
Adolescent Suicide Prevention

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Abstract: This case—prevention of adolescent suicide—is one of a series of teaching cases in the Case-Based Series in Population-Oriented Prevention (C-POP). It has been developed for use in medical school and residency prevention curricula. The complete set of cases is presented in this supplement to the *American Journal of Preventive Medicine*.

This teaching case examines the issue of prevention of adolescent and young adult suicide both at an individual and at a population or community level, using data from the Onondaga County Health Department. In the first section of the case, students are asked to determine whether five deaths related to falling or jumping at a local shopping mall should be considered to be suicidal deaths. Students then develop skills in the reporting as well as in the epidemiology of adolescent suicidal deaths in Onondaga County. As the case progresses, students analyze the results of a local surveillance study of suicidal attempts and ideation. The case concludes with students evaluating a hypothetical screening study intended to reduce the risk of suicidal death and discussing a research design to examine the effectiveness of this prevention strategy. (Am J Prev Med 2003;24(4S):150–156) © 2003 American Journal of Preventive Medicine

Recommended Reading:

- Zametkin AJ, Alter MR, Yemini T. Suicide in teenagers: assessment, management, and prevention. *JAMA* 2002; 286(24): 3021–5.
- Shaffer D, Craft L. Methods of adolescent suicide prevention. *J Clin Psychiatry* 1999; 60(Suppl 2): 70–4.
- King RA, Schwab-Stone M, Flisher AJ, et al. Psychosocial and risk behavior correlates of youth suicide attempts and suicidal ideation. *J Am Acad Child Adolesc Psychiatry* 2001; 40(7): 837–46.

Objectives: At the end of each case, the student will be able to:

- identify suicide as a public health issue,
- analyze community suicide data including surveillance of suicide attempts,
- assess the suicide risk of an adolescent and determine an appropriate clinical intervention,
- assess screening of students as a prevention intervention for adolescent suicide,
- calculate the sensitivity, specificity, and positive and negative predictive value, and
- evaluate research design as a method of determining screening effectiveness.

Case Note: This case illustrates some of the complexities of defining suicide and suicidal ideation. Students are asked to classify deaths as they relate to suicide. Furthermore, the epidemiology and risk factors associated with suicide are addressed. For these reasons, this case is best taught with the support of a psychiatrist or psychologist.

Adolescent Suicide

In the United States, mental disorders collectively account for more than 15% of the burden of disease for all causes, which is slightly more than the burden associated with all forms of cancer. In children and adolescents, the most frequently diagnosed mood disorders are major depressive disorder, dysthymic disorder, and bipolar disorder. The incidence of suicide attempts reaches a peak during the mid-adolescent years (ages 14–17 years). Mortality from suicide increases steadily throughout the teenage years and is the third leading cause of death in that age group. In 1996, \$82 billion were spent on treatment of mental health services.¹

Section A

Deaths from Falling or Jumping at a Large Shopping Mall

Teaching Note: Students should complete Section A prior to class.

Between April 1998 and April 2002, five people died after falling or jumping at a large shopping mall in Syracuse, New York. Three of the individuals were adolescents or young adults (aged 17–20 years).

The mall consists of seven levels with a large open atrium. Each of the levels has a railing approximately 4

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Table 1. Case histories for five individuals who jumped or fell to their death at a mall in Syracuse adapted from records from the Onondaga County Health Department, 1998–2002

Case	Scene	Causes of death	Past history
45-year-old female	Jumped from 3rd floor	Multiple injuries due to fall from height	History of psychiatric problems including bipolar disorder and prior suicide attempts, was under treatment at the time of death
17-year-old male	Jumped from 3rd floor Was impaired by drugs at time of death Landed on a table on the basement level where a 10–12-year-old boy was eating. The impact shattered the table and injured the patron	Multiple injuries due to fall from height	Marital problems History of over-the-counter drug abuse including cold preparations and anti-motion sickness medications Apprehended on the day of death for shoplifting Recent tension with mother and about drug use No prior history of depression or suicidal ideation
49-year-old female	Jumped from 3rd floor after asking about access to higher floors Witness screamed “no” but she jumped without speaking	Multiple injuries due to fall from height	History of depression and suicidal ideation Recent loss of stepmother financial concerns and stress at work
19-year-old male	Lost balance on escalator railing, falling 28 feet Appeared intoxicated prior to death	Multiple injuries due to fall from height	No data available
20-year-old female	Leaned over backwards on 2nd floor, fell off Brain matter was widely scattered There were numerous witnesses, several of whom were referred for mental health counseling	Multiple injuries due to fall from height	History of major psychotic illness, discharged from local hospital the day prior to death

feet high that functions as a barrier to prevent an individual from jumping or falling to the bottom of the main atrium. Of the five individuals noted above, three jumped from the third level, one fell or jumped from the second level, and one fell off an escalator railing. Details of the circumstances in each of these cases are given in Table 1.

Question 1. For each death, indicate if the death should be classified as a suicide.

Question 2. What criteria (major and minor) were used in your determination of the above?

Question 3. Is this situation (suicide at a public mall) a public health matter?

Question 4. Would you consider preventive interventions for this situation? If so, which methods would you employ?

Question 5. Are deaths from suicides preventable?

Section B

Adolescent or Young Adults Who Completed Suicide in Onondaga County NY 1993–2002

Please review information in Table 2 on completed adolescent suicides in Onondaga County residents from January 1993 to April 2002, and then answer the following questions.

Question 1. What health agencies are responsible for maintaining data on completed suicides?

Question 2. Identify biases in the reporting data in completed suicides.

Question 3. Comment on age, gender, race, time, and method of these suicides.

Question 4. What are possible explanations for gender differences?

Question 5. What are possible explanations for racial/ethnic differences observed?

Question 6. Define “risk factor” for a health condition or disease.

Question 7. What risk factors have been identified for adolescent suicide?

Section C

Onondaga County Health Department Surveillance of Adolescent Suicide Attempts (12/1/1998 to 12/31/99)

Project Description: In 1999, the Onondaga County Health Department (OCHD) performed a study of adolescent suicide attempts. The objective of this study was to obtain information on all children and adolescents (up to age 19 years) presenting to hospital emergency departments with suicide attempt or ideation. All four Syracuse hospital emergency departments, one of which has a specific mission to respond to mental health emergencies (the Comprehensive

Table 2. Completed adolescent suicides in Onondaga County January 1993 to April 2002

Date	Age	Race	Gender	Cause/method
Jan 1993	15	W	M	Gunshot wound to head
Jan 1993	19	W	M	Shotgun wound to head
Feb 1993	19	W	F	Asphyxia by hanging
Jan 1994	19	W	M	Shotgun wound to head
Jan 1994	18	W	M	Asphyxia by hanging
Apr 1994	16	W	F	Multiple injuries from blunt force
Jun 1994	19	W	M	Shotgun wound to head
Oct 1994	15	W	M	Gunshot wound to head
Jan 1995	16	W	M	Asphyxia by hanging
Mar 1995	14	W	M	Asphyxia by hanging
Mar 1995	18	W	M	Asphyxia by hanging
Sep 1995	16	W	M	Gunshot wound to head
Sep 1995	17	W	M	Asphyxia by hanging
Dec 1995	18	W	M	Multiple injuries from blunt force
Sep 1996	16	W	M	Shotgun wound to head
Feb 1997	19	W	M	Multiple injuries from blunt force
Mar 1997	17	W	M	Asphyxia by hanging
Jun 1997	17	W	M	Shotgun wound to head
Dec 1997	17	H	F	Asphyxia by hanging
Dec 1998	15	W	M	Gunshot wound to head
Aug 1998	16	W	M	Asphyxia by hanging
Oct 1998	16	W	M	Gunshot wound to head
Oct 1999	17	W	M	Firearms
Oct 1999	17	W	M	Hanging
Feb 2000	14	W	F	Overdose
Oct 2000	19	W	M	Jumping from height
Nov 2000	16	W	M	Asphyxia by hanging
Apr 2001	14	W	M	Asphyxia by hanging
Nov 2001	17	W	M	Asphyxia by hanging
Apr 2002	20	W	F	Jumping from height

Data Source: Medical Examiner's Office, Onondaga County Health Department, 2002.

F, female; H, Hispanic; M, male; W, white.

Psychiatric Emergency Program [CPEP]), participated in the study.

For each visit meeting the inclusion criteria requirement (refer to Table 3), a healthcare provider at the emergency department collected information using a uniform instrument. Information was obtained about the patient, time and place of the attempt, method used, perceived threat to life, and patient's disposition.

During the 1-year period, 266 visits were investigated. Of these, 156 were described as suicide attempts and 110 were described as suicidal ideation. (Refer to Figure 1.)

Question 1. Provide an operational definition of suicide attempt and suicidal ideation.

The results of this study are provided in Figures 1 – 8. For the following questions, please refer to these figures.

Question 2. Using the raw numbers (in brackets), comment on age distribution of attempted suicide/suicide ideation cases (Figure 1). Are younger children in this study more likely to have only suicidal ideation

Table 3. Adolescent Suicide Surveillance Project: inclusion criteria for any adolescent (aged ≤19 years) who presents to the Emergency Department

Type of injury	Criteria to be considered
Suspected* self-inflicted injury	Patients' vagueness as to cause of injury Demeanor of patient (hopelessness, disoriented, hostile, apathetic) Lack of interest in treatment Method of transport to facility (against will, brought by concerned person)
Injury of a suspicious nature	Single car/single occupant accidents Hanging accidents Jumping/falling accidents Extreme alcohol incidents Discharge of firearms (i.e., during cleaning) Overdose of medication Stabbing/cutting injuries Any other unexplained accident

*Could be suspected by another person (family member, friend, teacher) or by healthcare provider's intuition.

Data Source: Onondaga County Health Department.

(versus actual attempts)? Does this information surprise you?

Teaching Note: This graph can be confusing on first glance. It is important to emphasize that students need to look at the raw number to determine the age distribution.

Question 3. List possible explanations for the peak of suicide reports in August 1999 through October 1999 (Figure 2).

Question 4. Comment on racial distribution of attempted suicide/suicide ideation cases (Figure 3). What information that is critical to the interpretation of this information is not supplied?

Question 5. Comment on the gender distribution of attempted suicide/suicide ideation cases (Figure 4). How does this distribution differ from that described for the completed suicides?

Question 6. Describe the relationship between drug/alcohol abuse and suicide attempts/suicidal ideation (Figure 5). What are the shortcomings of the data in making conclusions about these factors?

Question 7. How does the distribution of methods used in the suicide attempts compare with the distribution of methods described for the completed suicides (Figure 6)?

Question 8. How do healthcare professionals judge how dangerous are different methods of suicide (Figures 6 and 7)?

Teaching Note: To answer this question, students will need to look at both graphs. Figure 6 has the total number of attempts by method. The percentages in Figure 7 do not add up to 100% because some of the suicides were deemed to be not life threatening.

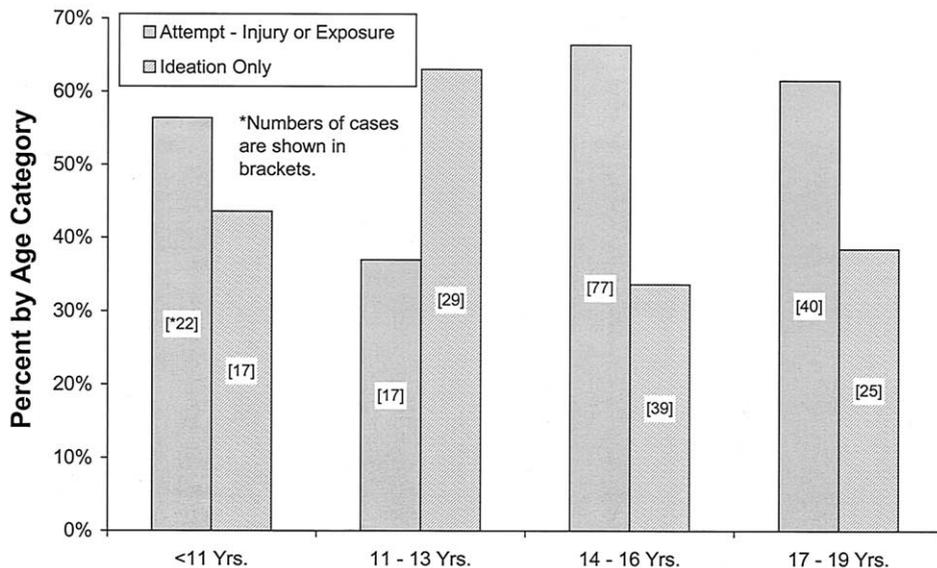


Figure 1. Emergency department visits for suicide attempts and suicidal ideation by age and attempt status, December 1, 1998 through December 31, 1999 (N=266).

Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

Question 9. Please refer to Figure 8 showing patient disposition by attempt status. List the factors that are important in determining the appropriate follow-up of an adolescent presenting to an emergency department following a suicide attempt. How would you determine whether a patient should be hospitalized?

routine screening of children or adolescents for depression. They noted that up to 2% of children and 4.5% of adolescents in primary care settings suffer from depression and that clinicians should be alert for possible signs of depression in younger children. Research involving children and adolescents that is currently in progress at the Agency for Healthcare Research and Quality hopefully will add to this evidence base.²

Section D
Prevention of Adolescent Suicide

The U.S. Preventive Services Task Force concluded that evidence was insufficient to *recommend for or against*

Schaffer and Craft³ of Columbia University and New York State Psychiatric Institute have reported on using systematic screening with a self-administered unit for

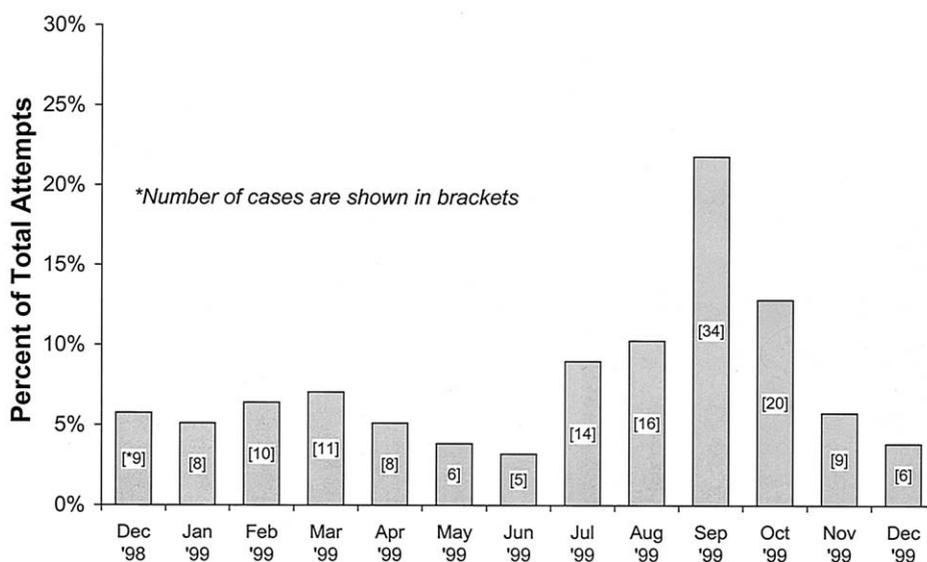
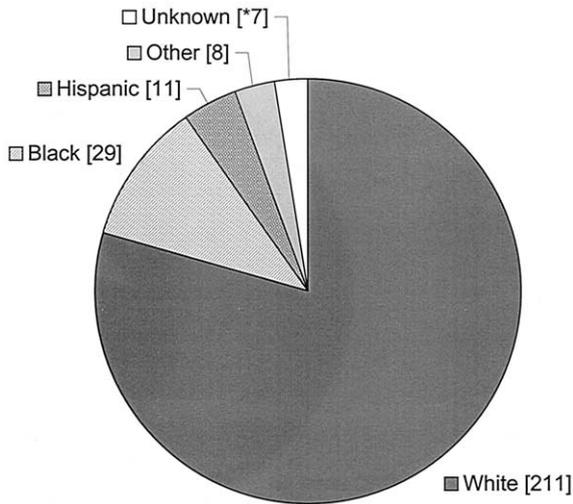


Figure 2. Emergency department visits for suicide attempts, by month, December 1, 1998 through December 31, 1999 (N=156). Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.



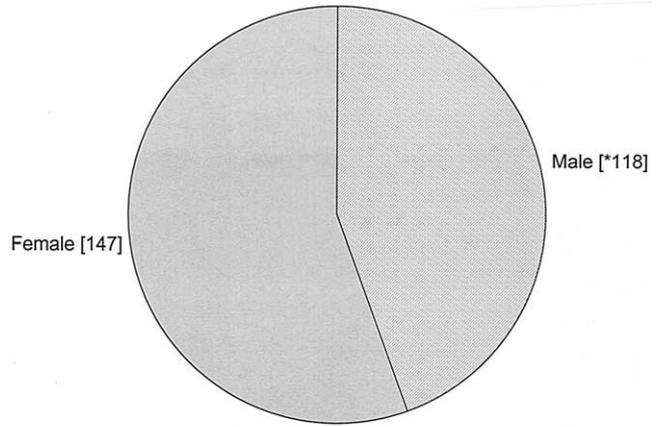
*Numbers of cases are shown in brackets.

Figure 3. Emergency department visits for suicide attempts or suicidal ideation, December 1, 1998 through December 31, 1999 (N=266).

Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

predictors of suicide in a high school population in New York City.

Screening for mood changes, depression, suicide ideation, and substance abuse may be an important tool to identify adolescents at risk for suicide. A self-administered screening test addressing questions of mood (feeling unhappy or sad), anger, temper, suicidal



*Numbers of cases are shown in brackets.

Figure 4. Emergency department visits for suicide attempts and suicidal ideation, by gender, December 1, 1998 through December 31, 1999 (N=266).

Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

thoughts, and substance abuse can be employed. Students who have a positive score on this test are referred for a formal diagnostic interview by a trained mental health professional (e.g., clinical psychologist or psychiatrist) that then makes the diagnostic and risk determination as well as the decision to refer the student for treatment. In this situation, the screening test is the self-administered tool to the high-school population while the diagnostic test (“gold standard”) is the formal interview by the mental health professional.

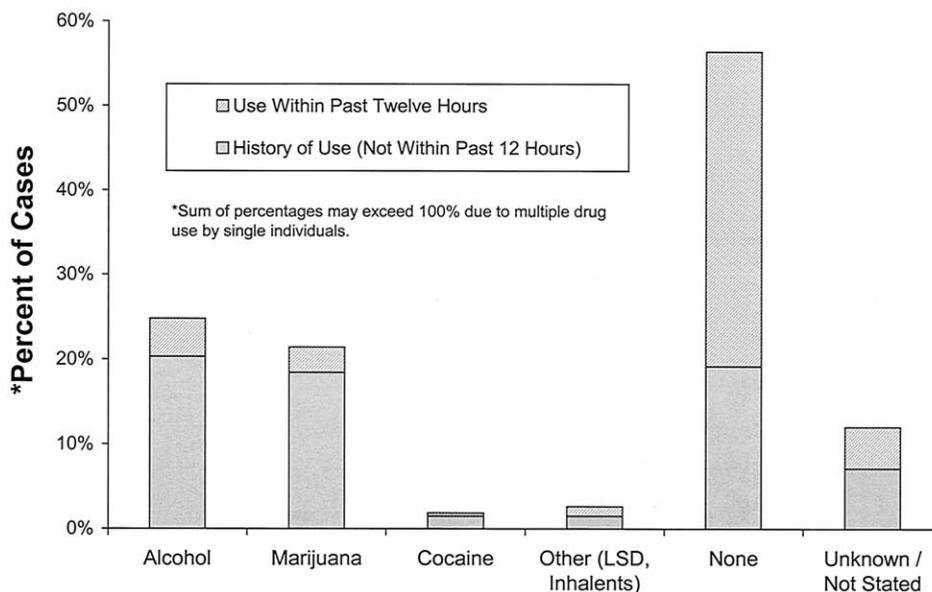


Figure 5. Emergency department visits for suicide attempts and suicidal ideation, by drug and alcohol use, December 1, 1998 through December 31, 1999.

Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

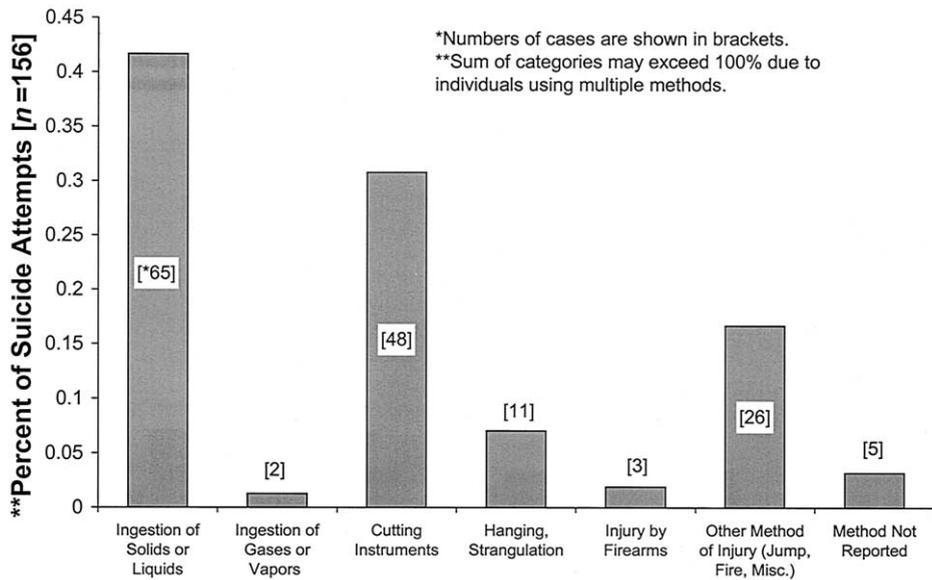


Figure 6. Emergency department visits for suicide attempts by reported method of injury or exposure, December 1, 1998 through December 31, 1999 (N=156).
 Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

In the following hypothetical example, 1000 students are screened with a self-administered instrument in urban high schools in Syracuse. Students who screen positive (mood disturbances, suicidal thoughts, substance abuse) are referred to a mental health professional that then establishes the diagnosis. The results are as follows:

Question 1. Calculate the sensitivity, specificity, and positive and negative predictive value of this screening test.

Question 2. List the possible problems associated with this type of screening procedure in the school setting. Are there methods to overcome these limitations?

The current cost of this screening procedure is \$20 per student screened (Step 1). For students who have a positive screening test, an additional cost of approximately \$75 per student is incurred for the diagnostic interview with a mental health professional (Step 2).

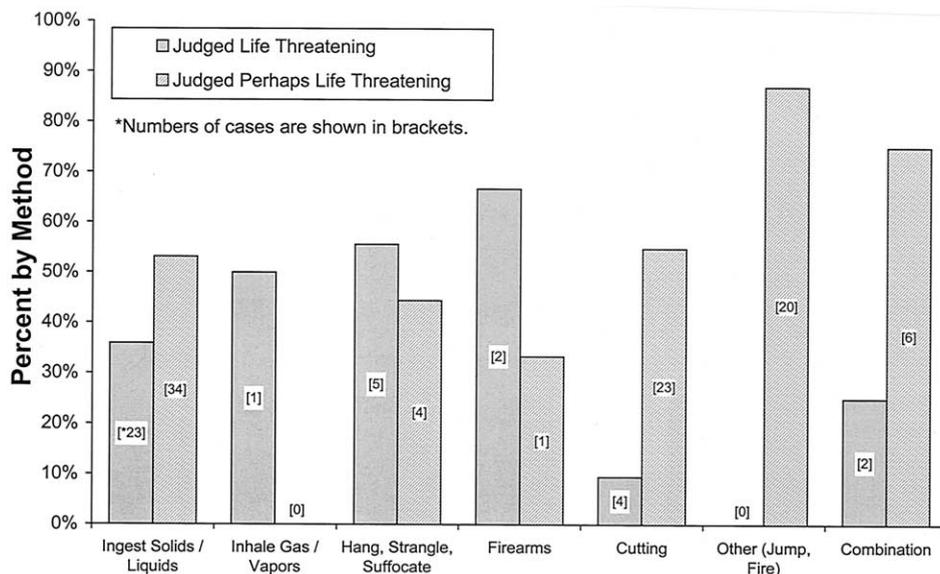


Figure 7. Emergency department visits for suicide attempts judged to be life threatening, by method, December 1998 through December 1999 (N=156).
 Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

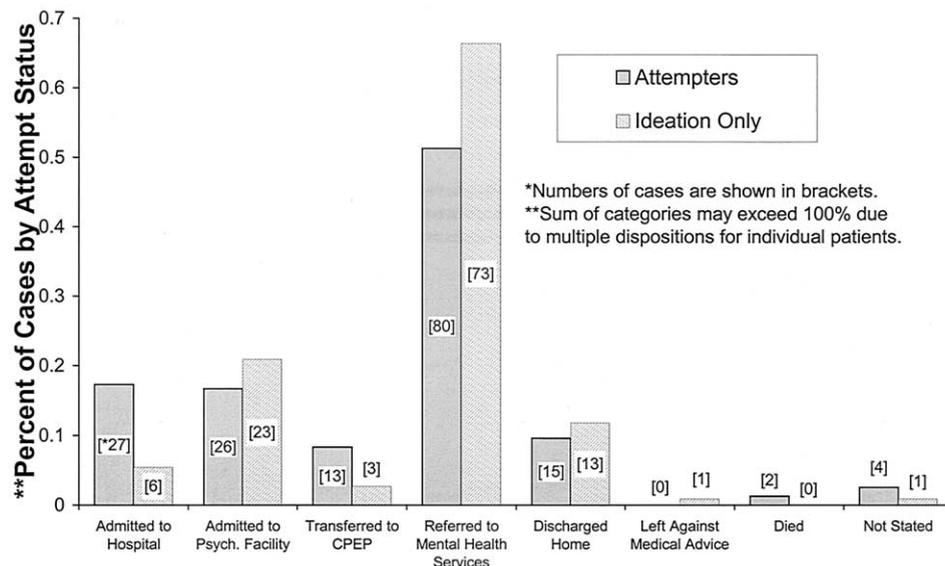


Figure 8. Disposition of emergency department visits for suicide attempts or ideation, by attempt status, December 1998 through December 1999 (N=266).

Data source: TeenWatch, the Adolescent Suicide Surveillance Project in Onondaga County, New York. Prepared by the Onondaga County Health Department, Bureau of Surveillance and Statistics.

Refer to Table 4 for the number of middle and high schools in Onondaga County and their respective enrollment.

Question 3.

A. Will you advise the local school board to adopt this screening method as a preventive intervention to reduce adolescent suicide in the entire middle and high school population in Onondaga County? (List the considerations in making this decision.)

B. Do you advise applying this screening procedure in pilot or demonstration schools?

An important component in developing a sustainable screening program is determining the effectiveness of the program. An effective screening program should significantly reduce adverse outcomes such as morbidity and mortality in the at-risk population.

Question 4. How would you proceed to evaluate the effectiveness of this suicide screening method? With whom would you collaborate?

Table 4. School and student population information, Onondaga County, New York

2000–2001 Academic Year

Total number of high schools:	20
Total high school population (Grades 9–12):	24,982
Range:	
Smallest:	292
Largest:	2,900
Total number of Middle Schools	24
Total Middle School Population:	19,946
Range:	
Smallest:	58
Largest:	1,690

Data Source: Onondaga County–Madison County Boces, NYS Department of Education.

Question 5: Describe the study intervention that you would test (specifics of screening program).

Question 6: What outcomes would you select to measure?

Question 7: What types of study designs are most commonly used to determine the effectiveness of screening interventions?

Question 8: Frequent concerns facing researchers in the process of designing a study include statistical power and selection bias. How would you address these in your study?

Question 9: Taking all of the above factors into account, what study design would you select to evaluate the effectiveness of a newly adopted screening method to decrease the risk of adolescent suicide in your middle and high school population?

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