substance use disorder, and other mental disorders in relation to inpatients with diagnoses of nonmental disorders and the general population.

DESIGN, SETTING, AND PARTICIPANTS—This national retrospective longitudinal cohort included inpatients aged 18 to 64 years in the Medicaid program who were discharged with a first-listed diagnosis of a mental disorder (depressive disorder, bipolar disorder, schizophrenia, substance use disorder, and other mental disorder) and a 10% random sample of inpatients with diagnoses of nonmental disorders. The cohort included 770 643 adults in the mental disorder cohort, 1 090 551 adults in the nonmental disorder cohort, and 370 deaths from suicide from January 1, 2001, to December 31, 2007. Data were analyzed from March 5, 2015, to June 6, 2016.

MAIN OUTCOMES AND MEASURES—Suicide rates per 100 000 person-years were determined for each study group during the 90 days after hospital discharge and the demographically matched US general population. Adjusted hazard ratios (ARHs) of short-term suicide after hospital discharge were also estimated by Cox proportional hazards regression models. Information on suicide as a cause of death was obtained from the National Death Index.

RESULTS—In the overall population of 1 861 194 adults (27% men; 73% women; mean [SD] age, 35.4 [13.1] years), suicide rates for the cohorts with depressive disorder (235.1 per 100 000 person-years), bipolar disorder (216.0 per 100000 person-years), schizophrenia (168.3 per 100000 person-years), substance use disorder (116.5 per 100000 person-years), and other mental disorders (160.4 per 100000 person-years) were substantially higher than corresponding rates for the cohort with nonmental disorders (11.6 per 100000 person-years) or the US general population (14.2 per 100 000 person-years). Among the cohort with mental disorders, AHRs of suicide were associated with inpatient diagnosis of depressive disorder (AHR, 2.0; 95% CI, 1.4-2.8; reference cohort, substance use disorder), an outpatient diagnosis of schizophrenia (AHR, 1.6; 95% CI, 1.1-2.2), an outpatient diagnosis of bipolar disorder (AHR, 1.6; 95% CI, 1.2-2.1), and an absence of any outpatient health care in the 6 months preceding hospital admission (AHR, 1.7; 95% CI, 1.2-2.5).

CONCLUSIONS AND RELEVANCE—After psychiatric hospital discharge, adults with complex psychopathologic disorders with prominent depressive features, especially patients who are not tied into a system of health care, appear to have a particularly high short-term risk for suicide.

The period immediately after psychiatric hospital discharge poses an exceptionally high risk for suicide.[1-7] Although only about 6% of mental health outpatients receive psychiatric inpatient care each year,[8] approximately one-third of all suicides among patients with mental disorders occur within 3 months of discharge from an inpatient psychiatric unit.[9] Knowledge of which mental disorders and other readily identifiable patient characteristics put adults at highest short-term risk for suicide after psychiatric hospital discharge might shed light on the mechanisms of acute risk for suicide and guide interventions to prevent suicide.

During the first year after psychiatric hospital discharge, approximately 0.3% to 1.3% of psychiatric patients die by suicide.[4,10,11] A meta-analysis of studies of psychiatric inpatients[12] reported that during the first year after hospital discharge, major depressive disorder but not schizophrenia, bipolar disorder, or substance use disorder is associated with

a significantly increased relative risk for suicide. A Swedish study of patients admitted to the hospital for attempted suicide reported that suicide rates in the first year after discharge are markedly elevated for patients with a diagnosis of schizophrenia or bipolar and unipolar depressive disorders.[13] A recent study of active-duty soldiers who were admitted for inpatient psychiatric care found that inpatient diagnoses of nonaffective psychosis and somatoform or dissociative disorders were significantly related to suicide risk during the first postdischarge year.[14]

From a clinical perspective, understanding suicide risk factors over relatively short time frames is particularly useful. Much of the longitudinal epidemiologic research on suicide risk has focused on only 1 psychiatric disorder[15-17] rather than risks across mental disorders. As a result, relatively little is known about the relative risk for suicide across the major psychiatric disorders or the role of psychiatric comorbidity. To help address these issues, we examined suicide risk during the 90 days after hospital discharge within a cohort of nonelderly patients (aged 64 years) in the Medicaid program. We focused on inpatients with a primary discharge diagnosis of a mental disorder and included comparisons with the general US population. In keeping with prior research on the epidemiology of suicide, we anticipated that male sex, depressive disorders, and a history of deliberate self-harm would be associated with the short-term risk for suicide.[18] Because connectedness to supportive relationships with health care professionals is a key construct in suicide prevention models,[19] we also examined whether adult psychiatric inpatients who had no contact with outpatient care during the 6 months before their hospital admission were at increased short-term risk for suicide after psychiatric hospital discharge.

Methods

Sources of Data

The inpatient cohort was extracted from National Medicaid Analytic Extract data from January 1, 2001, to December 31, 2007 (not including data from Arizona, Delaware, Nevada, Oregon, and Rhode Island), from the Centers for Medicare & Medicaid Services. The dates and information about causes of death were derived from linkage to the National Death Index, which provides a complete accounting of state-recorded deaths in the United States and is the most complete resource available for tracing mortality in national samples.[20] Data from the National Center for Health Statistics were used to provide US population suicide rates.[21] The data, which are deidentified, were determined to be exempt from human participant research review by the institutional review boards of New York State Psychiatric Institute and Rutgers University.

Inpatient Cohort Assembly and Group Assignment

To focus on hospital admissions for acute care, the inpatient cohort was restricted to adults who were 18 to 64 years of age, had hospital admissions of 1 to 30 days in duration, were not discharged to an institutional setting, and were eligible for Medicaid services during the 180 days before admission (eTable 1 in the Supplement). The cohort was partitioned based on the first listed discharge diagnosis of the first observed hospital admission into the following 6 mutually exclusive groups based on codes from the *International Classification*

of Diseases, Ninth Revision, Clincial Modification (*ICD-9-CM*): (1) depressive disorder (296.2x, 296.3x, 296.82, 298.0, 300.4, and 311); (2) bipolar disorder (296.0x, 296.1x, and 296.4x-296.8x); (3) schizophrenia (295); (4) substance use disorder (291, 292, and 303-305); (5) other mental disorders (other 290-319); and (6) diagnoses of nonmental disorders.

A 10% random sample of the group with hospital admissions lasting for 1 to 30 days and no primary or other hospital discharge diagnoses of a mental disorder served as the comparison group with nonmental disorders. No patient contributed more than 1 observation to the cohort. The cohort was followed up until the date of death from any cause or 90 days after index hospital discharge, whichever came first.

Suicide

The outcome of interest was suicide within 90 days of discharge. Suicide was defined as *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)* codes X60 to X84, Y87.0, or U03 (terrorism involving suicide) as the primary cause of death by the National Death Index, consistent with the US federal definition of suicide used by the Centers for Disease Control and Prevention.[22]

Sociodemographic and Clinical Characteristics

Based on Medicaid eligibility data, cohort members were classified by age (18-34, 35-54, and 55-64 years), sex, and race or ethnicity (white non-Hispanic, black non-Hispanic, and Hispanic). In addition to white race, the white group included individuals identified as Native American or Alaskan, Asian, Native Hawaiian or other Pacific Islander, and more than 1 race. Cohort members were also classified by geographic region (West, Midwest, South, and Northeast).

Variables representing outpatient mental health treatment within 180 days preceding the index inpatient admission were used to characterize the occurrence of any outpatient treatment of depressive disorders, alcohol use disorder, drug use disorder, schizophrenia, bipolar disorder, anxiety disorders, or other mental disorders (eTable 2 in the Supplement) and any treatment for deliberate self-harm (*ICD-9-CM* codes E950-E959) or any emergency department visits for mental disorders. Length of the inpatient admission was partitioned as 1 to 4, 5 to 8, and 9 to 30 days. A separate variable of no outpatient care in the past 180 days was defined as present if no outpatient health care visits for mental or nonmental disorders were recorded during the 180 days preceding the index inpatient admission.

Analysis

Data were analyzed from March 5, 2015, to June 6, 2016. The distributions of background characteristics of inpatients were first examined by the principal diagnostic group, including depressive disorder, bipolar disorder, schizophrenia, substance use disorder, other mental disorders, and nonmental disorders. For each group, person-years of follow-up, number of deaths from suicide, and suicide mortality rates per 100 000 person-years of follow-up were determined overall and stratified by sex and between the cohorts with any mental disorder and no mental disorder by age group.

The mean annual suicide rate for US adults aged 18 to 64 years (2001-2007) was calculated overall and separately for men and women. For the groups with any mental disorder and each of the 5 mental disorder subgroups, age-, sex-, and race- or ethnicity-matched annual suicide rates for the US population were also determined. Within the inpatient study groups, we used Cox proportional hazards regression models to determine unadjusted and age-, sex-, race- or ethnicity-, and region-adjusted hazard ratios of suicide during the follow-up period in each psychiatric disorder group compared with the nonmental disorder group. Among the cohort with a principal inpatient diagnosis of a mental disorder, Cox proportional hazards regression models were fit with each background characteristic as the independent variable and time until suicide or censoring during follow-up as the dependent variables. Separate unadjusted models were fit for each background characteristic, and then 1 model including all background characteristics simultaneously was fit to test independent effects. Separate models were also fit for men and women. We plotted Kaplan-Meier cumulative risk curves for each mental disorder group and the nonmental disorder group and used log-rank tests to examine pairwise differences of each mental disorder group with the nonmental disorder group. We also plotted cumulative risks for suicide among men and women with any principal inpatient diagnosis of a mental disorder.

A separate adjusted Cox proportional hazards regression model included a covariate that rescaled the number of outpatient mental disorder group diagnoses within the 180-day prehospital period as an interval scale (theoretical range, 0-6). A supplementary analysis examined short-term suicide risk stratified by the number of outpatient visits in the 180 days before admission. All statistical analyses were performed with SAS software (version 9.4; RTI).

Results

Background Characteristics of Study Cohorts

The overall study population consisted of 1 861 194 adults (27% men; 73% women; mean [SD] age, 35.4 [13.1] years), including 770 643 in the mental disorder cohorts and 1 090 551 in the nonmental disorder cohort. Among the study patients, the substance use disorder cohort had the lowest percentage of young adults and highest percentage of men. The nonmental disorder cohort included the highest percentage of young adults (aged 18-34 years) and women. Among each of the mental disorder cohorts, recent outpatient mental health care was more likely to be for the index inpatient diagnosis than for other mental disorders (eTable 3 in the Supplement).

Short-term Suicide Rates of Study Cohorts

The short-term suicide rate of the cohort with any mental disorder was 178.3 per 100000 person-years. To compare this rate with the suicide rate in the general US population, we considered the age, sex, and racial or ethnic distribution of the cohort with any mental disorder. The suicide rate of the US general population that had been demographically matched to the cohort with any mental disorder was 12.5 per 100 000 person-years. Figure 1 displays the corresponding suicide rates of each mental disorder cohort and its demographically matched general population. The short-term suicide rate was highest for

the depressive disorder cohort (235.1 per 100 000 person-years), followed by the bipolar disorder (216.0 per 100 000 person-years), schizophrenia (168.3 per 100000 person-years), and other mental disorders (160.4 per 100000 person-years) cohorts and lowest for the substance use disorders cohort (116.5 per 100000 person-years). The suicide rate for the demographically matched cohorts varied from 10.7 to 13.8 per 100000 person-years.

Compared with the cohort with nonmental disorders, the short-term suicide rate was approximately 15.4 times higher in the cohort with any mental disorder (Table 1). Adding all deaths from external causes of undetermined intent (*ICD-10* codes Y10-Y34) to deaths from suicide increased the short-term death rate of the cohort with any mental disorder from 178.3 to 229.5 per 100000 persons-years.

The 90-day rate of suicide was nearly twice as high for men as for women in the cohort with any mental disorder (238.3 vs 130.2) and approximately 4 times as high for men as for women in the nonmental disorder cohort (33.4 vs 7.8) (Table 1). When the cohorts were stratified by age groups, young adults (aged 18-34 years) had the highest hazard for short-term suicide risk associated with any mental disorder (eTable 4 in the Supplement).

Short-term Hazard of Suicide

During the first 90 days after hospital discharge, the cumulative risk for suicide was significantly greater for each of the 5 mental disorder cohorts than for the nonmental disorder cohort (depressive disorders, 57.9; bipolar disorder, 53.2; schizophrenia, 40.3; substance use disorders, 28.7; other mental disorders, 39.5; and nonmental disorders, 2.9 per 100000 persons) (Figure 2). The cumulative short-term risk for suicide was also significantly higher in men than women within the mental disorder cohorts (58.1 vs 32.1 per 100000 persons) (Figure 3).

In unadjusted Cox proportional hazards regression models that were limited to the cohort with any mental disorder, the hazard for suicide was significantly associated with older patient age; male sex; Hispanic and non-Hispanic white race or ethnicity (black race was the reference group); an inpatient diagnosis of depression, bipolar disorder, or schizophrenia (substance use disorder was the reference group); outpatient diagnosis of a depressive disorder or bipolar disorder during the past 6 months; and treatment of deliberate self-harm during this period. In a mutually adjusted model that simultaneously controlled for each of the demographic and clinical variables, the hazard for suicide was associated with older patients, men, and patients with Hispanic and non-Hispanic white race or ethnicity, an inpatient diagnosis of a depressive disorder, an outpatient diagnosis of schizophrenia or bipolar disorder, and an absence of outpatient health care in the past 6 months before hospital admission. For the fully adjusted model, the hazard ratio for the absence of outpatient health care was 1.7 (95% CI, 1.2-2.5), implying an increase in the short-term risk for suicide. We found a few differences in adjusted hazards for short-term suicide among men and women with any mental disorder (Table 2).

The recent outpatient mental health diagnosis of a larger number of different types of mental disorders was also related to a larger short-term risk for suicide, although the linear trend test was not significant in the fully adjusted model (*P* = .06) (eTable 5 in the Supplement).

Patients with a larger number of outpatient visits (31) during the 180 days before hospital admission also had an increased short-term risk for suicide (eTable 6 in the Supplement).

Discussion

Among inpatients treated for psychiatric disorders, short-term risk for suicide was highest for patients who were hospitalized for the treatment of depressive disorders, followed closely by patients hospitalized for bipolar disorder. Men, adults aged 45 to 64 years, and white psychiatric inpatients were also at an elevated short-term risk for suicide. Consistent with risk models that emphasize connectedness to health care professionals and other supports, psychiatric inpatients who had not received any outpatient health care in the 6 months before hospital admission were also at increased short-term risk for suicide.

During the first 90 days after psychiatric hospital discharge, suicide risk among women and men was highest for those with depressive and bipolar disorders, followed by schizophrenia and substance use disorder. In a Danish study with general population controls,[3] suicide risk was also highest during the first month after hospital discharge among patients with mood disorders, followed by schizophrenia and substance abuse disorders. In a long-term Danish study[23] that followed up patients for as long as 36 years, however, suicide risk was highest among women with schizophrenia, followed by those with bipolar disorder, unipolar depression, and substance abuse and among men with bipolar disorder, followed by those with unipolar depression, schizophrenia, and substance abuse. Although depressive episodes may pose the highest short-term risks, bipolar disorder and schizophrenia appear to pose heavy long-term risks.

Recent outpatient diagnosis of bipolar disorder or schizophrenia incrementally increased the short-term risk for suicide above and beyond a primary inpatient diagnosis of depression. The co-occurrence of several psychiatric disorders is generally associated with increased or additive functional impairment, disease burden, distress,[24,25] and suicide risk factors.[26] We found some support for the concept of additive suicide risk associated with a larger number of different clinical disorders. Similar additive interactive effects between the number of psychiatric disorders and the risk for suicide attempts has been found in the general population,[27] which suggests that risk is mediated through a general psychopathology factor. [28]

Psychiatric inpatients who had not received any outpatient health care during the 6 months before their hospital admission were at increased short-term suicide risk, as were those with a large number of visits. An absence of treatment before psychiatric hospital admission is strongly related to treatment disengagement after hospital discharge,[29] and fewer outpatient mental health care visits after psychiatric hospital discharge may increase the short-term risk for suicide.[14] Some interventions that promote follow-up mental health contacts after hospital discharge reduce suicide attempts and deaths.[30] From the standpoint of inpatient psychiatrists, patients who have not been in contact with the health care system for several months before their inpatient admission may merit dedicated efforts to coordinate their follow-up care.

Suicide attempts are strong risk factors for subsequent death from suicide.[31] We found that a recent history of deliberate self-harm was associated with the short-term risk for suicide, although the association was somewhat reduced in magnitude after controlling for demographic and other clinical characteristics. Underreporting of deliberate self-harm in the administrative data[32] may have attenuated the association between deliberate self-harm and suicide in this high-risk sample. Previous research has demonstrated that, in relation to the general population, patients who present to general hospitals with deliberate self-harm are at markedly increased and persistent risk for subsequent suicide.[33]

Demographic risk factors for suicide among recently discharged psychiatric inpatients resembled suicide risk factors in the general US population. In both populations, the risk is greater for men than women, older than younger adults, and white than black or Hispanic individuals.[34] In keeping with research that compares the demographic characteristics of deaths from suicide among adults with and without any recent mental health treatment,[8,35] the male preponderance of deaths from suicide was less striking among inpatients with mental disorders than among those without mental disorders. One possible explanation for the narrower male predominance of risk for death from suicide among mental health patients is a tendency for psychologically distressed women to have a greater propensity than correspondingly distressed men to seek mental health care[36] and thus have a higher likelihood to be hospitalized during periods of acute distress, leading to higher than expected rates of suicide after hospital discharge. In addition, male suicide decedents may be more likely to have alcohol use disorders than female suicide decedents,[37] which may contribute to proportionately lower rates of outpatient mental health treatment among men than women before suicide.

This study has several limitations. First, we have no means of validating the accuracy of the first-listed diagnoses of mental disorders in the Medicaid claims data. Second, different results may have been obtained if privately insured and uninsured inpatients with psychiatric disorders were included in the analysis. However, Medicaid is the single largest payer for inpatient mental health services in the United States.[38] Third, information was not available concerning several factors that are widely believed to pose a risk for suicide, such as a family history of suicide, lifetime personal history of attempted suicide, proximal stressful life events, self-harm events, and access to lethal means. Fourth, stigma,[39] low autopsy rates, [40] and emigration may have contributed to an underreporting or misclassification of suicide in the death certificate data. Fifth, our claims-based measure of deliberate self-harm does not capture self-harm events that do not result in medical care[41] and does not distinguish self-harm injuries with suicidal from non-suicidal intent.[42] Finally, the data reflect suicide mortality patterns in 2001 to 2007, which may have changed in recent years, and a nonelderly adult population, which may not reflect risks in other age groups. For example, the suicide rate of our male cohort with depressive disorders (393.0 per 100000 person-years) was considerably lower than the suicide rate of an older postdischarge cohort of veterans with depressive disorders (568 per 100000 person-years).[12]

Conclusions

Psychiatric inpatients are at high risk for suicide during the first few months after hospital discharge. Under financial pressures to shorten inpatient stays, inpatient psychiatrists commonly face clinical uncertainties in determining when patients are no longer at short-term risk for suicide. Among inpatients with primary diagnoses of mental disorders, a discharge diagnosis of depression was associated with the highest short-term risk for suicide. Recent outpatient diagnoses of schizophrenia or bipolar disorder incrementally increased the risk, as did the absence of recent contact with the outpatient health care system. These patterns suggest that complex psychopathologic diagnoses with prominent depressive features, especially among adults who are not strongly tied into a system of care, may pose a particularly high risk. As with many studies of completed suicide, however, the low absolute risk for suicide limits the predictive power of models based on clinical variables. These constraints highlight the critical challenge of predicting suicide among recently discharged inpatients based on readily discernible clinical characteristics.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key Points

Question

Which inpatients are at highest short-term risk for suicide after hospital discharge?

Findings

In this national retrospective longitudinal cohort of almost 1.9 million adult inpatients in the Medicaid program, suicide risk during the first 90 days after hospital discharge was highest for patients with first-listed depressive disorders, followed by those with bipolar disorder, schizophrenia, and substance use disorders and lowest for patients with nonmental disorders.

Meaning

Recently discharged psychiatric inpatients, especially those with mood disorders, are at exceptionally high short-term risk for suicide.
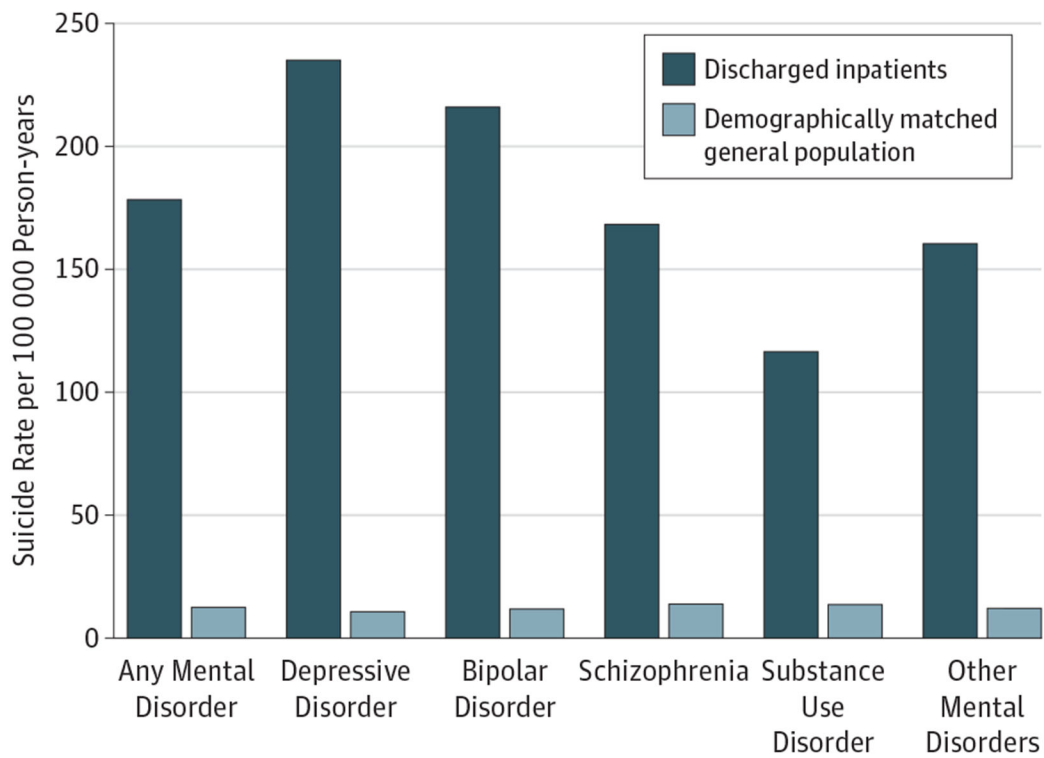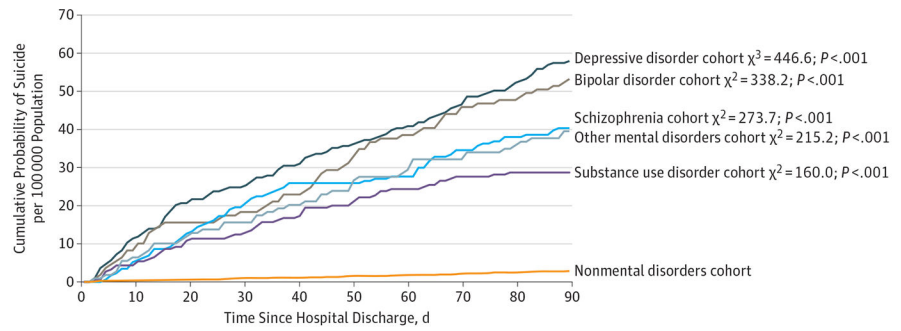
Figure 1. Comparison of Suicide Rates of Adult Inpatients With Mental Disorders and the General Population

Inpatient data are derived from the primary discharge diagnosis in the Medicaid program and followed up for the first 90 days after discharge. Suicide rates in the general population are derived from the Centers for Disease Control and Prevention Wide-Ranging Online Data for Epidemiologic Research[21] and matched to the mental disorder cohorts by age, sex, and race or ethnicity.

Figure 2. Cumulative Probability of Suicide During the First 90 Days After Hospital Discharge
Includes inpatients in the mental and nonmental disorder cohorts. All comparisons are with the nonmental disorder cohort using log-rank tests.
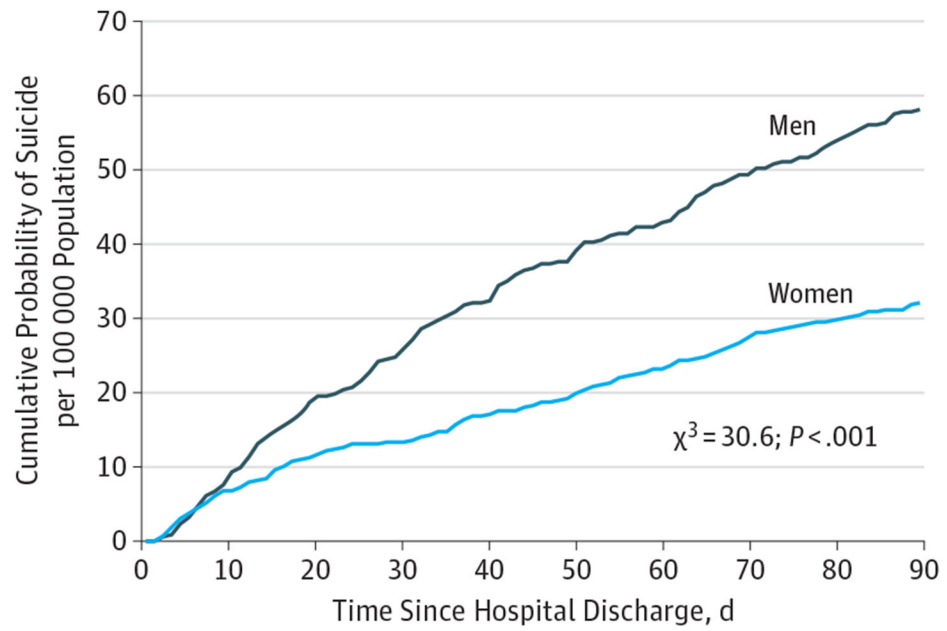
Figure 3. Cumulative Probability of Suicide of Male and Female Inpatients With Any Mental Disorder During the First 90 Days After Hospital Discharge

Comparison uses the log-rank test.

Table 1.

Suicide Rates of Adult Inpatients in the Medicaid Program by Primary Discharge Diagnosis and Sex During the First 90 Days After Hospital Discharge

Cohort	No. of Discharges	Person-years at Risk	No. of Suicides	Suicide Rate per 100 000 Person-years	Suicide, HR (95% CI)	
					Unadjusted	Adjusted[a]
All						
Any mental disorder	770 643	189 574	338	178.3	NA	NA
Depressive disorder	193 620	47 634	112	235.1	20.3 (13.7-30.3)	13.0 (8.7-19.5)
Bipolar disorder	109 139	26 857	58	216.0	18.7 (12.1-28.9)	11.1 (7.1-17.2)
Schizophrenia	173 810	42 784	72	168.3	14.6 (9.6-22.2)	8.9 (5.8-13.7)
Substance use disorder	185 064	45 490	53	116.5	10.1 (6.5-15.7)	6.6 (4.2-10.5)
Other mental disorders	109 010	26 810	43	160.4	13.9 (8.7-22.0)	9.0 (5.6-14.)
Nonmental disorders	1 090 551	268 215	31	11.6	1 [Reference]	1 [Reference]
General population[b]	NA	183 258 460	26 059	14.2	NA	NA
Men						
Any mental disorder	343 156	84 363	201	238.3	NA	NA
Depressive disorder	58 001	14 250	56	393.0	11.8 (6.4-21.5)	11.1 (6.0-20.3)
Bipolar disorder	36 254	8 913	29	325.4	9.7 (5.1-18.7)	9.1 (4.7-17.7)
Schizophrenia	96 673	23 793	54	227.0	6.8 (3.7-12.4)	7.4 (4.0-13.7)
Substance use disorder	107 007	26 291	37	140.7	4.2 (2.2-7.9)	5.2 (2.7-9.8)
Other mental disorders	45 221	11 115	25	224.9	6.7 (3.4-13.2)	6.9 (3.5-13.6)
Nonmental disorders	159 012	38 870	13	33.4	1 [Reference]	1 [Reference]
General population[b]	NA	91 092 253	20 487	22.5	NA	NA
Women						
Any mental disorder	427 484	105 210	137	130.2	NA	NA
Depressive disorder	135 617	33 383	56	167.7	21.4 (12.6-36.4)	13.3 (7.7-23.0)
Bipolar disorder	72 885	17 943	29	161.6	20.6 (11.4-37.1)	11.4 (6.2-21.0)
Schizophrenia	77 137	18 990	18	94.8	12.1 (6.3-23.2)	8.8 (4.5-17.2)
Substance use disorder	78 056	19 198	16	83.3	10.6 (5.4-20.8)	8.3 (4.1-16.6)
Other mental disorders	63 789	15 695	18	114.7	14.6 (7.6-28.1)	10.3 (5.3-20.0)

Cohort	No. of Discharges	Person-years at Risk	No. of Suicides	Suicide Rate per 100 000 Person-years	Suicide, HR (95% CI)	
					Unadjusted	Adjusted[a]
Nonmental disorders	931 539	229 344	18	7.8	1 [Reference]	1 [Reference]
General population[b]	NA	92 166 207	5572	6.0	NA	NA

Abbreviations: HR, hazard ratio; NA, not applicable.

[a] Adjusted for age, sex, race, and region.

[b] Mean data for US adults aged 18 to 64 years are from the Centers for Disease Control and Prevention Wide-Ranging Online Data for Epidemiologic Research (2001-2007)[21] and matched to the mental disorder cohorts by age, sex, and race or ethnicity.

Table 2.

Short-term Risk of Suicide of Adult Inpatients in the Medicaid Program With a First-Listed Diagnosis of a Mental Disorder

| Characteristic | HR (95% CI) | | Sex, Adjusted[b] | |
	Unadjusted[a]	Adjusted[b]	Men	Women
Age, y				
18-34	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
35-44	1.4 (1.1-1.9)	1.6 (1.2-2.1)	1.2 (0.9-1.8)	2.3 (1.4-3.6)
45-64	1.6 (1.2-2.1)	1.8 (1.3-2.3)	1.6 (1.1-2.2)	2.2 (1.4-3.5)
Sex				
Male	1.8 (1.5-2.3)	2.3 (1.80-2.86)	NA	NA
Female	1 [Reference]	1 [Reference]	NA	NA
Race or ethnicity				
White non-Hispanic[c]	5.3 (3.5-8.0)	4.9 (3.2-7.4)	4.4 (2.6-7.3)	6.1 (2.8-13.1)
Hispanic	2.0 (1.0-3.7)	2.2 (1.2-4.3)	1.9 (0.8-4.2)	3.2 (1.1-9.6)
Black non-Hispanic	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Primary discharge diagnosis				
Depressive disorder	2.0 (1.5-2.8)	2.0 (1.4-2.8)	2.1 (1.3-3.2)	1.7 (0.9-3.1)
Bipolar disorder	1.9 (1.3-2.7)	1.4 (0.9-2.1)	1.5 (0.9-2.6)	1.2 (0.6-2.3)
Schizophrenia	1.5 (1.0-2.1)	1.1 (0.7-1.7)	1.2 (0.7-2.1)	0.8 (0.4-1.8)
Other mental disorders	1.4 (0.9-2.1)	1.3 (0.9-2.0)	1.3 (0.8-2.3)	1.3 (0.6-2.5)
Substance use disorder	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Recent mental health treatment[d]				
Outpatient mental health diagnosis				
Depressive disorder	1.3 (1.0-1.6)	1.1 (0.9-1.4)	1.2 (0.8-1.7)	1.0 (0.7-1.5)
Alcohol use disorder	1.2 (0.9-1.5)	1.2 (0.9-1.6)	1.1 (0.7-1.6)	1.5 (0.9-2.4)
Drug use disorder	0.6 (0.4-0.9)	0.8 (0.5-1.3)	0.9 (0.5-1.5)	0.7 (0.3-1.5)
Schizophrenia	1.3 (1.0-1.6)	1.6 (1.1-2.2)	1.4 (0.9-2.1)	2.05 (1.1-3.3)
Bipolar disorder	1.7 (1.3-2.2)	1.6 (1.2-2.1)	1.4 (1.0-2.2)	1.7 (1.1-2.7)

| Characteristic | HR (95% CI) | | Sex, Adjusted[b] | |
	Unadjusted[a]	Adjusted[b]	Men	Women
Anxiety disorders	1.2 (0.9-1.6)	1.1 (0.8-1.5)	1.2 (0.7-1.8)	1.0 (0.6-1.6)
Other mental disorders	1.2 (0.9-1.5)	1.0 (0.8-1.3)	0.9 (0.7-1.4)	1.1 (0.7-1.6)
Any deliberate self-harm	2.3 (1.1-4.6)	1.7 (0.8-3.5)	0.9 (0.2-3.8)	2.4 (1.0-6.0)
Emergency mental health diagnosis	1.2 (1.0-1.6)	1.1 (0.8-1.4)	1.1 (0.8-1.6)	1.0 (0.7-1.6)
Inpatient length of stay, [d]				
1-4	1.1 (0.9-1.5)	1.1 (0.9-1.5)	1.1 (0.7-1.5)	1.3 (0.8-2.0)
5-8	1.1 (0.8-1.4)	1.0 (0.8-1.3)	1.1 (0.8-1.6)	0.9 (0.5-1.4)
9-30	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
No outpatient health care in past 180 [d]	1.2 (0.9-1.7)	1.7 (1.2-2.5)	1.5 (1.0-2.4)	2.2 (1.2-4.2)

Abbreviations: HR, hazard ratio; NA, not applicable.

[a] Indicates separate models that control for only variable of interest.

[b] Indicates a single mode that also controls for geographic region.

[c] Includes white, Native American or Alaskan, Asian, Native Hawaiian or other Pacific Islander, and more than 1 race.

[d] Indicates 180 days before hospital admission.