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RESEARCH BRIEF

A National Comparison of Suicide Among Medicaid and Non-Medicaid Youth

Cynthia A. Fontanella, PhD,[1] Lynn A. Warner, PhD,[2] Danielle L. Steelesmith, PhD,[1] Jeffrey A. Bridge, PhD,[3] Guy N. Brock, PhD,[4] John V. Campo, MD[5,6]

Introduction: In the U.S., youth enrolled in Medicaid experience more risk factors for suicide, such as mental illness, than youth not enrolled in Medicaid. To inform a national suicide prevention strategy, this study presents suicide rates in a sample of youth enrolled in Medicaid and compares them with rates in the non-Medicaid population.

Methods: Data sources were death certificate data matched with Medicaid data from 16 states, and the Web-based Injury Statistics Query and Reporting System. Deaths by suicide that occurred between 2009 and 2013 by youth aged 10 to 18 years were identified for Medicaid and non-Medicaid groups. Age-, gender-, and cause-specific mortality rates were calculated separately for both groups. Standardized mortality ratios were calculated to compare rates, and standardized mortality ratio 95% CIs were estimated with Poisson regressions. The data were analyzed in 2018.

Results: A substantial proportion (39%) of the total number of deaths by suicide (N=4,045) in youth occurred among those enrolled in Medicaid. The overall suicide rate did not significantly differ between groups (standardized mortality ratio=0.96, 95% CI=0.90, 1.03). However, compared with the non-Medicaid group, the suicide rate in the Medicaid group was significantly higher among youth aged 10 to 14 years (standardized mortality ratio=1.28, 95% CI=1.11, 1.47), females (regardless of age; standardized mortality ratio=1.14, 95% CI=1.01, 1.29), and those who died by hanging (standardized mortality ratio=1.26, 95% CI=1.16, 1.38).

Conclusions: The population-based profile of suicide among youth enrolled in Medicaid differs from the profile of youth not enrolled in Medicaid, confirming the importance of Medicaid as a "boundaried" suicide prevention setting.

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INTRODUCTION

Suicide among young people is a major public health problem in the U.S. It is the second leading cause of death among those aged 10–24 years, and more teenagers and young adults die from suicide than from cancer, heart disease, AIDS, birth defects, stroke, pneumonia, influenza, and chronic lung disease combined.[1] To inform interventions that could substantially reduce deaths by suicide, the National Action Alliance for Suicide Prevention's Research Prioritization Task Force has recommended that "boundaried populations" (i.e., populations defined by a service setting or organizational function) be an immediate research focus.[2]

The Medicaid program is one potentially important boundaried setting for youth suicide prevention efforts. In any given year more than 36 million children (38%)

From the [1]Department of Psychiatry and Behavioral Health, Wexner Medical Center, Ohio State University, Columbus, Ohio; [2]School of Social Welfare, University at Albany SUNY, Albany, New York; [3]The Research Institute at Nationwide Children's Hospital, Columbus, Ohio; [4]Department of Biomedical Informatics, Ohio State University, Columbus, Ohio; [5]Behavioral Medicine and Psychiatry, West Virginia University, Morgantown, West Virginia; and [6]Rockefeller Neuroscience Institute, Morgantown, West Virginia

Address correspondence to: Cynthia Fontanella, PhD, Harding Hospital, Rm 455, 1670 Upham Drive, Columbus OH 43210.
E-mail: cynthia.fontanella@osumc.edu.

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are enrolled in Medicaid and they experience more suicide risk factors, including mental illness, than the general population.[3–5] Despite the broad reach of the program, no studies have examined suicide among youth enrolled in Medicaid. The few existing studies of suicide mortality within health systems have focused on adults served by the Veterans Health Administration[6] or enrolled in one state's Medicaid program[7] or an HMO network.[8] This article provides novel information on suicide mortality in a national sample of youth in the U.S. Medicaid program. Age-, gender-, and cause-specific mortality rates are calculated separately for Medicaid and non-Medicaid groups, and then compared to determine if patterns of suicide risk differ.

METHODS

Study Population

The study population is all youth aged 10 to 18 years who died by suicide between 2009 and 2013 in 16 states: California, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, Minnesota, New York, North Carolina, Ohio, Oregon, Texas, Virginia, Washington, and Wisconsin. These states include the ten most populous states in the U.S., span all regions of the country, and account for two thirds (65%) of the total child Medicaid population.[9]

Measures

Suicide cases in Medicaid were identified by a two-step procedure. First, death certificate data from each state's department of vital statistics were used to identify deaths by suicide based on the ICD-10 codes X60–X84, Y87.0, and U03. Age at death, sex, and cause of death, including method of suicide, were obtained directly from death certificates. Second, suicide decedents' data were linked with data in Medicaid Analytic eXtract files by using Social Security numbers. The same data were obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS).[1] For each age, sex, and method of death category, the total number of Medicaid suicides was subtracted from the total number of WISQARS suicides to determine the number of non-Medicaid suicides. Suicide method was grouped into four categories: firearms, hanging/suffocation (i.e., hanging, suffocation by plastic bag, and suffocation by unspecified means), poisoning (i.e., drugs, other solid or liquid substances, gases, and vapors), and other means (e.g., fall, cut/pierce, and transportation-related).

Statistical Analysis

Crude suicide rates per 100,000 person years were calculated separately for the Medicaid and non-Medicaid groups based on the observed counts and total person years of exposure for the given time frame. These rates were calculated overall and by age (10–14 years, 15–18 years), sex, and suicide method. All rates were compared using standardized mortality ratios (SMRs). Wald 95% CIs for the SMRs were estimated using Poisson regression methods. The data were analyzed in 2018.

RESULTS

Of the total number of deaths by suicide (N=4,045) in the 16 states among youth aged 10 to 18 years, 39% occurred among those enrolled in Medicaid. The overall suicide rate did not significantly differ between Medicaid and non-Medicaid groups (SMR=0.96, 95% CI=0.90, 1.03; Table 1). In both groups, the highest suicide rates were among older youth and males. For individuals aged 15–18 years, the crude rate per 100,000 person years was 6.62 in the non-Medicaid group, and 6.29 in the Medicaid group; among males, the rates were 5.52 and 5.12 in the non-Medicaid and Medicaid groups, respectively. However, the SMRs show that risk for suicide was significantly higher among age and sex subgroups in the Medicaid population relative to the non-Medicaid population. Specifically, suicide risk was 28% greater among children aged 10–14 years (SMR=1.28, 95% CI=1.08, 1.53) and 14% greater among females (regardless of age; SMR=1.14, 95% CI=1.01, 1.29).

Suicide method also significantly differed between the Medicaid and non-Medicaid groups (Table 2). Among Medicaid youth, most suicides occurred by hanging/suffocation (54.6% of male suicides and 72.3% of female suicides). Compared with the non-Medicaid group, risk of suicide by hanging is 26% greater for Medicaid youth (SMR=1.26, 95% CI=1.16, 1.38).

DISCUSSION

This is the first study to examine suicide mortality in a national sample of youth enrolled in Medicaid and to compare suicide rates between Medicaid and non-Medicaid populations. Almost 40% of youth who died by suicide were covered by Medicaid, suggesting effective suicide screening of enrollees could substantially decrease suicide mortality in the U.S. The overall suicide rate was not significantly different for Medicaid and non-Medicaid youth, and in both groups the highest rates of suicide were among males and older youth. However, there were disproportionate deaths by suicide by hanging/suffocation among the Medicaid youth, and youth aged 10 to 14 years and females in Medicaid had disproportionate suicide risk compared with age and sex matched youth in the non-Medicaid population. These findings, together with prior research indicating Medicaid subgroups experience more child maltreatment and poverty-related adversity than non-Medicaid youth,[10–13] suggest a need to develop the capacity of healthcare delivery systems to implement trauma-informed approaches across the continuum of care.

Table 1. Suicide Rates Among Medicaid and Non-Medicaid Youth Populations in 16 States,[a] by Gender and Age Group, 2009–2013

Gender and age, years	Medicaid population[b]			Non-Medicaid population[c]			SMR (95% CI)
	Suicide deaths	Population person years	Crude rate per 100,000 person years	Suicide deaths	Population person years	Crude rate per 100,000 person years	
Males	1,123	21,922,853	5.12	1,912	34,635,245	5.52	0.93 (0.86, 1.00)
10–14	232	12,002,249	1.93	282	18,700,984	1.51	**1.28 (1.08, 1.53)**
15–18	891	9,920,604	8.98	1,630	15,934,261	10.23	**0.88 (0.81, 0.95)**
Females	440	21,775,797	2.02	570	32,216,776	1.77	**1.14 (1.01, 1.29)**
10–14	129	12,575,964	1.03	127	16,856,588	0.75	**1.36 (1.07, 1.74)**
15–18	311	9,199,833	3.38	443	15,360,188	2.88	**1.17 (1.01, 1.36)**
Total	1,563	43,698,650	3.58	2,482	66,852,021	3.71	0.96 (0.90, 1.03)
10–14	361	24,578,213	1.47	409	35,557,572	1.15	**1.28 (1.11, 1.47)**
15–18	1,202	19,120,437	6.29	2,073	31,294,449	6.62	0.95 (0.88, 1.02)

Note: Boldface indicates statistical significance ($p<0.05$).
[a]States are California, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, Minnesota, New York, North Carolina, Ohio, Oregon, Texas, Virginia, Washington, and Wisconsin.
[b]Medicaid population data from death certificate data matched by Social Security number with Medicaid data for each state.
[c]Non-Medicaid population data drawn from WISQARS.
SMR, standardized mortality ratio; WISQARS, Web-based Injury Statistics Query and Reporting System.

Table 2. Suicide Rates Among Medicaid and Non-Medicaid Youth Populations in 16 States,[a] by Gender and Suicide Method, 2009–2013

Gender and method	Medicaid population[b]			Non-Medicaid population[c]			SMR (95% CI)
	Suicide deaths	Population person years	Crude rate per 100,000 person years	Suicide deaths	Population person years	Crude rate per 100,000 person years	
Males							
Firearms	414	21,922,853	1.89	886	34,635,245	2.56	**0.74 (0.66, 0.83)**
Hanging/suffocation	613	21,922,853	2.80	785	34,635,245	2.27	**1.23 (1.11, 1.37)**
Poisoning	46	21,922,853	0.21	78	34,635,245	0.23	0.93 (0.65, 1.34)
Other[d]	50	21,922,853	0.23	163	34,635,245	0.47	**0.48 (0.35, 0.67)**
Females							
Firearms	48	21,775,797	0.22	123	32,216,776	0.38	**0.58 (0.41, 0.81)**
Hanging/suffocation	318	21,775,797	1.46	341	32,216,776	1.06	**1.38 (1.18, 1.61)**
Poisoning	45	21,775,797	0.21	47	32,216,776	0.15	1.42 (0.94, 2.13)
Other[d]	29	21,775,797	0.13	59	32,216,776	0.18	0.73 (0.47, 1.13)
Total							
Firearms	462	43,698,650	1.06	1,009	66,852,021	1.51	**0.70 (0.63, 0.78)**
Hanging/suffocation	931	43,698,650	2.13	1,126	66,852,021	1.68	**1.26 (1.16, 1.38)**
Poisoning	91	43,698,650	0.21	125	66,852,021	0.19	1.11 (0.85, 1.46)
Other[d]	79	43,698,650	0.18	222	66,852,021	0.33	**0.54 (0.42, 0.70)**

Note: Boldface indicates statistical significance ($p<0.05$).
[a]States are California, Florida, Georgia, Illinois, Indiana, Massachusetts, Michigan, Minnesota, New York, North Carolina, Ohio, Oregon, Texas, Virginia, Washington, and Wisconsin.
[b]Medicaid population data drawn from death certificate data matched by Social Security number with Medicaid data for each state.
[c]Non-Medicaid population data drawn from WISQARS.
[d]Other includes ICD-10 cause of death diagnoses *U03, X71,X75–X79,X80–X84,Y87.0.
SMR, standardized mortality ratio; WISQARS, Web-based Injury Statistics Query and Reporting System.

Developmental approaches to prevent suicide at the individual level are challenging to study, given a relatively long time horizon and considerable cost.[14] Population-based prevention efforts relevant to suicide in Medicaid insured youth include home visitation models (e.g., Nurse Family Partnership), which have been associated with reductions in risk factors for suicide, such as childhood maltreatment,

behavioral problems, and substance use disorders in children.[15] Classroom-based prevention efforts directed at pediatric populations (e.g., Good Behavior Game) have been shown to reduce the risk of subsequent disruptive behavioral problems, drug use disorders,[16,17] and suicide attempts in children.[18]

Results from this study suggest that analysis of existing health and mental health service utilization patterns captured in Medicaid claims are a promising avenue for future research. Findings could prove helpful in identifying periods known to be associated with heightened suicide risk, such as that immediately following discharge from inpatient psychiatric care.[19]

Limitations

Several limitations should be considered when interpreting the results. First, although data are from diverse states and capture nearly two thirds of Medicaid youth enrollees, the results may not be generalizable to all 50 states. Second, like all studies reliant on death certificate data, suicide prevalence may be underestimated because suicide is an underreported cause of death.[10] Finally, it was not possible to calculate race-adjusted rates because race/ethnicity is not reliably reported in Medicaid data. However, prior studies using WISQARS data have shown racial disparities. For example, the suicide rate among black children younger than 13 years is two times higher than same-aged white children,[20] and the rate of suicide by hanging has increased over time for black boys.[21] With approximately 44% of youth enrolled in Medicaid identified as non-white,[22] state Medicaid systems must more accurately record demographic data to advance both health equity and suicide prevention agendas.

CONCLUSIONS

As knowledge about the risk and protective factors associated with suicide among youth advances, this study provides a previously unavailable comparison point for other health systems that may be initiating surveillance of suicide mortality in their populations. Furthermore, the population-based profile of suicide among youth enrolled in Medicaid differs from the profile of youth not enrolled in Medicaid, confirming the importance of Medicaid as a boundaried suicide prevention setting.

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