

**WHO ATTEMPTS SUICIDE BY BURNING? AN ANALYSIS OF AGE
PATTERNS OF MORTALITY BY SELF-INFLICTED BURNING IN THE
UNITED STATES**

Brett D. Thombs, PhD¹; Melissa G. Bresnick, BS²; Gina Magyar-Russell, PhD^{2,3}

¹Department of Psychiatry, Sir Mortimer B. Davis-Jewish General Hospital and McGill University, Montreal, Quebec, ²Johns Hopkins Burn Center, Johns Hopkins Bayview Medical Center, Baltimore, Maryland; Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Running Title: Suicide by Burning

Address for Correspondence:

Brett D. Thombs, Ph.D.

Institute of Community and Family Psychiatry

SMBD-Jewish General Hospital

4333 Cote Ste Catherine Road

Montreal, Quebec H3T 1E4

Tel (514) 340-8222 ext. 5112

E-mail: brett.thombs@mcgill.ca

Word Count: 3,327

ABSTRACT

Objective: The objective of this study was to compare age patterns of completed suicide by burning in the U.S. to age patterns in suicide by all methods as an indicator of whether suicide by burning may be a phenomenon related to altered mental status (psychosis and/or intoxication).

Methods: Analysis of three national databases: Fatal injury data from the U.S. National Vital Statistics System, estimates of nonfatal injury data from the U.S. National Electronic Injury Surveillance System All-Injury Program, and mortality data from the American Burn Association National Burn Repository.

Results: Risk of suicide by burning is highest between 30-59 years (odds by decile of age compared to 18-29 years 1.47 to 1.82), whereas risk by all methods is highest for ages 70 and older (odds 1.26 to 1.55). Of patients admitted to burn centers with large self-inflicted burns (total body surface area $\geq 20\%$), 58.6% live. Among those with specified psychiatric or substance abuse/dependence disorders, 69.2% had a psychotic disorder and/or a substance abuse/dependence disorder.

Conclusions: Age patterns of suicide by burning suggest that psychotic and/or substance-related disorders may be present in a substantial proportion of victims. Further research is needed, however, to document the psychiatric characteristics of these patients.

INTRODUCTION

Suicide by burning is among the most dramatic of all forms of suicide. Perhaps more than any other form of self-destruction, the act of suicide by burning has a long documented history of powerful cultural meaning and political impact across much of the world [1]. The 1963 self-incineration of Buddhist monk Thich Quang Duc on a Saigon street corner, for instance, became an enduring symbol of protest against the South Vietnamese Diem government and the Vietnam war [1,2]. Similarly, Jan Palach, a 21-year-old student who doused himself in gasoline in 1969 and set himself on fire in Prague's Wenceslas Square to protest the Soviet invasion of Czechoslovakia, became a symbol of international resistance that is still celebrated in Czechoslovakia [1,3].

Accounts of culturally-sanctioned ritualistic self-burning go back as far as first century B.C. Greece [1], and intentional self-burning continues to be a major cause of serious burn injury and death in many parts of the world [4]. In studies from the Indian subcontinent and the Middle East, for instance, victims of self-inflicted burn injuries, the vast majority of whom are young women, account for more than 25% of all admissions to burn centers [4-7]. Between 70% and 90% of self-inflicted burns reported in these burn centers were fatal [4]. In India, some of these deaths are related to the practice of *suttee*, which involves a widow throwing herself on the funeral pyre of her deceased husband. More, however, occur when young women are compelled to commit suicide by burning when dowry expectations are not met by her family (other women are murdered over dowry) [8]. In Iran, over 80% of female suicides are by burning, and most victims are young, illiterate, impoverished married women [9].

Attempted suicide by burning is relatively rare, however, in North America and Europe [4], and there are no readily identifiable current cultural patterns or practices reflected in profiles of individuals who attempt suicide by burning in Western cultures. Consequences of attempted suicide by burning are also different compared to regions where the practice is more common. A majority of patients admitted to hospitals in Europe or North America with self-inflicted burn injuries survive [4], and of those who do not survive, death often comes slowly. Many patients live for several hours to several months before dying [10]. Those who survive tend to have extensive burn injuries [4] that result in considerable damage to skin integrity, including hypertrophic scarring that causes severe disfigurement and substantial physical impairment [11]. In addition, they face an excruciatingly painful recovery process and will most likely continue to experience significant pain and itching even years postburn [12-14].

Thus, an important issue with implications for acute and long-term care involves the nature of characteristics of individuals who attempt suicide through self-burning in the United States. Given the absence of culturally-anchored practices related to self-burning in the U.S., the relatively low fatality rate, and the degree of suffering experienced by survivors of severe burn injuries, who would choose to attempt suicide in this way? When suicidal behavior reflects an absence of rationality and little concern for pain or outcomes in the case of survival, psychosis should be suspected [15]. Self-inflicted burn injuries encompass a range of behaviors from repeated self-mutilation with minimal injury to self-incineration [16], but relatively little is known about patients who deliberately burn themselves with the intent of committing suicide. Studies that have investigated patient characteristics and outcomes related to self-inflicted burn injuries

have generally been limited by very small numbers of patients from single burn centers. Only 2 existing studies have included more than 100 patients with self-inflicted injuries [17,18], and almost all other studies report data from fewer than 50 patients [4]. As a result, these studies have tended to produce somewhat contradictory descriptions of patient characteristics, such as age, gender, and burn severity.

A recent review also found widely discrepant estimates of the percentage of European and North American patients with self-inflicted burn injuries who had psychiatric diagnoses (32% to 100%). The author of the review noted that the most commonly mentioned psychiatric diagnosis was depression [4]. None of the studies reviewed, however, used sufficiently systematic diagnostic or psychiatric autopsy methods [19] or investigated a large enough number of patients to reliably document the prevalence of specific psychiatric disorders. The few existing case series that have included documented methods of psychiatric diagnoses (7-15 patients in each study) all report that most patients who attempt suicide by burning have psychotic illnesses [20-23].

Among adults who attempt suicide by any method, patterns of psychiatric diagnosis change across the lifespan. Substance use and affective disorder are present in completed suicides in all age groups. Major depression, however, is much more common in later-life victims, whereas disorders related to impulsivity and confused thinking, such as substance use disorders and psychotic disorders, are much more common in the earlier and middle portions of the adult lifespan [24,25]. Patients who die by suicide and patients who make medically serious suicide attempts have been shown to have similar characteristics [26]. Thus, an understanding of characteristics of patients who commit suicide by burning would be a useful proxy to help understand characteristics of

survivors and aid in assessing acute clinical and post-discharge needs of this patient group. The objective of this study was to use three large national databases from the United States to compare age patterns of completed suicide by all methods to age patterns among victims of suicide by burning as an indicator of whether suicide by burning among adults is likely to be a phenomenon primarily related to depression or one related to altered mental state, in particular, psychosis and/or intoxication.

METHODS

Data Sources

Three independent sources of data were used. In order to estimate case fatality rates from self-inflicted burn injuries, population-based fatal and non-fatal injury data were used. Fatal injury data from 1995 through 2003 were obtained from the National Vital Statistics System (NVSS), which is operated by the Center for Disease Control's (CDC) National Center for Health Statistics. Data in the NVSS represent all death certificates filed in the United States. Nonfatal injury data for 2000 through 2003 were obtained from the National Electronic Injury Surveillance System (NEISS) All-Injury Program, which is operated by the U.S. Consumer Product Safety Commission in collaboration with the CDC's National Center for Injury Prevention and Control (NCIPC) and from the CDC Firearm Injury Surveillance Study, conducted through NEISS. The non-fatal injury data represent national estimates computed based on sample weights obtained from a nationally stratified, probability sample of 66 hospital emergency departments. The fatal and non-fatal injury datasets are available through the NCIPC's Web-based Injury Statistics Query and Reporting System (<http://www.cdc.gov/ncipc/wisqars>) [27]. Each of these datasets provides a breakdown of

injuries by etiology (e.g., burn, gunshot) and intent (e.g., accidental, self-harm or suicide). Patterns of suicide rates by burning compared to all methods across the lifespan were analyzed using the U.S. population-based fatal injury data.

The population-based datasets do not provide breakdowns on specific intent (e.g., mutilation versus suicide) or on the extent of the burn injury. Thus, in addition to the population-based fatal and non-fatal injury data, data for adult patients admitted to 70 burn centers across the United States with thermal injuries (flame, contact, or scald) from 1995-2005 were extracted from the American Burn Association National Burn Repository (ABA-NBR) database in order to investigate mortality rates among patients admitted with serious self-inflicted burn injuries (e.g., total body surface area burned [TBSA] $\geq 20\%$), a group that is unlikely to include a high proportion of patients whose intent was probably mutilation rather than death. In addition to the circumstances of the injury (e.g., suicide attempt, accident), patient data in the ABA-NBR include age, sex, race, year of injury, the etiology of the burn injury (e.g., flame, scald), mortality status and cause, percent TBSA burned, percent TBSA burned 2nd degree, percent TBSA burned 3rd degree, the presence or absence of an inhalation injury, and pre-existing medical conditions. Data on psychiatric and substance abuse diagnoses, although incomplete in the ABA-NBR, were also referenced as an indicator of the relative proportions of psychiatric diagnoses. Patients age 90 and over were not included in the ABA-NBR analysis because their actual ages were not entered into the dataset due to patient privacy regulations. Patient records with missing data points and duplicate records were also excluded from the analysis. A more complete description of the ABA-NBR database is provided elsewhere [28]. Since data were not available for all of the same

years across the 3 databases, all available data from 1995 forward were included for each database.

Statistical Analysis

For comparisons on demographic and burn injury variables between individuals with self-inflicted and other burn injuries, chi-square tests were used to compare categorical variables, and a nonparametric statistical test, the Wilcoxon rank-sum test was used for continuous variables due to non-normal distributions. Estimated case fatality rates for self-inflicted injuries by burning, other prominent methods, and all methods were generated by comparing population-adjusted rates of fatal and non-fatal injuries using the national datasets. Case fatality rates were generated by dividing the number of fatal self-inflicted injuries by the estimated total number of fatal and non-fatal injuries. Fatality rates were also calculated from the ABA-NBR database for patients admitted to burn centers with large self-inflicted burn injuries (TBSA $\geq 20\%$). To compare suicide rates across the lifespan by burning as compared to all methods, odds ratios with confidence intervals were calculated for the likelihood of a fatal suicide attempt by age group (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+) with the 18-29 age group as the reference group.

RESULTS

Rates and Characteristics of Fatal Self-Inflicted Burn Injuries

There were 265,629 (14.25 per 100,000) suicides by all methods in the United States by individuals aged 18 or older between 1995 and 2003, and 1,466 (0.08 per 100,000) of these were by burning. Individuals who committed suicide by burning were significantly less likely to be male (69.6%) than persons who committed by all other

methods (80.5%, $p < .01$). The median ages were very similar: 44 years of age for all methods and 43 years of age for burn injuries.

A total of 30,382 adult patients ages 18-89 admitted to 70 burn centers were included in the ABA-NBR, including 593 (2.0%) with self-inflicted burns. Of 6,007 patients in the sample with burns of at least 20% TBSA, 331 were self-inflicted (5.5%). There were no significant differences between groups defined by race/ethnicity with the exception of Asians, for whom 10.8% (14 of 130) of large burns were self-inflicted, compared to 5.4% (317 of 5,877) in all other groups ($p < .01$). This difference would not affect overall patterns in the U.S, however, due to the very small proportion of Asians among patients with self-inflicted burns and with burn injuries in general. Among patients with at least 20% TBSA burned, patients with self-inflicted burns tended to be significantly younger (median 37 years vs. 43 years, $p < .01$) and significantly more likely to have a documented history of drug abuse (10.3% vs. 4.0%, $p < .01$), alcohol abuse (11.2% vs. 8.0%, $p = .04$), or a psychiatric diagnosis (18.4% vs. 3.3%, $p < .01$) than patients whose burns were not self-inflicted.

Fatality Rates of Self-Inflicted Injury by Burning and by Other Methods

As shown in Table 1, the population case fatality rate that is generated by dividing the number of fatal self-inflicted injuries by the total number of fatal and non-fatal injuries is only slightly higher for burning (11.4%) than the rate for all methods (9.7%). The rate for burning is substantially lower than for gunshot (82.9%), suffocation/inhalation (75.1%) or falls (29.4%). These rates, however, reflect both the lethality of methods and intent since it is not known to what degree persons included in these data intended to only cause injury or to cause death. Table 2 shows the rate of

fatalities and the mean length of stay among survivors for patients admitted to U.S. burn centers for self-inflicted injuries with least 20% TBSA burned. Overall, 41.4% of admitted patients died. Among survivors, mean length of stay was 31.2 days for patients with 20-29% TBSA burned and increased with burn size to approximately 5 months for patients who survived burns of 80-89% TBSA.

Suicide by Burning and by All Methods Across the Adult Lifespan

Table 3 presents the rate of suicide by all methods and by burning by age group among adults in the United States from 1995-2003. Odds ratios for all methods and for burning are calculated compared to the 18-29 age group. As shown in Figure 1, the odds of suicide by burning climb rapidly, peak in the 40-49 age group, and decrease in subsequent age groups. For all methods, there is some, but much less, elevation up to the 40-49 age group then a slight decline through the 60s prior to a rapid upswing in later life. The odds ratios in Table 3 indicate that, compared to the 18-29 age group, the odds of suicide by burning are significantly more elevated for age groups 30-39, 40-49, and 50-59 compared to all methods. The odds, however, are significantly lower for suicide by burning for the age groups 70-79 and 80+. Suicide by all methods is much more likely in the 70-79 and 80+ age groups than in younger age groups, and suicide by burning much less likely among these older cohorts.

Psychiatric Diagnoses in the ABA-NBR

Of all adult patients in the ABA-NBR, 10.0% (n = 3,042) had a psychiatric and/or substance abuse diagnosis, including 2.8% (n = 860) with a psychiatric diagnosis, 5.8% (n = 1,766) with a diagnosis of alcohol abuse or dependence, and 3.3% (n = 990) with a diagnosis of drug abuse or dependence. Among patients with self-inflicted injuries and

TBSA 20% or greater, 36.9% of records (n = 122 of 331) were positive for a psychiatric or substance abuse disorder, including 20.8% (n = 69) with a psychiatric diagnosis but no substance-related diagnosis, 10% (n = 33) with only a substance abuse or dependence diagnosis, and 6.0% (n = 20) with both psychiatric and substance-related diagnoses. The ABA-NBR data appear to underreport psychiatric and substance abuse/dependence diagnoses compared to previous estimates for suicide in general [25] and among burn patients [29]. Interpreted cautiously, however, these data may provide some insight into the relative proportions of diagnoses. Of the 89 patients with psychiatric diagnoses, 30.3% (n = 27) had major depressive disorder or another depressive disorder, 3.4% (n = 3) had an anxiety disorder, 46.1% (n = 41) had a psychotic disorder (14 with schizophrenia, 13 with bipolar disorder, 10 with an unspecified psychotic disorder, and 4 with major depression with psychotic features), and 20.2% (n = 18) had an unspecified psychiatric disorder. When patients with an unspecified disorder are not included, patients with a psychotic disorder comprised 57.7% of psychiatric diagnoses compared to 38.0% for depressive disorders. Of patients with a specified psychiatric disorder or substance abuse (n = 118), 69.2% were diagnosed with either a psychotic disorder and/or a substance abuse/dependence disorder.

DISCUSSION

The main finding of this study was that age patterns of suicide differ significantly between burning and all methods of suicide. Among suicides by all methods, compared to the 18-29 age group, there is a slight bump in population rates from 30-59 years then a sharp decline, followed by a steep rise to the end of the lifespan. For burning, on the other hand, there is a substantial peak for the years 30-59 followed by much lower rates across

all older groups. Survival rates among individuals who attempted suicide by burning were high. In the U.S. population from 2000-2003, the case fatality rate was 11.4% for burning, only slightly greater than the overall rate for all methods (9.7%). Of patients admitted to a group of 70 U.S. burn centers between 1995 and 2005, 41.4% of patients with self-inflicted injuries of TBSA 20% burned or greater died. The recovery process for survivors, however, is long. Mean hospital stays ranged from 31 days for patients with burns of TBSA 20-29% to 153 days for patients with burns of TBSA 80-89%. Victims of suicide by burning were significantly more likely to be female (30.4%) compared to victims of suicide by all methods (19.5%). Although the reasons for this are unknown, this finding is of interest given the predominance of women among victims of suicide by burning in other parts of the world [4-7, 9].

Data on psychiatric and substance abuse/dependence disorders from the ABA-NBR suggest that psychotic disorders comprise almost 60% of specified psychiatric disorders and that psychotic disorders and substance related disorders comprise just under 70% of all specified psychiatric and substance related disorders. These data appear to underreport total diagnoses, however, and these proportions may not be representative. Thus, the findings from this study do not provide conclusive evidence that disorders characterized by confused thinking, including psychotic and substance abuse disorders, are prominent among patients who attempt suicide by burning. Nonetheless, the combination of age patterns and ABA-NBR diagnostic patterns suggest that much more attention needs to be given to psychiatric diagnosis in this population and that psychosis and intoxication related to substance abuse/dependence disorders may play a central role in suicide by burning. Existing studies on age of onset and suicide show that, for both

bipolar disorder and schizophrenia, suicide risk is highest early in the course of the disease [30-32]. Three distinct subgroups of age onset of bipolar disorder have been identified (mean ages 17, 27, and 46 years), all of which fall in the peak range for suicide by burning [33,34]. For schizophrenia, the majority of identified cases have onsets in the middle to late 20s [35].

Since characteristics of survivors and non-survivors of suicide attempts are similar [26], these findings suggest not only that a large proportion of suicides by burning may occur in the context of psychosis, but, also, that many of those who survive will have psychotic disorders. No studies, however, have investigated the acute or post-discharge needs of patients who attempt suicide by burning, and there is no evidence in the burn literature related to the management and care of patients with severe Axis I psychiatric illness regardless of association with suicide. The absence of evidence-based recommendations is of concern since the presence of any psychiatric disorder is a predictor of longer hospital stays among burn patients [36,37]. One study found that patients with a psychiatric disorder stayed in the hospital 43% longer than patients with similar demographic, medical, and burn injury characteristics [36]. In addition, patients who make medically serious suicide attempts are at substantially greater risk for subsequent attempts and death [26,38]. Many patients, however, who are treated in hospitals for serious suicide attempts do not receive psychiatric follow-up [39].

There are limitations that should be taken into consideration in interpreting the results from this study. First, this study examined age patterns that have been associated with psychiatric diagnoses in the context of suicide, but presented only admittedly flawed data on actual psychiatric diagnoses. Thus, this study should be considered a test of the

plausibility of the theory that a large proportion of individuals who attempt suicide by burning have psychotic and/or substance related disorders rather than as conclusive evidence. Another limitation is that the data used in this study are from large national databases and registries, all of which are limited with respect to the depth of data that can be captured for each patient.

In summary, age patterns of suicide by burning in the United States suggest that psychotic and/or substance-related disorders may be present in a substantial proportion of victims. The rate of fatalities from self-inflicted burns is low, even with TBSA burned of 20% or greater. Patients who survive suicide attempts, however, are often left with massive and debilitating injuries. Research is needed to document the psychiatric characteristics of patients who attempt suicide by burning and to provide recommendations for acute and long-term integrated psychiatric and medical care.

REFERENCES

1. Crosby K, Rhee JO, Holland J. Suicide by fire: A contemporary method of political protest. *Int J Soc Psychiatry* 1977; 23:60-69.
2. Ben Park BC. Sociopolitical contexts of self-immolations in Vietnam and South Korea. *Arch Suicide Res* 2004; 8:81-97.
3. Czech Radio (<http://www.radio.cz/en/article/74777>). Young Czechs remember Jan Palach. 2006; 2006:1.
4. Laloe V. Patterns of deliberate self-burning in various parts of the world. A review. *Burns* 2004; 30:207-215.
5. Saadat M. Epidemiology and mortality of hospitalized burn patients in Kohkiluyeh Va Boyer-Ahmad province (Iran): 2002-2004. *Burns* 2005; 31:306-309.
6. Wagle SA, Wagle AC, Apte JS. Patients with suicidal burns and accidental burns: A comparative study of socio-demographic profile in India. *Burns* 1999; 25:158-161.
7. Laloe V, Ganesan M. Self-immolation a common suicidal behaviour in eastern Sri Lanka. *Burns* 2002; 28:475-480.
8. Kumar V. Burnt wives--a study of suicides. *Burns* 2003; 29:31-35.
9. Maghsoudi H, Garadagi A, Jafary GA, Azarmir G, Aali N, Karimian B, et al. Women victims of self-inflicted burns in Tabriz, Iran. *Burns* 2004; 30:217-220.

10. Cave Bondi G, Cipolloni L, Parroni E, Cecchi R. A review of suicides by burning in Rome between 1947-1997 examined by the pathology department of the Institute of Forensic Medicine, University of Rome 'la sapienza'. *Burns* 2001; 27:227-231.
11. Fauerbach JA, Spence RJ, Patterson DR. Adult burn injury, in *Psychological Aspects of Reconstructive and Cosmetic Plastic Surgery: Clinical, Empirical, and Ethical Perspectives*. Edited by Sarwer DB, Pruzinsky T, Cash TF, Goldwyn RM, Persing JA, Whitaker LA. Philadelphia, Lippincott Williams & Wilkins, 2006, pp 105-124.
12. Choiniere M, Melzack R, Papillon J. Pain and paresthesia in patients with healed burns: An exploratory study. *J Pain Symptom Manage* 1991; 6:437-444.
13. Malenfant A, Forget R, Papillon J, Amsel R, Frigon JY, Choiniere M. Prevalence and characteristics of chronic sensory problems in burn patients. *Pain* 1996; 67:493-500.
14. Dauber A, Osgood PF, Breslau AJ, Vernon HL, Carr DB. Chronic persistent pain after severe burns: A survey of 358 burn survivors. *Pain Med* 2002; 3:6-17.
15. Maris RW, Berman AL, Silverman MM. Suicide attempts and methods, in *Comprehensive Textbook of Suicidology*. Edited by Maris RW, Berman AL, Silverman MM. New York, Guilford, 2000, pp 284-308.

16. Wiechman SA, Ehde DM, Wilson BL, Patterson DR. The management of self-inflicted burn injuries and disruptive behavior for patients with borderline personality disorder. *J Burn Care Rehabil* 2000; 21:310-317.
17. Rashid A, Gowar JP. A review of the trends of self-inflicted burns. *Burns* 2004; 30:573-576.
18. van der Does AJ, Hinderink EM, Vloemans AF, Spinhoven P. Burn injuries, psychiatric disorders and length of hospitalization. *J Psychosom Res* 1997; 43:431-435.
19. Beskow J, Runeson B, Asgard U. Psychological autopsies: Methods and ethics. *Suicide Life Threat Behav* 1990; 20:307-323.
20. Antonowicz JL, Taylor LH, Showalter PE, Farrell KJ, Berg S. Profiles and treatment of attempted suicide by self-immolation. *Gen Hosp Psychiatry* 1997; 19:51-55.
21. Scully JH, Hutcherson R. Suicide by burning. *Am J Psychiatry* 1983; 140:905-906.
22. Andreasen NC, Noyes R, Jr. Suicide attempted by self-immolation. *Am J Psychiatry* 1975; 132:554-556.
23. Daniels SM, Fenley JD, Powers PS, Cruse CW. Self-inflicted burns: A ten-year retrospective study. *J Burn Care Rehabil* 1991; 12:144-147.
24. Conwell Y, Brent D. Suicide and aging. I: Patterns of psychiatric diagnosis. *Int Psychogeriatr* 1995; 7:149-164.

25. Conwell Y, Duberstein PR, Cox C, Herrmann JH, Forbes NT, Caine ED.
Relationships of age and axis I diagnoses in victims of completed suicide: A psychological autopsy study. *Am J Psychiatry* 1996; 153:1001-1008.
26. Beautrais AL. Suicides and serious suicide attempts: Two populations or one? *Psychol Med* 2001; 31:837-845.
27. Vyrostek SB, Annest JL, Ryan GW. Surveillance for fatal and nonfatal injuries - united states, 2001, in *Surveillance Summaries*, September 3, 2004. Edited by Anonymous 2004, pp 1-57.
28. American Burn Association. National burn repository: 2005 report. Dataset version 2.0. 2006.
29. Fauerbach JA, Lawrence J, Haythornthwaite J, Richter D, McGuire M, Schmidt C, Munster A. Preburn psychiatric history affects posttrauma morbidity. *Psychosomatics* 1997; 38:374-385.
30. Baldessarini RJ, Pompili M, Tondo L. Suicide in bipolar disorder: Risks and management. *CNS Spectr* 2006; 11:465-471.
31. Dilsaver SC, Chen YW, Swann AC, Shoaib AM, Tsai-Dilsaver Y, Krajewski KJ. Suicidality, panic disorder and psychosis in bipolar depression, depressive-mania and pure-mania. *Psychiatry Res* 1997; 73:47-56.
32. Palmer BA, Pankratz VS, Bostwick JM. The lifetime risk of suicide in schizophrenia: A reexamination. *Arch Gen Psychiatry* 2005; 62:247-253.

33. Bellivier F, Golmard JL, Rietschel M, Schulze TG, Malafosse A, Preisig M, et al.
Age at onset in bipolar I affective disorder: Further evidence for three subgroups. *Am J Psychiatry* 2003; 160:999-1001.
34. Bellivier F, Golmard JL, Henry C, Leboyer M, Schurhoff F. Admixture analysis of age at onset in bipolar I affective disorder. *Arch Gen Psychiatry* 2001; 58:510-512.
35. Schurhoff F, Golmard JL, Szoke A, Bellivier F, Berthier A, Meary A, et al.
Admixture analysis of age at onset in schizophrenia. *Schizophr Res* 2004; 71:35-41.
36. Thombs BD, Singh VA, Halonen J, Diallo A, Milner SM. The effects of pre-existing medical comorbidities on mortality and length of hospital stay in acute burn injury: Evidence from a national sample of 31,338 adult patients. *Ann Surg*; In press.
37. Tarrier N, Gregg L, Edwards J, Dunn K. The influence of pre-existing psychiatric illness on recovery in burn injury patients: The impact of psychosis and depression. *Burns* 2005; 31:45-49.
38. Beautrais AL. Further suicidal behavior among medically serious suicide attempters. *Suicide Life Threat Behav* 2004; 34:1-11.
39. Nordentoft M, Sogaard M. Registration, psychiatric evaluation and adherence to psychiatric treatment after suicide attempt. *Nord J Psychiatry* 2005; 59:213-216.

ACKNOWLEDGMENTS

The National Burn Repository of the American Burn Association is the source of some of the data contained in this document. The conclusions and opinions derived from National Burn Repository data represent the authors' views and are not necessarily those of the American Burn Association. No outside funding was received for this study.

Table 1. Fatal and non-fatal self-inflicted injuries by method for the United States 2000-2003.

	Fatal Self-Inflicted Injuries		Non-Fatal Self-Inflicted Injuries		Case Fatality Rate (%)
	Total	per 100,000	Total	per 100,000	
All Methods	119,064	13.9	1,114,228	130.4	9.7
Burn	599	0.1	4,654	0.5	11.4
Gunshot	65,669	7.7	13,504	1.6	82.9
Fall	2,649	0.3	6,372	0.7	29.4
Poisoning	20,771	2.4	740,342	86.6	2.7
Suffocation/Inhalation	23,187	2.7	7,694	0.9	75.1
Cut/pierce	1,966	0.2	215,407	25.2	0.9
Other	4,223	0.5	126,255	14.8	3.2

Table 2. Mortality and length of hospital stay among survivors by total body surface area burned from a sample of patients admitted to U.S. burn centers with self-inflicted injuries (total body surface area burned $\geq 20\%$) 1995-2005.

% TBSA Burned	Number of Patients	Deaths (%)	Mean Length of Stay (Standard Deviation)
20 - 29.9	79	4 (5.1)	31.2 (22.4)
30 - 39.9	54	13 (24.1)	42.1 (22.7)
40 - 49.9	55	13 (23.6)	48.8 (28.5)
50 - 59.9	29	17 (58.6)	53.1 (28.9)
60 - 69.9	28	16 (57.1)	66.2 (39.8)
70 - 79.9	22	15 (68.2)	93.4 (70.3)
80 - 89.9	31	26 (83.9)	153.2 (36.3)
90 - 100	33	33 (100.0)	-----
Total	331	137 (41.4)	46.2 (35.9)

Table 3. Odds of Death by Suicide by Age Group Compared to 18-29 Age Group for All Methods and for Burning for the United States 1995-2003.

Age Group	All Methods	Odds Ratio (95% Confidence Interval)	Burning	Odds Ratio (95% Confidence Interval)
	Rate/ 100,000		Rate/ 100,000	
18-29	12.70	-----	0.06	-----
30-39*	13.96	1.10 (1.09 – 1.11)	0.09	1.47 (1.25 – 1.73)
40-49*	15.36	1.21 (1.20 – 1.22)	0.11	1.82 (1.56 – 2.13)
50-59*	14.12	1.11 (1.10 – 1.13)	0.09	1.53 (1.28 – 1.82)
60-69	12.56	0.99 (0.97 – 1.00)	0.06	0.94 (0.74 – 1.18)
70-79*	15.97	1.26 (1.24 – 1.28)	0.04	0.71 (0.54 – 0.94)
80 and older*	19.71	1.55 (1.52 – 1.58)	0.05	0.83 (0.60 – 1.16)

* Significantly different odds between all methods and burning compared to 18-29 age group ($p < .05$).

Figure 1.

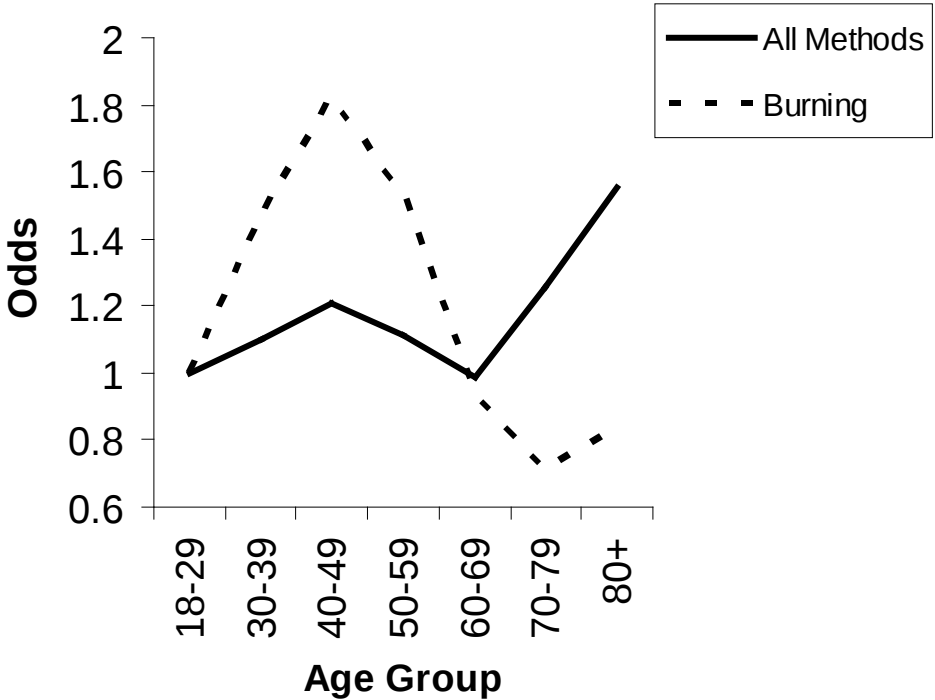


FIGURE LEGENDS

Figure 1. Fatal self-inflicted injuries by age group. Fatal self-inflicted injuries in the United States from all methods are depicted by a solid line. Fatal self-inflicted burn injuries are depicted by a dashed line. Odds ratios are calculated for each age group as deaths per total U.S. population in each age group indexed to the rate for the 18-29 year age group.