Emergency Psychiatry in the General Hospital

The emergency room is the interface between community and health care institution. Whether through outreach or in-hospital service, the psychiatrist in the general hospital must have specialized skill and knowledge to attend the increased numbers of mentally ill, substance abusers, homeless individuals, and those with greater acuity and comorbidity than previously known. This Special Section will address those overlapping aspects of psychiatric, medicine, neurology, psychopharmacology, and psychology of essential interest to the psychiatrist who provides emergency consultation and treatment to the general hospital population.

Details on suicide among US physicians: data from the National Violent Death Reporting System

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ABSTRACT

Objective: Physician suicide is an important public health problem as the rate of suicide is higher among physicians than the general population. Unfortunately, few studies have evaluated information about mental health comorbidities and psychosocial stressors which may contribute to physician suicide. We sought to evaluate these factors among physicians versus non-physician suicide victims.

Methods: We used data from the United States National Violent Death Reporting System to evaluate demographics, mental health variables, recent stressors and suicide methods among physician versus non-physician suicide victims in 17 states.

Results: The data set included 31,636 suicide victims of whom 203 were identified as physicians. Multivariable logistic regression found that having a known mental health disorder or a job problem which contributed to the suicide significantly predicted being a physician. Physicians were significantly more likely than non-physicians to have antipsychotics, benzodiazepines and barbiturates present on toxicology testing but not antidepressants.

Conclusions: Mental illness is an important comorbidity for physicians who complete a suicide but postmortem toxicology data shows low rates of medication treatment. Inadequate treatment and increased problems related to job stress may be potentially modifiable risk factors to reduce suicidal death among physicians.

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1. Introduction

The rate of suicide in physicians is known to be higher than that of the general public [1–5]. While studies of mental health among medical students demonstrate high levels of depression, anxiety, burnout, there are fewer studies of mental health and suicide risk factors among practicing physicians [6,7]. Small studies of suicide and suicide attempts among physicians have noted high levels of psychiatric distress among victims [8,9]. Most existing sources of information about physician suicides generally lack corroborating or collateral information which would help to verify the overall risk of suicide in the physician population, identify concomitant risk factors for self-harm, or describe mental health variables which might contribute to physician suicide [2].

The National Violent Death Reporting System (NVDRS) provides broad detail about violent deaths in the United States and presents an important opportunity to more broadly estimate the frequency of physician death by suicide in the United States [10,11]. The NVDRS also offers critical, and heretofore rarely-available, data on psychosocial, psychiatric, mental health care, medical comorbidity and substance abuse variables associated with suicide. An analysis of these data could contribute to a significantly better understanding of the magnitude and nature of the problem of physician suicide and could lead to new educational, preventive and clinical interventions. We used the NVDRS to investigate risk factors and comorbidities associated with physician suicide and to explore differences between the physician and non-physician population of suicide victims.

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2. Methods

The NVDRS combines information from multiple data sources including death certificates, coroner data, medical examiner information, toxicology information and law enforcement reports [11]. We analyzed data from the NVDRS for 2003–2008 (the years of NVDRS that were available when the study was initiated) for 16 states contributing statewide data to the sample (Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia and Wisconsin) and one state which provided data from limited counties (California). The sample consisted of adults 18 years and older who committed suicide.

2.1. Occupation

Occupation was coded by a single coder by reviewing free text indicating profession. Physicians were typically labeled clearly as physician or specialist, with various terms and spellings such as "physician," "medical doctor," "surgeon," "anesthesiologist," "OB/GYN Doctor" or "Pediatrician." We included physicians and residents in any specialty but excluded medical students and physician assistants. The occupation variable in NVDRS is based on data from the US Death Certificate and would include a victim's usual occupation while employed, even if the person is retired at the time of death [12,13].

2.2. Method of suicide

Method of suicide was identified by *ICD-9* codes listed in the NVDRS. When this field was blank or unidentifiable, we coded the method based on free text listed in four cause-of-death fields. If cause was still missing, we used weapon data to identify deaths from firearms. In cases where a victim had no clear cause of death but had presence of carbon monoxide in toxicology testing, cause was labeled as asphyxia. If there was no cause of death but toxicology ingested a presence of a lethal substance (such as strychnine), cause was labeled as overdose. When toxicology testing revealed presence of drugs which can be lethal only at certain doses (such as aspirin, acetaminophen, antidepressants, and other medications), but there were no other codes indicating method, we left cause of death as "missing." Due to NVDRS restrictions on reporting small cells (no cells with fewer than 5 people may be reported although zero values may be listed), we combined deaths from asphyxia (mostly strangulation and carbon monoxide poisoning) with deaths from drowning and fires. We also combined deaths which were combined methods or "other" methods with "unknown" cause.

2.3. Mental health

The NVDRS includes several variables related to mental health. One variable indicates presence of a known mental health condition and the specific condition (if known). If the victim had a prescription for a psychiatric medication, that is assumed by NVDRS to represent presence of a mental health condition. If an antidepressant was found in toxicology testing and the cause of death was not overdose, NVDRS assumes there is a current mental health condition. We extended this assumption to also include antipsychotic medications found in non-overdose deaths. Another NVDRS variable indicates whether the victim had a depressed mood in the two weeks prior to death since this may be a risk factor for suicide even among victims who do not meet full criteria for major depressive disorder or for victims who have never had formal screening for mental illness so would not have a known mental health problem.

The data set includes variables for known history of alcohol or substance abuse as well as variables for alcohol or illicit drugs identified in the person on autopsy. NVDRS coded presence of marijuana, cocaine, opiates, amphetamines, and blood alcohol level above 0.08% (80 mg/dl). We also reviewed the free text data from the toxicology results to identify cases where drugs were present but had not been coded positive and to identify additional categories of drugs including benzodiazepines, barbiturates, antidepressants and antipsychotics. Although NVDRS includes a variable showing whether or not the victim received psychiatric treatment, the coding manual states that if a mental health disorder was present, the coder should assume the victim was receiving mental health treatment. Since we felt this was not an accurate assumption about true treatment rates, we did not utilize the treatment variable in our analysis.

Since many victims may have more than one mental health comorbidity, we created a variable to indicate the frequency (0, 1, 2 or 3) of the following mental health problems: known mental illness, known alcohol or substance abuse disorder, or current depressed mood. We performed univariate analysis using chi-square tests, *t* tests and analysis of variance as appropriate to compare demographics (gender, race, age, marital status) between physicians and non-physicians. Level of significance for all analysis was set at .05.

We conducted multiple logistic regression analysis using work type (physician versus non-physician) as the dependent variable (Table 2). Demographic factors (race, gender, marital status, and age) were included in the model as independent variables. The regression model was further controlled for mental health measures (known mental illness, known alcohol or substance abuse disorder, current depressed mood) and psychosocial stressors which were coded by NVDRS as likely contributing to the suicide (conflict with a current of former intimate partner, problems with another relationship, suicide of friend or family member in the last 5 years, other death of a friend or family member in the last 5 years, physical health problem, financial problem, job problem, legal problem, or crisis in the last 2 weeks) as independent variables. The "job" variable was defined by coders as positive if the victim was experiencing a problem at work such as "tensions with a coworker, poor performance reviews, increased pressure, feared layoff" or was jobless, e.g., "recently laid off, having difficulty finding a job" [13]. Although we assumed all physicians had postgraduate education, educational information was missing for 57% of the entire sample, so we did not include this variable in our multivariable analysis.

On the subset of victims for whom a toxicology test was performed, a different set of multiple logistic regression models were used to identify the odds of a physician being identified with a particular substance on testing. For each substance type, these models use the presence/absence of the substance as the dependent variable with work type as the primary independent variable. The models were controlled for the demographic variables: race, gender, marital status and age.

3. Results

The NVDRS dataset included 31,636 suicide victims 18 years and older. Of these we identified 203 physicians who were older and more

Table 1
Demographics

	Physician (n=203)	Non-physician (n=31,433)	P value
Race			
–Caucasian	89%	89%	P=.001
–African-American	3%	7%	
–Asian/other/missing	8%	4%	
Gender			
–Male	85%	81%	P=.120
–Female	15%	19%	
Marital status			
–Currently married	61%	41%	P<.0005
Age in years			
–(mean±standard deviation)	59±16	47±17	P<.00005

likely married than were patients of other occupations committing suicide. (Table 1) There were no significant differences in current mental health disorder between physicians and other occupations (46% versus 41%) or in current depressed mood (42% versus 39%). Physicians were significantly less likely to have a known alcohol or substance dependence problem (14% versus 23%, P=.004). When we evaluated the total number of mental health categories for each deceased individual (known mental illness, known alcohol or substance abuse disorder, or current depressed mood) we found that two thirds of all victims had at least one disorder, 31% had at least two disorders, and 6% had all three. These results did not differ significantly between physicians and non-physicians.

We examined suicide methods chosen by physicians and non-physicians. For physicians, firearms were the most common method (48%), followed by poisoning (23.5%), blunt trauma (14.5%), and asphyxia which included hanging (14%). Non physicians also used firearms as the most common method (54%), but asphyxia was the second most common cause of death (22%) followed by poisoning (18%) and then blunt trauma (6%).

Our multivariable logistic regression modeled the likelihood of identifying the work type (physician versus non-physician) as a function of the potential predictors of victim demographics, mental health variables, and psychosocial stressors (Table 2). Older age (OR:1.04, CI:1.03–1.05, P<.0005), being married (OR:1.7, CI:1.27–2.28, P<.0005), and having other or missing race (OR:3.13, CI:1.85–5.29, P<.0005) were all associated with significantly higher likelihood of being a physician. Among the suicide victims, having a known mental illness was mildly associated with a higher odds of being a physician (OR: 1.34, CI: 1.01–1.82, P=.045). Among the psychosocial risks, we found that having a job problem contribute to the suicide predicted an increased likelihood of being a physician (OR:3.12, CI:2.10–4.63, P<.0005) while the death of a friend or family member (OR:0.37, CI:0.15–0.90, P=.029) or a crisis in the last 2 weeks (OR:0.61, OR:0.41–0.90, P=.014) were significantly associated with being a non-physician. In order to test the association in view of the

Table 2
Demographics, mental health and psychosocial stressors associated with the likelihood of the suicide victim being a physician

Demographics	OR (95% CI)	P value[a]
Age	1.04 (1.03–1.05)	P<.0005
Gender		
–Male	1.0	P=.455
–Female gender	0.86 (0.57–1.28)	
Marital status		
–Not married	1.0	P<.0005
–Married	1.70 (1.27–2.28)	
Race		
–Caucasian	1.0	–
–African-American	0.63 (0.28–1.47)	P=.299
–Other/Missing	3.13 (1.85–5.29)	P<.0005
MENTAL HEALTH		
Known mental illness	1.34 (1.01–1.81)	P=.045
Depressed mood in last 2 weeks	0.95 (0.70–1.29)	P=.746
Known alcohol or substance use disorder	0.75 (0.50–1.14)	P=.185
CONTRIBUTING STRESSORS		
Conflict with current or former intimate partner	1.08 (0.73–1.59)	P=.688
Problems with another relationship	0.91 (0.49–1.69)	P=.757
Death of friend or family member	0.37 (0.15–0.90)	P=.029
Physical health problem	0.90 (0.64–1.25)	P=.515
Financial problems	0.81 (0.50–1.31)	P=.395
Job problem	3.12 (2.10–4.63)	P<.0005
Legal Problem	0.94 (0.49–1.83)	P=.860
Suicide of friend/family in last 5 years	1.83 (0.67–5.00)	P=.237
Crisis in last 2 weeks	0.61 (0.41–0.90)	P=.014

[a] Based on multivariable logistic regression analysis which adjusted for all measures in the table.

Table 3
Odds of substances identified in toxicology testing for physicians compared to non-physicians (reference); limited to individuals tested for each substance

Substances present (among those tested)	Physician versus non-physician OR (95% CI)	P value[a]
Antidepressants	1.31 (0.82–2.10)	P=.263
Antipsychotics	28.7 (7.94–103.9)	P<.0005
Benzodiazepines	21.0 (11.4–38.6)	P<.0005
Barbituates	39.5 (15.8–99.0)	P<.0005
Opiates	1.15 (0.72–1.83)	P=.551
Amphetamines	0.51 (0.07–3.67)	P=.503
Cocaine	0.20 (0.03–1.43)	P=.108
Blood alcohol >0.08	0.56 (0.33–0.95)	P=.032

[a] Based on multivariable logistic regression analysis adjusting for demographics (gender, race, age, marital status).

potential multicollinearity among the predictors, we carried out a logistic regression analysis using backward stepwise elimination and found that the same independent variables were statistically significant with the exception of known mental illness which dropped out of the final model (P=.054).

Almost three-quarters of all suicide victims had toxicology testing to identify medications and other substances present in their body and frequency of testing did not vary by profession with 27% of all victims having one or more illicit drugs or a blood alcohol level above 0.8%. Physicians were at significantly higher odds than the non-physicians of having antipsychotics (OR:28.7, CI:7.94-103.9, P<.0005), benzodiazepines (OR:21.0, CI:11.4-38.6, P<.0005), or barbiturates (OR:39.5, CI:15.8-99.0, P<.0005) present on toxicology testing. There was no significant difference with respect to antidepressants, opiates, amphetamines or cocaine. Physicians were less likely to have blood alcohol level above 0.08% (Table 3).

4. Discussion

The results of this study paint a picture of the typical physician suicide victim that is substantially different from that of the non-physician suicide victim in several important ways. The physician who commits suicide is far less likely to have had a recent death of a friend of family member or a recent crisis contribute to the suicide but is much more like to have a job problem contribute. The greater likelihood of having a known mental illness is not matched by a greater likelihood of antidepressant therapy, but physician suicide victims do show a dramatically higher likelihood of having measurable levels of benzodiazepines and barbiturates. The latter is particularly significant because of its infrequent use for therapeutic purposes and its known lethal potential. The equally dramatic increased likelihood of measurable antipsychotics being found is unclear as to its significance, whether they were used for over dosage or because of a significant difference in the prevalence of conditions such as bipolar disorder. While multiple studies show high rates of depression and anxiety among medical students, few have examined the prevalence of mental health conditions among physicians and most existing research is based on retrospective self-report [6,14]. In a Canadian study, nearly a quarter of physicians scored positive on a two-question screen for depression [15]. Other self-report studies in the US and the UK have reported rates ranging from 11–46% [9,16–18].

Several prior studies have shown the importance of major depression on suicide risk, particularly for female physicians, and a recent small study in Canada noted similar psychiatric risks for physicians and non-physicians [2,8,9]. Detection of mental illness in physicians is complicated due to the significant stigma experienced by this population and their reluctance to seek treatment [14,18,19]. Many physicians voice fears that a depression diagnosis could negatively impact their medical licensing [17–19]. One study in the UK found that only half of physicians would seek professional

treatment if they developed mental illness and in another study a third of physicians agreed that doctors should be able to avoid becoming depressed [16,17].

Despite their seeming greater access to primary and specialized mental health care, physicians in our study had no higher rate of antidepressants detected from toxicology testing, suggesting they were no more likely to be receiving pharmacologic treatment for depression. Many physicians describe complicated efforts to protect confidentiality around mental health problems such as seeking care outside of their medical community and avoiding treatment altogether [18,19]. Physicians also report higher rates of self-prescription and having medications prescribed by a colleague whom they are not seeing for medical care [17,19]. Medical students also report low rates of treatment for past depression as well as current depression or suicidal ideation [14]. A consensus statement from 15 experts on suicide and depression recommended multiple systemic changes to improve self-care and to assist physicians with mental health problems [2].

It is interesting that physicians were more likely to be older than other suicide victims. U.S. suicide rates rise rapidly up to age 24; since medical students are unlikely to have finished professional training by this age, physicians would not be identifiable among deaths of younger people [5]. The finding that physicians were more likely to be married is also notable as marriage is widely seen as a protective factor against suicide and the suicide rate for single people is twice that of those who are married [5,20]. However, the data on marriage is complicated. Young married couples appear to have increased risk, some studies suggest marriage is protective for men but not for women, and there is data that among patients with a psychiatric hospitalization, having high income, employment, postgraduate education and being married actually increase the risk for suicide [5,21,22]. Further, physicians have much lower rates of divorce than the general working population and are more likely to be married at the time of death [23].

For precipitating factors, the reduced risk of a recent loss or crisis and the increased risk of a job problem may reflect physician experience dealing with death and loss but an inability to cope with problems related to their identity as a physician. Physician self-identity is often centered around the professional role, and this may permeate both work and home aspects of their lives. For someone whose work helps to define his/her personal and professional identify, a crisis in a work situation might feel more threatening than for someone whose personal identity was less reliant on work satisfaction. A study by Schwenk et al. noted that 81% of physicians reported that depression had increased their professional stress level and 91% reported that depression had decreased work satisfaction [18]. It seems plausible that job unhappiness could be an intermediate factor in a causal pathway between depression and suicide among physicians. Prior studies have noted a correlation between patient demands, role conflicts, lack of control over working conditions, degrading experiences or harassment, and conflicts with coworkers as significant risks for suicidal ideation among physicians [24–27]. Physician retirement has been proposed as a source of role loss and a potential risk for suicide [28]. While this is an important issue for further research, retirement is not likely to lead to a positive screen for a job problem in the NVDRS data set given the guidance provided in the NVDRS coding book about criteria for a positive screen [13].

A number of studies have evaluated the role of burnout in physician depression and suicidal ideation. Improved work satisfaction, less emotional exhaustion, and lower burnout scores were associated with better mental health in a large study of Swiss physicians [29]. Burnout, physician stress and workplace satisfaction are important areas for future research to improve physician well-being.

It is believed, although somewhat speculatively so, that the rate of physician suicide is actually higher than that reported because physician suicide may be miscoded on death certificates, sometimes deliberately so. For example, a death may be coded as an accidental overdose of a recreational drug or prescription medication rather than a purposeful overdose. This miscoding is thought to occur because of the significant stigma attached to depression and suicide in general, and the even higher level of stigma attached to depression and suicide in physicians. There is substantial evidence of such stigma in depressed medical students, residents and practicing physicians [6,17,19]. This stigma leads to several adverse consequences, including poor utilization of physical and mental health care as well as preventative care, higher risk of sharing with friends or family rather than healthcare professionals, and an increased likelihood of self-prescription of antidepressants [6,16–18].

Methods of suicide differ between physicians and non-physicians. Several studies have demonstrated higher risk of poisoning/overdose deaths among physicians, presumably due to easier access [8,30–32]. Physicians in our study had significantly higher rates of antipsychotics, benzodiazepines and barbiturates found on testing; these are all prescription-medications which could be obtained more easily by a physician, but toxicology testing does not reveal whether their use was intended to be therapeutic or toxic. In the general population, overdose is often considered a less lethal approach than firearms or hanging, but among physicians who are well educated in the toxic effects and doses for specific medications, overdose may pose a much higher risk. This is consistent with prior research showing increased access to prescription medications as a potential suicide risk factor for health professionals. A study of physician suicides in Finland reported a high prevalence in victims of hypnotic and sedative drugs, particularly barbiturates, which our study also noted [33]. While more than a quarter of all victims had illicit or psychotropic drugs or alcohol in their systems at the time of death, it is not possible to tell from this data set whether such substances were used with direct lethal intent or to lower inhibitions and which were recreationally but led to impaired judgment which contributed to the suicidal process.

In many European nations, overdose is the leading method of suicide, but our study found firearms most common for both physicians and non-physicians [28,32,34]. This is consistent with prior US studies on suicide as well as data showing that the availability of firearms within different geographic regions in the US is directly linked with the method used for suicide [34].

4.1. Limitations

The NVDRS is a unique source of data about suicide deaths but has several limitations. Many of the variables depend on interpretation by coders who are abstracting data from police and toxicology reports. Such a method likely underreports true incidence of mental illness, depression, and precipitating circumstances since the victim cannot be interviewed about these factors. The significant stigma associated with mental illness may also lead to underreporting. Physicians, in particular, may be able to hide mental illness by self-prescribing medications or obtaining medications outside of usual routes. Postmortem data allows associations to be described between suicide and mental illness and stress, but does not allow investigators to identify a causal relationship. Since the NVDRS assumes all victims with mental illness are being treated (which we do not believe is an appropriate assumption), we could not use this variable to assess treatment impacts or determine whether treatment might be protective.

Identification of victim occupation may under-code physicians (and corresponding rates of suicide) if the occupation does not indicate type of training. Under-coding physician occupation seems more likely than over-coding. For example, a health professional working in an administrative job might be listed as a "manager" or "supervisor" rather than a physician. Data on substances identified does not provide information about toxicity or quantity, so it is not

possible to determine whether substances were ingested for recreational or therapeutic purposes or with lethal intent. NVDRS defines medications such as tricyclic antidepressants and trazodone as antidepressants; some of these medications are commonly used for sleep disorders or pain rather than mood problems so it is possible the actual rate of treatment with antidepressants in this population is lower than reported; however, we would not expect this phenomenon to vary between our physicians and non-physician groups. Finally, NVDRS is not a nationally-representative sample, and some findings related to the method of suicide may not apply to other countries where firearms are less widely available. It does have multiple strengths however, including provision of data from a large population which allows larger sample size than many existing studies of suicide in physicians, linkage of multiple data sources, and evaluation of psychological and psychosocial risk factors.

In summary, NVDRS data indicate that among suicide victims, presence of known mental illness makes physicians more vulnerable than non-physicians. Further, for physicians, job stressors may impact physician identity and be a particular risk factor for which more attention is warranted. Although aggressive programs to manage depression have demonstrated efficacy in reducing suicide in general populations, no concerted effort has been made in building a stress and depression management program for practicing physicians and to better characterize the extent of mental health problems among physicians [35]. There are multiple barriers to appropriate help-seeking, diagnosis, and treatment of mental health problems among physicians due to stigma and possibly lack of social recognition of the problem. Physician knowledge of pharmaceuticals, dosing, and lethality as well as greater access to medications with lethal potential presents a further challenge in designing an effective plan to reduce physician suicide.

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