ORIGINAL ARTICLE

Emergency Treatment of Young People Following Deliberate Self-harm

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Objective: To examine national patterns in the emergency department assessment and treatment during visits by young people, aged 7 to 24 years, who are seen following an episode of deliberate self-harm.

Method: An analysis was conducted of a nationally representative sample of hospital emergency department visits from the 1997-2002 National Hospital Ambulatory Medical Care Survey focusing on visits by persons aged 7 to 24 years related to deliberate self-harm. National census data were used to derive population-based rates of emergency department visits for deliberate self-harm overall and stratified by sex, age, race, and ethnicity. Demographic, clinical, and treatment characteristics of the visits are presented including comparisons of visits that resulted in an inpatient admission with those that resulted in discharge to the community.

Results: Among young people aged 7 to 24 years, the annual rate of emergency visits with self-harm was 225.3 per 100 000. A mental disorder was diagnosed in 56.0% of these visits including depressive disorders in 15.1% and substance use disorders in 7.3%. Approximately one half of the visits (56.1%) resulted in an inpatient admission. As compared with visits resulting in discharge to the community, emergency department visits that resulted in inpatient admission were significantly more likely to result in the patients receiving a mental disorder diagnosis (63.8% vs 45.7%; $P=.03$), especially a depressive disorder (22.5% vs 5.8%; $P=.005$), and receiving psychotropic medications (18.0% vs 4.7%; $P=.007$), intravenous fluids (39.2% vs 22.3%; $P=.02$), gastric lavage (24.1% vs 9.8%; $P=.02$), and a specific antidote for poisoning (12.2% vs 1.3%; $P=.02$).

Conclusions: Mental disorders are diagnosed in roughly one half of emergency department visits by young people following an episode of deliberate self-harm. Systematic mental health assessments in the emergency department of young people following an episode of deliberate self-harm may improve detection of mental disorders.

Arch Gen Psychiatry. 2005;62:1122-1128

Young people are commonly seen in emergency departments following an episode of deliberate self-harm.[1] A study of 8 states reported an annual rate of 259 emergency department evaluations for deliberate self-harm per 100 000 population 15 to 19 years of age.[2] In treating these patients, frontline emergency department physicians are called on to assess the medical severity of the injury, provide necessary medical support, evaluate mental health problems and the continuing risk of self-harm, and determine an appropriate disposition for follow-up care.[3]

Deliberate self-harm is a clinically ominous event. Longitudinal[4,5] and case-control[6,7] research with young people establishes that deliberate self-harm is an important risk factor for subsequent suicide. In 1 study of adolescents treated at an inpatient poison treatment unit, for example, there was a 22-fold increase in the male suicide rate and a 14-fold increase in the female suicide rate at follow-up compared with the age-normalized population.[4] A second study reported that 10% of adolescents admitted to the hospital with self-poisoning had at least 1 further hospital admission for poisoning over the following 3 to 4 years.[5]

Mental disorders are highly prevalent among young people who deliberately harm themselves.[8-12] In a community sample of older adolescents, 96.2% who attempted suicide during a 1-year period met research criteria for 1 or more mental disorders during that period.[9] In another community study, 91% of young people, aged 14 to 24 years, with a lifetime history of suicide attempt met research criteria for 1 lifetime mental disorder, 79% met criteria for 2 or more mental disorders, and 45% met criteria for 4 or more disorders.[8] In the National Institute of Mental Health Methods for the Epidemiology of Child and Adolescent Mental Disorders study, 76% of youth, aged 9 to 17 years, who had ever attempted suicide met current criteria for 1 or more mental disorders.[12] Because of the close link between mental disorders and de-

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liberate self-harm and the persistent health threat posed by deliberate self-harm, professional guidelines recommend that all young people who are examined after deliberate self-harm should be referred to a mental health professional,[13] and if possible, an extended mental health evaluation should be conducted before discharge from the emergency department.[14]

Little is known about the emergency department assessment, treatment, and discharge disposition of young people following an episode of deliberate self-harm. In 1 large European study of emergency treatment following suicide attempts, 29% of boys and 26% of girls were discharged without a recommendation for follow-up mental health treatment.[15] The comparable figures for adults were 16% of men and 14% of women.[16] A recent British report of emergency department dispositions following suicide attempts found that 46% of patients were admitted for inpatient care and 27% were either seen by or referred to an outpatient mental health specialist.[17] The remaining 27% did not receive a mental health assessment. These studies suggest that mental health evaluations may not be uniformly provided in the emergency care of youth who deliberately harm themselves. Equivalent information from the United States is not currently available.

In the current study, we examine the emergency assessment, treatment, and discharge disposition of a nationally representative sample of emergency department visits by young people after deliberate self-harm. More specifically, we determine the frequency with which young people making such emergency visits are diagnosed with mental disorders, provided various medical and psychiatric treatments, and referred for inpatient and outpatient care.

METHODS

Data were drawn from the 1997-2002 National Hospital Ambulatory Medical Care Survey (NHAMCS).[18] The National Center for Health Statistics sponsors this annual survey of care provided by emergency departments of short-stay nonfederal hospitals. The survey uses a 4-stage probability design with samples of geographically defined areas, hospitals within these areas, emergency departments within hospitals, and patient visits within emergency departments.

Members of the hospital staff complete patient record forms for a systematic random sample of patient visits to the emergency department during a randomly assigned 4-week reporting period. A fixed panel of hospitals is selected for the NHAMCS sample. The basic sampling unit is the patient visit or encounter. A patient visit is defined as a direct, personal exchange with a physician, or a staff member operating under a physician's direction, for the purpose of seeking care and rendering health services.

Samples of 22 209 (1997), 24 175 (1998), 21 103 (1999), 25 622 (2000), 34 546 (2001), and 37 337 (2002) emergency department patient visits were collected from 395 (1997), 398 (1998), 376 (1999), 386 (2000), 355 (2001), and 373 (2002) hospitals with emergency departments. This represents response rates of 96.3% (1997), 98.6% (1998), 93.1% (1999), 97.0% (2000), 89.9% (2001), and 94.2% (2002).

We limited the analysis to patient visits by persons aged 7 to 24 years that were determined to follow an episode of intentional self-inflicted injury (*International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*): E950.0-959.9). Injuries that were determined to be unintentional (E800-E869, E880-E929), assault related (E960-E969, E979), or of undetermined intent (E980-E989) were excluded from the analyses. This definition of intentional self-harm resembles the World Health Organization EURO Multicentre Study on Parasuicide definition of parasuicide but excludes episodes in which no physical harm occurred, such as when an individual is rescued just before jumping from a height.[16] To estimate population visit rates of emergency care for deliberate self-harm, population data for 7- to 24-year-olds were culled from the 2000 US Census Bureau.[19]

Our first goal was to determine the national rate of emergency department patient visits for deliberate self-harm by youth and young adults overall and stratified by age, sex, race, ethnicity, and disposition. Separate rates were estimated stratified by age, sex, race, and disposition of deliberate self-harm visits in which poisoning (E950.0-E952.9) or cutting/piercing (E956) were the methods of injury. We then evaluated the distribution of characteristics in the total patient-visit sample and compared the characteristics of visits where the patient was admitted to the hospital or referred to another inpatient facility (admitted patient visits) with visits where the patient was discharged to the community (discharged patient visits). Discharged patient visits included those with no planned follow-up or those where the patient was instructed to return to the emergency department as needed or with an appointment, instructed to return to a referring physician, or referred to another physician or clinic for follow-up. A series of logistic regressions were performed to evaluate the strength of independent associations between selected demographic characteristics, medical procedures, diagnoses, and disposition.

The sociodemographic, clinical, and treatment characteristics of admitted and discharged patient visits were compared. We considered 3 age ranges (7-12, 13-18, and 19-24 years) to facilitate comparisons with previous research,[2,20] sex, race (white, nonwhite), ethnicity (Hispanic, non-Hispanic), and primary payer for the emergency visit. Primary payer was partitioned as private insurance, public insurance (Medicare, Medicaid, workers' compensation), self-pay (self-pay, no charge), and a residual group of other payers.

Clinical assessment services included mental status examination, blood alcohol level, and evaluation by a staff physician. Mental disorder diagnoses (*ICD-9*: 290-319) were classified as depressive disorders (296.2., 296.3, 300.4, 311), substance use disorders (291, 292, 303, 304, 305), and all other mental disorders.

General medical care included ingestion treatment, wound care, and administration of intravenous fluids. The 4 types of ingestion treatment were gastric lavage, activated charcoal, syrup of ipecac, and a specific antidote including naloxone hydrochloride, acetylcysteine, flumazenil, and atropine. Wound care included general wound care, tetanus toxoid, and laceration treatment. Pharmacological treatments administered in the emergency department were classified as anxiolytic medications, antidepressant medications, and other psychotropic medications including antipsychotic medications, antimanic medications, and stimulants.

We used the SUDAAN statistical software package[21] to accommodate the complex sampling design and weights from the NHAMCS when calculating means and corresponding standard errors and to calculate 95% confidence intervals for the rate estimates.

RESULTS

RATE OF EMERGENCY VISITS

Between 1997 and 2002, the annualized overall rate of emergency visits by persons aged 7 to 24 years for deliberate self-harm was 225.3 per 100 000 population. In stratified analyses, the rate of visits with deliberate self-harm

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Table 1. Annualized Rates of Emergency Department Visits Following Deliberate Self-harm, Patients Aged 7 to 24 Years*

	Cell Size	Weighted Rate Per 100 000	95% Confidence Interval
Total	283	225.3	185.4-265.2
Sex			
Male	128	189.5	142.6-236.3
Female	155	263.0	202.0-323.9
Age, y			
7-14	44	102.6	63.1-142.1
15-19	129	341.8	269.5-414.2
20-24	110	315.2	219.6-410.7
Race			
White	218	254.6	206.2-303.1
Nonwhite	65	159.0	103.9-214.1
Ethnicity†			
Hispanic	44	231.7	138.3-325.1
Non-Hispanic	191	216.6	171.7-261.5
Disposition‡			
Admitted	162	126.0	96.8-155.1
Discharged	120	98.6	74.2-123.0

*Annualized visit rates per 100 000 were calculated with National Hospital Ambulatory Medical Care Survey emergency department data from 1997 through 2002 and US census data from 2000. Self-harm visits were those including *International Classification of Diseases, Ninth Revision* codes E950 through E959.

†Ethnicity estimates are partially based on imputation of missing data (n = 48).

‡Disposition unavailable for 1 deliberate self-harm visit (patient left against medical advice).

Table 2. Sociodemographic Characteristics of Emergency Department Visits Following Deliberate Self-harm by Discharge Status, Patients Aged 7 to 24 Years*

Characteristic	Admitted Patient Visits, % (n = 162)	Discharged Patient Visits, % (n = 120)	Test	*P* Value
Age, y, mean (SE)	18.0 (0.4)	17.9 (0.4)	$t_{38} = .02$	.86
Age, y			$\chi^2_2 = 2.9$	.25
7-14	20.1	22.0		
15-19	38.8	47.4		
20-24	41.1	30.6		
Sex			$\chi^2_1 = 3.7$	.06
Male	36.7	51.6		
Female	63.3	48.4		
Race			$\chi^2_1 = 0.1$	.80
White	77.9	79.5		
Nonwhite	22.1	20.5		
Ethnicity			$\chi^2_1 = 0.003$	.96
Hispanic	17.6	17.3		
Non-Hispanic	82.4	82.7		
Primary payer†			$\chi^2_3 = 0.7$	.88
Private insurance, any	41.3	34.5		
Public insurance, any	28.5	31.3		
Self-pay	26.1	30.3		
Other	4.0	3.9		

*Rates and means are weighted national estimates from National Hospital Ambulatory Medical Care Survey emergency department data, averaged across 1997 through 2002. Self-harm visits were those including *International Classification of Diseases, Ninth Revision* codes E950 through E959. Standard errors and test statistics account for the complex survey design. See text for definition of admitted and discharged patient visits.

†Categories are mutually exclusive (n = 252); 31 visits were excluded because the insurance variable was missing, "unknown," or "no charge."

per 100 000 persons was significantly higher for people 15 to 19 years of age and 20 to 24 years of age than for persons 7 to 14 years of age. The rate of emergency visits for deliberate self-harm did not significantly differ by patient sex, ethnicity, or race, though the rate among visits by white individuals was higher than that for visits by persons of other racial groups, and this difference approached statistical significance (**Table 1**).

PATIENT VISIT CHARACTERISTICS

A majority of the emergency department patient visits following deliberate self-harm were by females (56.9%), white individuals (78.4%), and people of non-Hispanic ancestry (82.6%). Roughly one third of the visits were by patients with private health insurance (38.2%), though a substantial proportion were paid with public insurance (29.6%) or out-of-pocket (28.2%). Self-poisoning (67.2%) accounted for a majority of the deliberate self-harm visits followed by self-cutting/piercing (25.8%). Other specific methods of deliberate self-harm were much less common and included suffocation (2.2%), firearm injury (1.7%), fire (0.6%), drowning (0.5%), and falls (0.1%). Overall, roughly one half (56.1%) of the patient visits resulted in a mental disorder diagnosis including 15.1% resulting in a depressive disorder diagnosis and 7.3% resulting in a substance use disorder diagnosis. Only 1 visit resulted in a patient being diagnosed with substance dependence. Psychotropic medications were provided in 12.1% of the patient visits, most commonly anxiolytics (6.2%). Approximately 4 (41.3%) in 10 visits involved treatment for an ingestion including 17.8% where the patient received gastric lavage.

Among patient visits following self-poisoning, 49.4% resulted in a mental disorder diagnosis, with 15.2% resulting in a depressive disorder diagnosis and 10.3% resulting in a substance use disorder diagnosis. A substantial proportion of self-poisoning visits involved gastrointestinal decontamination, including activated charcoal (40.1%), gastric lavage (25.9%), specific antidotes (11.1%), and syrup of ipecac (2.2%).

Slightly more than one half of the patient visits (56.1%) resulted in inpatient admission. In addition, 29.0% of the visits resulted in outpatient care referral; 5.8% resulted in referral to the emergency department for continuing care, 4.9% resulted in no follow-up care, and follow-up care was unspecified in 3.4% of the visits. The proportion of visits by patients who received mental health care following discharge from the emergency department is unknown.

INPATIENT ADMISSION

The characteristics of patient visits that resulted in inpatient admission were compared with patient visits that resulted in discharge from the emergency department. Visits resulting in admission did not significantly differ from those resulting in discharge with respect to age, sex, race, ethnicity, or primary payer (**Table 2**). As compared with visits that resulted in discharge, visits resulting in inpa-

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tient admission tended to include a greater proportion of females (63.3% vs 48.4%), though this difference did not achieve statistical significance (P=.06).

In relation to visits that resulted in discharge, visits resulting in inpatient admission were significantly more likely to include a mental disorder diagnosis, especially a depressive disorder diagnosis. Admitted patient visits were also significantly more likely than discharged patient visits to involve receiving medical treatments for ingestions, particularly gastric lavage or a specific antidote. By contrast, wound care was slightly more common among patient visits that resulted in discharge rather than inpatient admission. Admitted patient visits were significantly more likely than discharged patient visits to involve treatment with a psychotropic medication, especially an anxiolytic, in the emergency department (**Table 3**).

ASSESSMENT AND DIAGNOSIS BY METHOD OF SELF-HARM

During the study period, there were 150 emergency department visits for deliberate self-poisoning per 100 000 population per year. Overall, roughly one third of the deliberate self-poisoning visits (38.4%) included a mental status examination and nearly one half (49.3%) resulted in a mental disorder diagnosis. The rate of emergency department visits for deliberate self-poisoning was significantly greater for females than males. Mental status examinations were provided during a significantly larger proportion of self-poisoning visits made by patients 20 to 24 years of age than those made by patients 7 to 19 years of age (**Table 4**).

Emergency department visits for deliberate self-cutting or piercing occurred at an annualized rate of 58.2 per 100 000 population. Almost three quarters (73.0%) of these visits resulted in a mental disorder diagnosis. Among visits to emergency departments for deliberate self-cutting or piercing, mental disorder diagnoses were significantly more common among patient visits by nonwhite than white individuals and tended to be more common among admitted than discharged patient visits (Table 4).

PREDICTING INPATIENT ADMISSION

In the first regression, which included patient visit age, sex, and self-harm method, none of the predictors were significantly related to hospital admission (model 1). When mental status examination and mental disorder diagnosis were added to the model (model 2), mental disorder diagnosis was significantly related to hospital admission. In model 3, prescription of a psychotropic medication and a mental disorder diagnosis were independently and significantly related to hospital admission, controlling for patient visit age, sex, method of self-harm, mental status examination, and provision of injury care (**Table 5**). In a similar model limited to emergency visits for the treatment of self-poisoning, prescription of a psychotropic medication (odds ratio, 4.23 [95% confidence interval, 1.16-15.38]) and ingestion treatment (odds ratio, 2.24 [95% confidence interval, 1.06-4.79]), but neither mental disorder diagnosis (odds ratio, 1.78 [95% confidence interval, 0.79-4.00]) nor the other covariates, were significantly related to hospital admission.

Table 3. Clinical and Treatment Characteristics of Emergency Department Visits Following Deliberate Self-harm by Discharge Status, Patients Aged 7 to 24 Years*

Characteristic	Admitted Patient Visits, % (n = 162)	Discharged Patient Visits, % (n = 120)	χ^2_1	P Value
Assessment				
Mental status examination	43.3	30.9	2.5	.13
Blood alcohol level	21.1	18.7	0.1	.73
Evaluation by a staff physician	91.7	91.8	0	.99
Mental disorder diagnosis, any	63.8	45.7	5.1	.03
Depressive disorder	22.5	5.8	8.8	.005
Substance use disorder	10.3	3.3	2.4	.13
Other mental disorder	38.9	38.6	0	.98
Medical care	71.1	66.5	0.4	.52
Ingestion treatment	48.0	32.2	4.4	.04
Gastric lavage	24.1	9.8	5.6	.02
Charcoal	29.8	24.5	0.6	.44
Antidotes†	12.2	1.3	6.5	.02
Ipecac	1.2	1.8	0.1	.75
Wound care	19.1	27.6	1.5	.22
Intravenous fluids	39.2	22.3	6.0	.02
Psychotropic medication, any	18.0	4.7	8.1	.007
Anxiolytic	10.3	1.1	5.9	.02
Antidepressant	7.3	2.7	2.5	.12
Other	7.0	2.5	2.5	.12

*Rates and means are weighted national estimates from National Hospital Ambulatory Medical Care Survey emergency department data, averaged across 1997 through 2002. Self-harm visits were those including *International Classification of Diseases, Ninth Revision* codes E950 through E959. Test statistics account for the complex survey design. See text for definition of admitted and discharged patient visits.

†Antidotes include naloxone hydrochloride, acetylcysteine, flumazenil, and atropine.

COMMENT

In keeping with earlier reports,[2,22] the rate of emergency visits for deliberate self-harm by young people tended to increase with patient age and was higher for white individuals than other racial groups and higher for females than males, though the racial and sex differences were not statistically significant in the current study. The overall rate of emergency treatment of youth self-harm resembles findings from earlier studies of emergency medical personnel,[22] administrative data,[2] and medical record reviews[20] in the United States. These findings are also broadly consistent with the results from the World Health Organization EURO Multicentre Study on Parasuicide. Across the 16 sites participating in this study, the annual rate of parasuicide was 283 per 100 000 for females aged 15 to 24 years and 168 for males in this age range.[16] In the current study, the most common methods were poisoning and cutting, which together accounted for approximately 90% of the visits for deliberate self-harm.

The rate of emergency treatment of adolescent deliberate self-harm in the current report is markedly lower than the rate of medically injurious suicide attempts from the Youth Risk Behavior Survey. In this national survey, 2.9% of high school students reported that during the last year they had made a suicide attempt that resulted in an injury

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Table 4. Annualized Rates of Emergency Department Visits for Self-poisoning and Self-cutting/piercing Stratified by Sex, Age, Race, and Disposition, Patients Aged 7 to 24 Years

	Cell Size	Weighted Rate per 100 000 (95% Confidence Interval)	% (95% Confidence Interval)	
			Weighted Receiving Mental Status Examination	Weighted Receiving Mental Disorder Diagnosis
Self-poisoning	190	150.0 (118.3-181.8)	38.4 (28.8-48.9)	49.3 (40.5-58.2)
Male	75	106.8 (73.7-139.9)	39.1 (25.5-54.7)	48.6 (35.2-62.2)
Female	115	195.4 (143.9-247.0)	37.9 (26.0-51.5)	49.8 (38.2-61.4)
Aged 7-19 y	112	125.8 (97.7-154.0)	29.3 (19.9-40.9)	45.1 (33.2-57.5)
Aged 20-24 y	78	218.0 (140.7-295.3)	53.0 (38.7-66.9)*	56.3 (41.1-70.4)
White	142	167.4 (129.6-205.3)	36.6 (27.3-47.0)	46.5 (35.2-58.2)
Nonwhite	48	110.6 (67.3-153.9)	44.4 (26.1-64.4)	59.2 (37.7-77.6)
Admitted	114	88.0 (63.1-112.9)	43.1 (30.2-57.0)	54.2 (41.8-66.0)
Discharged	75	61.2 (41.4-81.0)	32.0 (20.2-46.7)	41.8 (28.3-56.7)
Self-cut/pierce	66	58.2 (39.0-77.5)	38.9 (25.8-53.8)	73.0 (56.5-84.9)
Male	33	63.3 (33.0-93.7)	34.2 (17.4-56.2)	72.0 (47.0-88.2)
Female	33	52.9 (29.3-76.5)	44.7 (27.4-63.4)	74.3 (51.1-88.8)
Aged 7-19 y	45	56.3 (34.5-78.2)	36.8 (21.7-55.0)	70.0 (49.0-85.0)
Aged 20-24 y	21	63.5 (26.2-100.7)	44.1 (19.6-71.8)	80.5 (57.8-92.6)
White	49	64.4 (41.0-87.8)	35.3 (20.1-54.2)	66.3 (47.4-81.1)
Nonwhite	17	44.3 (11.7-76.9)	50.6 (23.0-77.7)	95.2 (79.3-99.0)†
Admitted	35	33.3 (19.3-47.4)	47.1 (27.4-67.8)	85.6 (63.6-95.3)‡
Discharged	31	24.9 (13.6-36.3)	27.8 (11.3-53.8)	56.1 (32.3-77.4)

*Visits by persons who were older (vs younger) were more likely to include a mental status examination ($\chi^2_1 = 7.9$; $P = .008$).
†Visits by persons who were white (vs nonwhite) were more likely to result in a mental disorder diagnosis ($\chi^2_1 = 4.8$; $P = .04$).
‡Visits by persons who were admitted (vs discharged) were more likely to result in a mental disorder diagnosis ($\chi^2_1 = 4.1$; $P = .051$).

Table 5. Logistic Regression Models Predicting Inpatient Admission of Emergency Department Visits for Deliberate Self-harm, Patients Aged 7-24 Years*

Predictor	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Age, y	1.03 (0.95-1.12)	1.02 (0.94-1.11)	1.00 (0.92-1.09)
Female (referent, male)	1.83 (0.96-3.51)	1.78 (0.90-3.52)	1.79 (0.89-3.58)
Self-poisoning (referent, other method)	1.24 (0.59-2.60)	1.51 (0.70-3.25)	1.61 (0.72-3.60)
Mental status examination (referent, none)		1.24 (0.63-2.46)	1.42 (0.71-2.86)
Mental disorder diagnosis (referent, none)		2.22 (1.16-4.24)	2.03 (1.07-3.85)
Psychotropic medication (referent, none)			5.02 (1.83-13.76)
Any injury care (referent, none)			1.44 (0.74-2.82)

Abbreviations: CI, confidence interval; OR, odds ratio.
*Two hundred eighty-two visits. National Hospital Ambulatory Care Survey emergency department data from 1997 through 2002. Deliberate self-harm visits were those including *International Classification of Diseases, Ninth Revision* codes E950 through E959. The ORs and CIs account for the complex survey design.

that was treated by a doctor or nurse.[23] Part of this large discrepancy may be explained by young people who see a school nurse or an office-based or other community health care professional for self-harm but are not taken to an emergency department.[24] In addition, community surveys of injury history are vulnerable to recall and telescoping biases that tend to inflate event reporting in relation to emergency department surveillance, which is considered more accurate.[25]

In the current study, most patient visits did not include a mental status examination. Some types of patient visits, such as those by youth aged 7 to 19 years following self-poisoning, only rarely (29.3%) included such an evaluation. Overall, the proportion of visits where a patient was identified as having a mental disorder at the time of deliberate self-harm (56.0%) was substantially lower than the rates reported in community samples using structured diagnostic interviews of young people with past suicide attempts.[8-12] It is likely that many mental disorders pass undetected in the emergency treatment of young people following episodes of deliberate self-harm. However, without an independent systematic diagnostic assessment, we were unable to determine the proportion of patient visits that met criteria for 1 or more mental disorder diagnoses. We also had no means of determining what proportion of visits resulted in patients receiving mental health care following discharge from the emergency department.

A diagnosis of a depressive disorder was strongly associated with inpatient admission. Depression is a well-known and powerful risk factor for youth suicide.[7,26,27] Diagnosis of a mental disorder also independently predicted admission for inpatient treatment after control-

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ling for patient visit age, sex, method of self-harm, provision of a mental status examination, psychotropic medication treatment, and injury care.

Although not statistically significant, deliberate self-harm visits by females tended to be more likely to result in inpatient admission than visits by males, even after controlling for several relevant covariates. This trend is surprising and warrants further study. Suicide rates are consistently higher in males than females,[28] and emergency department visits after deliberate self-harm tend to be more severe in males than females.[29] A tendency to admit female rather male patients may reflect biases in assessment processes related to the greater sophistication of cognitive and personality development of girls than boys[30] or a tendency for girls to report suicidal ideation.[23]

In a multivariate analysis limited to visits for deliberate self-poisoning, ingestion treatment and treatment with a psychotropic medication, but not mental disorder diagnosis, were significantly related to inpatient admission. This suggests these emergency department disposition decisions are a joint function of the medical severity of the self-poisoning and the patient's current psychiatric status.[29]

Visits for self-inflicted cutting were weakly related to discharge from the emergency department rather than hospital admission. Self-cutting is only rarely a cause of death in completed suicide in young people[28] and tends to be less lethal than other forms of self-harm.[31,32] However, 1 follow-up study of adult suicide attempts found that a substantial proportion of subsequent suicides were preceded by self-laceration.[33] In addition, people seen for emergency care sometimes self-cut and self-poison.[17] For these reasons, deliberate self-inflicted cutting should not be dismissed as a risk factor for future suicide.

Poisoning is the most common method of deliberate self-harm seen in emergency departments.[2,34,35] In the current nationally representative sample, approximately two thirds of emergency department visits by young people following deliberate self-harm involved poisoning and mental disorders were identified in approximately one half of them. Fortunately, self-poisoning is less likely to result in death than several other less common methods of self-harm. Among emergency department visits, the case fatality rate for self-poisoning is approximately 1%.[2,36]

Emergency medical care was provided in a substantial proportion of the patient visits after deliberate poisoning. Activated charcoal, which is widely recommended in the short-term management of poisoning,[37-40] was administered in roughly one third of the self-poisoning visits, and gastric lavage was administered in approximately one quarter of the visits. In a vast majority of poisoning cases, combining gastric emptying with activated charcoal is no more effective than activated charcoal alone.[41-44] Professional guidelines recommend that gastric lavage only be considered when the patient has ingested a potentially life-threatening quantity of poison and when lavage can be initiated within 1 hour of ingestion.[36] The observation that nationally approximately one quarter of self-poisoning patients receive gastric lavage suggests that it may be overused and may reflect a lack of awareness of relevant clinical guidelines.[45]

Syrup of ipecac was used in 2% of the patient visits with self-poisoning. According to practice guidelines, the routine use of ipecac syrup in emergency departments should be abandoned.[45] There is no evidence that ipecac improves the outcome of poisoned patients, and it may delay administration and reduce the effectiveness of activated charcoal and specific antidotes.[45]

The likelihood of inpatient admission did not significantly vary by primary payer. Despite concerns that financial considerations may bias clinical decisions to admit young people with psychiatric illness for inpatient care,[46] insured- and uninsured-patient visits were roughly equally likely to result in inpatient admission.

The current study has several limitations. First, independent research assessments were not available for mental disorders and self-harm events. Without standardized diagnostic assessments of mental disorders, it is not possible to determine the extent of agreement between clinical and research diagnoses. Stigma associated with mental illness and attempted suicide may contribute to systematic underreporting of mental disorders and deliberate self-harm. A dedicated monitoring system and database designed specifically to gather information on episodes of self-harm would likely improve recognition.[47] Second, the results concern visits to emergency departments rather than individual patients. The surveys capture an unknown number of patients who made repeat visits to the emergency departments during the 4-week survey period. Young people who reattempt suicide may be an especially high–risk group for completed suicide.[48,49] Third, information was not available concerning the timing, specific substance, and volume of the poisonings. Such information would help in evaluating the appropriateness of the clinical management. Fourth, the data permit no means of distinguishing inpatient admissions that are primarily for medical care from those that are primarily for the treatment of psychiatric disorders. Previous research with adults suggests that most admissions following deliberate self-harm are to medical floors rather than psychiatric units.[17,50] Fifth, although information was available concerning provision of mental status examinations, no information was available on the depth or extent of psychosocial evaluations during the routine emergency management of young people following deliberate self-harm. Finally, the surveys provided no information about self-harm events that were not treated in emergency departments.

Mental disorders were diagnosed in roughly one half of emergency visits by young people treated for episodes of deliberate self-harm. This suggests substantial underrecognition of mental illness and likely inadequate referral for follow-up mental health care. Further research is clearly needed to better understand the extent and reasons for problems with the detection of mental disorders during emergency department evaluations of young people following self-harm. In the meantime, efforts should be made to fortify mental health assessments. One promising strategy involves routine administration of rapid and efficient diagnostic instruments[51] to all young people following deliberate self-inflicted harm. Improving mental health assessment of these young people provides an important opportunity for secondary prevention.

Submitted for Publication: November 29, 2004; final revision received April 4, 2005; accepted April 27, 2005.
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