National Patient Safety Goals

Inpatient Suicide and Suicide Attempts in Veterans Affairs Hospitals

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Suicide is the eleventh leading cause of death in the United States,[1] taking the lives of 30,622 people in 2001.[2] In 2002, 132,353 individuals were hospitalized following suicide attempts; 116,639 were treated in emergency departments and released.[2] Approximately 1,500 suicides take place in inpatient hospital units in the United States each year, and one third of these take place while the patient is on 15-minute checks.[3,4] A review of inpatient suicides conducted by The Joint Commission found that 75% of suicides involved hanging and that another 20% resulted from patients jumping from a roof or window.[5] Other studies of inpatient suicide include patients that committed suicide while on pass or eloping from the hospital, so it is difficult to discern the methods of those who committed suicide while in the hospital itself.[6–9] However, all report hanging and jumping to be the most common methods.

Lambert and Fowler[10] described how veterans possess many of the common risk factors for suicide, and Kaplan et al.[11] reported that veterans are twice as likely as nonveterans to die of suicide, making suicide prevention in Department of Veterans Affairs (VA) medical centers a particular challenge. Previous suicide attempts are a primary risk factor for completed suicides, which underscores the importance of trying to understand and prevent not only completed but also attempted suicides. One powerful method of determining underlying causes of a suicide or suicide attempt is to conduct a root cause analysis (RCA),[12,13] as mandated by the Joint Commission since 1997 for accredited hospitals.

To encourage the development of a culture of safety within the VA health care system—a system that provides comprehensive health care services to more than 6 million veterans across the United States through 154 VA medical centers nested within 21 geographically defined integrated service networks—in 1999 the VA established the National Center for Patient Safety (NCPS). The NCPS instituted an RCA program to individually and collectively analyze adverse events.[14,15]

The NCPS defines *adverse events* as "untoward incidents,

Article-at-a-Glance

Background: Suicide is the eleventh leading cause of death in the United States. Approximately 1,500 suicides occur in inpatient hospital units in the United States each year. In an attempt to determine the methods and environmental factors involved in inpatient suicide and suicide attempts in Department of Veterans Affairs (VA) hospitals, all root cause analysis (RCA) reports of inpatient suicides and suicide attempts submitted to the VA National Center for Patient Safety (NCPS) before June 2006 were reviewed.

Methods: VA medical centers are required to conduct RCAs on all inpatient suicides and report all suicides and serious suicide attempts to the NCPS. All reports of inpatient suicide and suicide attempts submitted between December 1999 and June 2006 were reviewed, including methods and environmental factors involved in the events.

Results: A total of 185 inpatient suicide and suicide attempts were reported; 42 were completed suicides and 143 were suicide attempts. Approximately 52% of the total number of events occurred while the patient was on an inpatient psychiatry unit. Three methods of self harm—intentional drug overdose, cutting with a sharp object, and hanging—accounted for 71% of the total number of events. Doors and wardrobe cabinets accounted for 41% of the anchor points when hanging was the method of self-harm. For suicide attempts involving cutting behaviors, razor blades accounted for 37% of the total number of events; 57% of jumping-related events occurred from balconies and walkways.

Conclusions: Careful review of RCA reports of inpatient suicide has resulted in focused interventions to improve patient care and patient safety in VA medical centers, including a comprehensive environment-of-care checklist for reviewing inpatient psychiatry units.

therapeutic misadventures, iatrogenic injuries, or other adverse occurrences directly associated with care or services provided within the jurisdiction of a medical center, outpatient clinic, or other facility."[16] Adverse events "may result from acts of commission or omission, e.g., administration of the wrong medication, failure to make a timely diagnosis or institute the appropriate therapeutic intervention, adverse reactions or negative outcomes of treatment, etc."[16]

In VA medical centers, serious adverse events and "potential" adverse events that meet the selection criteria as defined in the Safety Assessment Code (SAC) are subjected to mandatory review using RCA methodology.[14,17] In addition, VA medical centers report less severe events as safety reports to the NCPS. Each VA facility supports a full-time patient safety manager responsible for investigating all adverse events at the local level.

Although other studies have summarized patient characteristics that are indicative of suicidal risk and made recommendations for the psychosocial and medical treatment for such patients[4] or have described the specific characteristics of patients who have committed suicide while in the hospital,[18–20] few have analyzed environmental factors relevant to inpatient suicide or suicide attempts.[3,5] Moreover, none has reviewed all reported inpatient suicides and suicide attempts within a large national health care system to allow for the systematic comparison of locations and methods. In an effort to better understand the underlying methods of inpatient suicide and suicide attempts in VA hospitals, all completed RCA reports of inpatient suicide or suicide attempts were reviewed [J.M.DeR]. This article summarizes the results of this review and makes recommendations for environmental interventions aimed at reducing inpatient suicide and suicide attempts.

Methods

Coding Events for the RCA Process

All adverse events that are reported within the VA are rated by the patient safety manager against two criteria: harm (from catastrophic to minor) and probability (from frequent to remote). Each event is coded both for the actual harm and the potential harm that could have been caused. Harm and probability are combined to produce a SAC score from 1 to 3.[14,17] A rating of 1 represents the lowest level of priority, whereas 3 represents the highest level of priority for undergoing an RCA. All events coded as a "SAC 3" are analyzed using the RCA process. (Those with scores of 2 or 1 may receive an RCA at the discretion of the patient safety manager at each facility) RCA reports come into the NCPS via a secure computerized report system. RCA reports are submitted to the NCPS throughout the year and include narrative descriptions of the event, all contributing factors, a final understanding of the event, and a specific action plan for addressing underlying causes. VA medical centers are required to conduct RCAs on all completed inpatient suicides, and patient safety managers are required to report all completed suicides, serious suicide attempts, and related RCAs to the NCPS.

Analysis of RCA Reports

To identify RCA reports on inpatient suicide and suicide attempts, we conducted a search of all RCA reports received between December 1, 1999, and June 30, 2006, to identify any events that involved suicide or suicide attempts that occurred while the patient was being treated on an inpatient unit. For this review, *suicide attempt* was defined to be an uncompleted suicide where action had been taken (for example, neck in noose, cut wrists) verses a threat or gesture.

Results

A total of 185 inpatient suicides and suicide attempts were reported; 42 were completed suicides and 143 were suicide attempts. In this period, there were 4.8 million total inpatient admissions in the VHA system, 819,947 of which were psychiatric admissions. There were 19 inpatient suicides on psychiatry units, or 2.31 completed suicides for every 100,000 psychiatric admissions.

Figure 1 (page 484) displays the location of the events. Approximately 52% of the total number of events occurred while the patient was on an inpatient psychiatry unit. Figure 2 (page 484) displays the methods for the events; patient-induced drug overdose (18.9%), cutting with a sharp object (20.1%) and hanging (31.4%) accounted for 70.4% of the total number of events. Table 1 (page 485) displays the breakdown of the nine most common methods of suicide or suicide attempts by their location; note that hangings, cuttings, strangulation, asphyxiation, and fire took place primarily on inpatient psychiatry units, whereas a large percentage of overdoses, jumpings, stabbings, and ingestion of chemicals took place on other units. Figure 3 (page 486) displays the anchor points for the 58 cases of hanging. Doors and wardrobe cabinets accounted for 41.4% of the anchor points listed. Figure 4 (page 486) displays the materials used as nooses in the 58 cases of hangings; 39.7% of the total used bedding. Figure 5 (page 487) displays the cutting implements used in the 38 reported cases of serious cutting; razor blades accounted for 36.8% of the total. Figure 6 (page 487) displays locations for the 14 cases of jumping; 57.1% of the events originated from medical center balconies and walkways.

Location and Percent of Inpatient Suicides and Suicide Attempts, December 1999–June 2006, *N* = 185

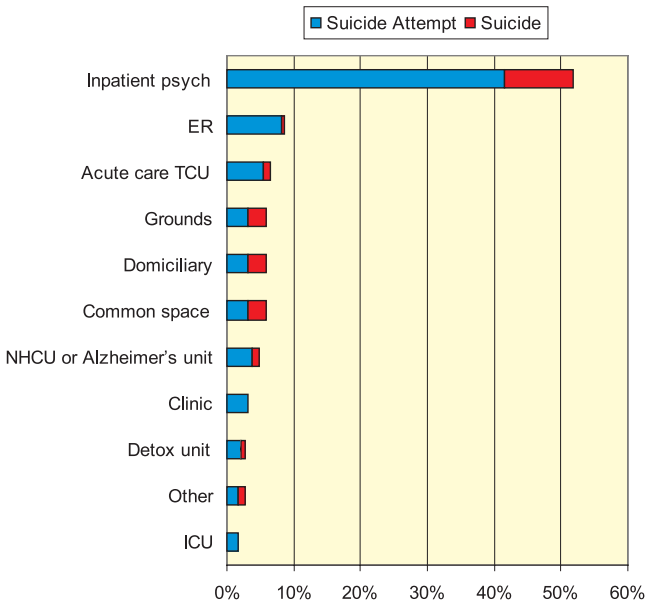

Figure 1. *Approximately 52% of the total number of events occurred while the patient was on an inpatient psychiatry unit. ER, emergency room; TCU, treatment care unit; NHCU, nursing home care unit; detox, detoxification; ICU, intensive care unit.*

Reported Methods and Percent for Inpatient Suicides and Suicide Attempts, December 1999–June 2006, *N* = 185

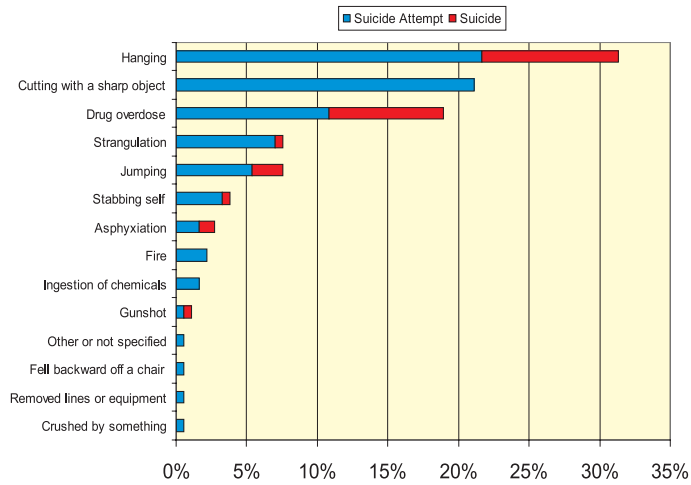

Figure 2. *Patient-induced drug overdose (18.9%), cutting with a sharp object (20.1%), and hanging (31.4%) accounted for 70.4% of the total number of events.*

Discussion

Our findings are similar to those found in the private sector.[3,5] In comparison with the 1998 Joint Commission study of inpatient suicides, in which 75% of the cases involved hanging and another 20% jumping from a roof or window, as stated, in our study, 18 (43%) of the 42 completed inpatient suicides were hangings, 15 (36%) were drug overdoses, and 4 (9.5%) were jumping from a high place. Although we found a lower percentage of suicides involving the physical environment, clearly, the inpatient physical environment continues to be a factor in inpatient suicides. The most recent summary of sentinel events provided by the Joint Commission listed deficiencies in the environment as one of the root causes in almost 73% of suicides that were reported.[21] Similarly, 109 (76%) of the 143 reported VA inpatient suicide attempts that we reviewed involved the environment of care.

In 1998, the Joint Commission recommended a number of strategies to reduce inpatient suicides, including removing or replacing non-breakaway hardware, weight testing all breakaway hardware, and blocking patient access to sharp objects and potentially harmful items such as cleaning solvents.[5] Yeager et al.[3] also recommends removing curtains, replacing regular doors with accordion or pocket doors, building safety features such as a stainless steel box around plumbing fixtures, and adding plates to grab bars to reduce the risk of hanging. In addition, weekly "safety rounds" are recommended to identify potential environmental components that could be used either to commit suicide or to harm someone else. For example, parts of some beds can be removed and used to harm another, and some types of drawers can be pulled out, splintered, and used to stab.[3]

The majority of suicides and suicide attempts, especially hangings and cutting, in our review occurred while the patient was on an inpatient psychiatry unit. It is not surprising that these units would have a higher rate of suicide because they have a much higher percentage of suicidal patients. Accordingly, these are also the units that should be the best equipped to anticipate and prevent suicidal behaviors. Patient characteristics that are associated with completed suicides (depressed mood, hopelessness, disconnection from others, suicidal idea, previous suicide attempts) are often not helpful in the prediction of imminent risk for a specific patient, especially on the psychiatric unit, where most of the patients will have many of the risk factors for suicide. As a result, staff vigilance and, more importantly, a reduction of environmental hazards

Table 1. Common Methods of Inpatient Suicide or Suicide Attempts by Location

Location	Hanging		Cutting		Overdose	
	Number	Percent	Number	Percent	Number	Percent
Inpatient psychiatry unit	47	81.0%	17	43.6%	10	28.6%
Emergency department	3	5.2%	6	15.4%	1	2.9%
Acute care	1	1.7%	3	7.7%	4	11.4%
Common space	2	3.4%	3	7.7%	4	11.4%
Domiciliary	1	1.7%	2	5.1%	7	20.0%
Grounds	1	1.7%	1	2.6%	1	2.9%
Nursing home or Alzheimer's unit	1	1.7%	2	5.1%	2	5.7%
Clinic	0	0.0%	2	5.1%	2	5.7%
Other	0	0.0%	2	5.1%	0	0.0%
Intensive care unit	0	0.0%	0	0.00%	2	5.7%
Detoxification unit	2	3.4%	1	2.6%	2	5.7%
Total	58	100.0%	39	100.0%	35	100.0%

Location	Strangulation		Jumping		Stabbing	
	Number	Percent	Number	Percent	Number	Percent
Inpatient psychiatry unit	9	64.3%	0	0.0%	2	28.6%
Emergency department	0	0.0%	0	0.0%	3	42.9%
Acute care	2	14.3%	2	14.3%	0	0.0%
Common space	1	7.1%	1	7.1%	0	0.0%
Domiciliary	0	0.0%	1	7.1%	0	0.0%
Grounds	0	0.0%	8	57.1%	0	0.0%
Nursing home or Alzheimer's unit	1	7.1%	1	7.1%	1	14.3%
Clinic	0	0.0%	0	0.0%	1	14.3%
Other	1	7.1%	0	0.0%	0	0.0%
Intensive care unit	0	0.0%	1	7.1%	0	0.0%
Detoxification unit	0	0.0%	0	0.0%	0	0.0%
Total	14	100.0%	14	100.0%	7	100.0%

Location	Asphyxiation		Fire		Ingestion of Chemicals	
	Number	Percent	Number	Percent	Number	Percent
Inpatient psychiatry unit	4	80.0%	3	75.0%	0	0.0%
Emergency department	0	0.0%	1	25.0%	0	0.0%
Acute care	0	0.0%	0	0.0%	0	0.0%
Common space	0	0.0%	0	0.0%	0	0.0%
Domiciliary	0	0.0%	0	0.0%	0	0.0%
Grounds	1	20.0%	0	0.0%	0	0.0%
Nursing home or Alzheimer's unit	0	0.0%	0	0.0%	2	66.7%
Clinic	0	0.0%	0	0.0%	1	33.3%
Other	0	0.0%	0	0.0%	0	0.0%
Intensive care unit	0	0.0%	0	0.0%	0	0.0%
Detoxification unit	0	0.0%	0	0.0%	0	0.0%
Total	5	100.0%	4	100.0%	3	100.0%

Hanging Anchor Points for Inpatient Suicide and Attempted Suicide by Hanging, December 1999–June 2006, *N* = 58

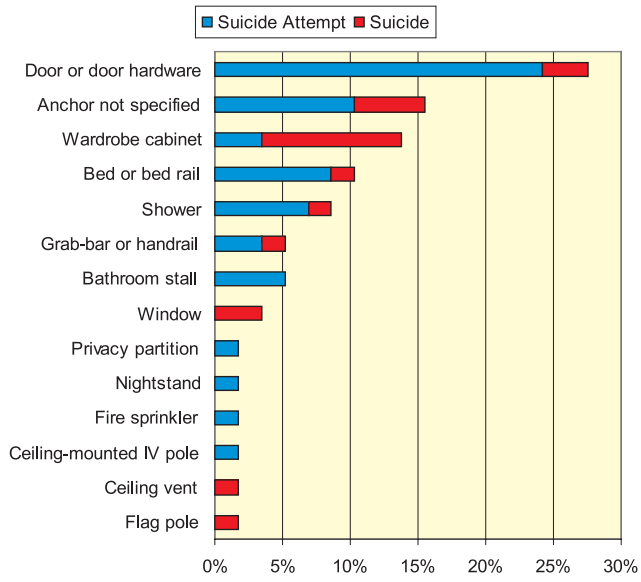

Figure 3. *Doors and wardrobe cabinets accounted for 41.4% of the anchor points listed. IV, intravenous.*

Materials Used as a Noose for Inpatient Suicide and Attempted Suicide by Hanging, December 1999–June 2006, *N* = 58

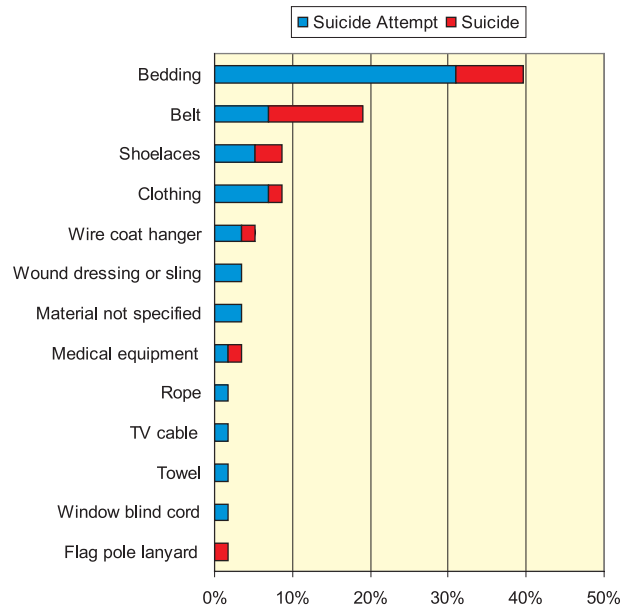

Figure 4. *Of the 58 cases of hangings, 39.7% entailed the use of bedding.*

become critical barriers to suicidal behaviors.

It is important to note that although the majority of inpatient suicides and suicide attempts occurred on psychiatry units, 48% occurred in other areas of the hospital, most notably the emergency department. Because it is often impossible to eliminate environmental hazards in these areas, it is critical to develop systematic protocols for evaluating and managing suicidal patients. In some VA facilities, specialized psychiatric emergency departments are available with many of the environmental modifications of an inpatient psychiatry unit.

In this study, we found that although belts and shoelaces account for a significant number of the materials employed as a noose, bedding is by far the most common material used. For a variety of reasons, including infection control and patient comfort, bedding has not been eliminated on most psychiatry units, and as a result there may be potential noose material. Consequently, the fact that hanging is the number-one method for suicide makes the reduction of anchor points on the ward a very important goal. A number of potential anchor points are identified in Figure 3. Corridor doors are needed for fire safety and so cannot be eliminated; however, interior doors and cabinet doors can often be removed or replaced by accordion doors that cannot be used as anchor points. In addition, any type of door knob, faucet, railing, hook, or protrusion should be considered a possible anchor point and eliminated or modified so that it will not sustain much weight, so that a potential noose will slip off, or so that it is impossible to thread any noose material through it.

This study's results also indicate that a significant number of inpatient suicides and suicide attempts were caused by intentional drug overdoses. Although the presence of drugs on an inpatient unit is not technically a structural issue, access to these drugs can have environmental causes. In a review of suicide prevention strategies, Mann et al. concluded that restricting access to lethal means for committing suicide was one of the few interventions found to be effective.[22] On an inpatient unit, this can take the form of systematic contraband checks, careful evaluation of whether the patient has swallowed his or her medication, and clear education for visitors not leave any type of drug. More than 71% of the overdoses took place on units other than the psychiatry inpatient units, notably the residential units (domiciliary) and detoxification units. Of the 11 adverse events reported on domiciliary units, 7 (63.6%) were overdoses. Similarly, of the 5 events on detoxification units,

Cutting Implements for Inpatient Attempted Suicide by Cutting, December 1999–June 2006, *N* = 38

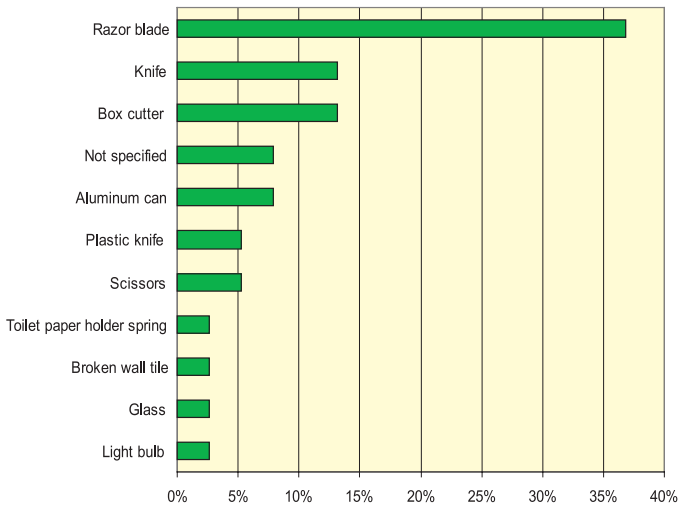

Figure 5. *Razor blades accounted for 36.8% of the 38 cases, none of which resulted in death.*

Jumping Locations for Inpatient Suicide and Attempted Suicide by Jumping, December 1999–June 2006, *N* = 14

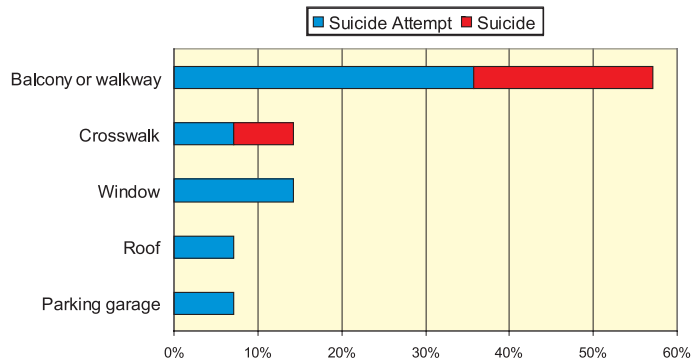

Figure 6. *Of the 14 cases of jumping, 57.1% originated from medical center balconies and walkways.*

40% were overdoses. By comparison, on psychiatric inpatient units, only 10.4% of the events were drug overdoses.

This study has several limitations. First, our RCA database only contains those adverse events that are reported. It is possible that other adverse events and close calls occurred that were not accounted for in the RCA data. Second, we did not control for patient characteristics, such as diagnosis, presence of psychosis, or severity of risk for suicide. Third, we did not control for facility characteristics such as the level of staffing, the design of patient units, level of observation, or the numbers of patients on specific units. Fourth, we did not consider what preventive efforts were already in place on the units where the attempted suicides and suicides occurred. For example, when bedding was used as noose material, we did not determine whether there was a policy banning belts and shoelaces from the unit.

Despite these limitations, this study provides an initial understanding of some of the highest-frequency environmental hazards for inpatient suicide and suicide attempts. Our results are similar to other findings in the field and can be generalized to the inpatient population in non–VA hospitals. Further research is needed to determine the interaction effects of patient, staff, and facility characteristics on overall patient outcomes. Data on actual suicide attempts are useful in consideration of ward design and furnishings and can be an invaluable evidence-based tool for those performing environmental rounds on inpatient units where suicide is determined to be a risk factor for patients.

Recommendations

On the basis of our preliminary findings, the following recommendations are made for modifying psychiatric inpatient units to prevent suicide:

- Eliminate doors when not required by code.
- Remove doors on wardrobe cabinets and replace rods and hangers with shelves.
- Eliminate belts, shoelaces, and safety razors (shave high-risk patients or observe while shaving).
- Ensure there is a protocol in place to eliminate access to drugs that could be used for an overdose.
- Conduct environmental rounds using active observations skills and a comprehensive checklist of potential environmental hazards.

A mental health environment-of-care checklist has been developed and implemented in the VA and is available by e-mail request. J

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