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Adolescent Suicide: The Role of Epidemiology in Public Health

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Lesson Plan

TITLE: Adolescent Suicide: The Role of Epidemiology in Public Health

SUBJECT AREA: Health education, mathematics, social sciences

OBJECTIVES:

- To understand the contribution of epidemiology to the resolution of public health problems
- To increase knowledge about the frequency of adolescent suicide, the risk factors for adolescent suicide and interventions for the problem
- To help students understand how a public health problem is studied and how to develop intervention strategies to combat this problem

TIME FRAME: Three 40-minute lessons

PREREQUISITE KNOWLEDGE: None

NOTE: This lesson is recommended for students with some degree of emotional maturity. Material may be too sensitive for students in grades 9 and 10.

MATERIALS NEEDED: Handout provided in this module.

PROCEDURE: Students will follow a lesson that demonstrates how adolescent suicide can be used as a case study to evaluate a public health program that currently exists. Teachers will be provided a narrative about the recent research that has been done on adolescent suicide. The lesson shows how a public health problem like suicide would be studied so that public health professionals could use this information to develop programs to prevent future suicides. The narrative includes discussion questions that teachers can ask their students during the lesson. A student version of the lesson is also included in this module. Teachers can distribute this version to their students; however, this document is 15 pages long, so teachers might alternatively choose to show tables and figures as overheads and lead a discussion on the material in the text. An assignment is given at the end of the lesson.

ASSESSMENT: The final assignment that follows the lesson asks students to evaluate the suicide prevention program in their school based on what they have learned from the lesson and other sources.

EPIDEMIOLOGIC CONCEPTS COVERED: Primary, secondary and tertiary prevention; cohort studies; case-control studies; screening; risk factors

LINK TO STANDARDS:

Health Education Standards

- Students will comprehend concepts related to health promotion and disease prevention: identifying what good health is; and recognizing health problems and ways in which lifestyle, the environment and public policies can promote health.
- Students will demonstrate the ability to advocate for personal, family and community health: identifying community resources, accurately communicating health information and ideas, and working cooperatively to promote health.
- Students will analyze the influence of culture, media, technology and other factors on health: describing and analyzing how one's cultural background, messages from the media, technology and one's friends influence health.
- Students will demonstrate the ability to practice health-enhancing behaviors and reduce health risks: identifying responsible and harmful behaviors, developing health-enhancing strategies and managing stress.

National Social Studies Standards

- Students will demonstrate the ability to study people, places and environments.
- Students will study the interactions among individuals, groups and institutions.

Available at <http://www.socialstudies.org/standards/2.0.html>

National Science Education Standards

- Formulate and revise scientific explanations and models using logic and evidence: In the process of answering questions, students should engage in discussions and arguments that result in the revision of their explanations.
- Recognize and analyze alternative explanations and models: Students should be able to use scientific criteria to find the preferred explanations.
- Develop an understanding of personal and community health.

Available at <http://www.nap.edu/readingroom/books/nses/html/6e.html>

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Student Version of Lesson

Introduction

What is public health? According to the Institute of Medicine’s Committee for the Study of the Future of Public Health, the mission of public health is to “fulfill society’s interest in assuring conditions in which people can be healthy.” According to the Association of Schools of Public Health*, “public health carries out its mission through organized, interdisciplinary efforts that address the physical, mental, and environmental health concerns of communities and populations at risk for disease and injury. Its mission is achieved through the application of health promotion and disease prevention technologies and interventions designed to improve and enhance quality of life.”

Epidemiology is the basic science of public health. Some important public health functions are shown below, along with ways in which epidemiology contributes to their accomplishment.

Public Health Function	Role of Epidemiology
Estimating the magnitude of a problem	Estimating the frequency of the problem
Setting public health priorities	Combining information about the frequency of the problem with information about the impact of the problem
Identifying groups who are at risk	Performing studies (usually case-control studies and cohort studies) to identify groups at risk
Primary prevention	Evaluating interventions aimed at modifying risk factors
Secondary prevention	Evaluating interventions aimed at detecting individuals at an early stage of disease
Tertiary prevention	Evaluating interventions aimed at minimizing the consequences of a problem on people who are already affected by the problem

In this module we will examine adolescent suicide as a public health problem and explore the ways in which epidemiology can contribute (and has contributed) to the public health approach to teen suicide.

* Found at <http://www.asph.org/document.ofm?page=300>

Quantifying the Problem

When we refer to a public health problem, we are referring to situations that are potentially harmful to society as a whole. Sometimes the focus is on a disease or condition (e.g., cancer, depression, human immunodeficiency virus/acquired immunodeficiency syndrome [HIV/AIDS], homelessness), and at other times the focus is on an environmental or behavioral risk factor (e.g., smoking, air pollution).

Question 1. Can you think of some diseases that are of public health importance?

Question 2. Can you think of some risk factors that are of public health importance?

The first step in approaching a potential public health problem is to quantify its magnitude. This is done by estimating the prevalence and the incidence of the problem. **Prevalence** is defined as the proportion of a population that is affected by the problem at a given point in time. For example, say we were interested in knowing the prevalence of asthma among school-age children. We select a sample of school-age children, test them for asthma and discover that 6% of them have asthma. We could then conclude that the prevalence of asthma among school-age children is 6%. Prevalence is like a cross-sectional snapshot of a population at one point in time and is useful for estimating the burden of disease and for planning health services. It is not useful for the identification of risk factors because it is not a measure of the appearance of *new* cases of the disease in the population.

Incidence is defined as the proportion of a population that develops new cases of the diseases over a given period of time, for example, one year. Say we were interested in the incidence of asthma among school-age children. We select a sample of school-age children who do not have asthma and follow them for one year. We discover that 1% of the children developed asthma over the year. We could then conclude that the one-year incidence of asthma in school-age children is 1%. Incidence is useful for the identification of risk factors. For example, if we found that the incidence of asthma is four times as high in children whose parents smoke as in children whose parents do not smoke, we could conclude that exposure to second-hand smoke is a risk factor for childhood asthma.

Question 3. Why is it important to begin the public health approach to a problem by quantifying it?

Question 4. Another important step in setting public health priorities is to understand the impact of the problem. Can you think of some ways of quantifying the impact of a problem?

Question 5. Look back at the definitions of prevalence and incidence presented earlier. When considering a problem such as suicide, would you use prevalence or incidence to quantify the magnitude of the problem?

Table 1 shows data about deaths due to suicide in the United States in 2000. The first column shows selected five-year age groups. The second column is the mortality rate for suicide (per 100,000 population). The third column indicates what proportion of all deaths was attributable to suicide.

Table 1. Suicide Mortality in Selected Age Groups, by Age Group, United States, 2000

Age Group (yrs)	Mortality Rate (per 100,000)	Percent of All Deaths
10–14	1.5	7.2
15–19	8.2	12.0
20–24	12.8	13.4
25–34	12.8	11.8
35–44	14.6	7.3
45–54	14.6	3.4
55–64	12.3	1.2

National Vital Statistics Report 2002;50(16): 13–14—available at the following Web site: <http://www.cdc.gov/nchs/pressroom/02facts/final2000.htm>

Question 6. Examine the first two columns in Table 1. If you were to consider only the mortality rates, would you conclude that suicide is an important public health problem for children and teens aged 10–19?

Question 7. Describe how the mortality rates vary by age group. Then describe how the percent of all deaths varies by age group. Explain the differences in the two patterns.

Question 8. How does consideration of the percent of all deaths affect your conclusion about whether suicide should be regarded as an important public health problem in children and teens aged 10–19?

Question 9. Table 2 shows suicide death rates by age, sex and race. Summarize the information in the table. Does this information provide clues to which groups should be targeted by preventive interventions?

In the United States, death certificates are available for almost all deaths. Death certificates include information on demographic characteristics of the person who died as well as information on cause of death. Funeral directors complete part of the death certificate, and physicians complete the section on cause of death. In cases in which homicide, suicide or accident was the cause of death, the medical examiner or coroner completes the death certificate. The local registrar checks the death certificate and sends it to the state registrar, who sends a copy to the National Center

for Health Statistics (NCHS). The NCHS compiles the information and publishes mortality rates. The numbers in Tables 1 and 2 are derived from the published mortality information.

Table 2. Suicide Mortality Rate (per 100,000) in Persons Aged 10–19, by Age Group, Sex and Race, United States, 2000

Age Group (yrs)	Black Males	Black Females	White Males	White Females
10–14	2.2	*	2.4	0.7
15–19	9.7	1.5	13.9	2.9

* Number too small for reliable estimates.

National Vital Statistics Report 2002;50(16):13–14—available at the following Web site:
<http://www.cdc.gov/nchs/pressroom/02facts/final2000.htm>

Question 10. Do you think death due to suicide in young people is accurately reported? What are some limitations of using death certificate data for the purpose of estimating the magnitude of the suicide problem in young people?

Question 11. Examine Figure 1. What patterns do you observe?

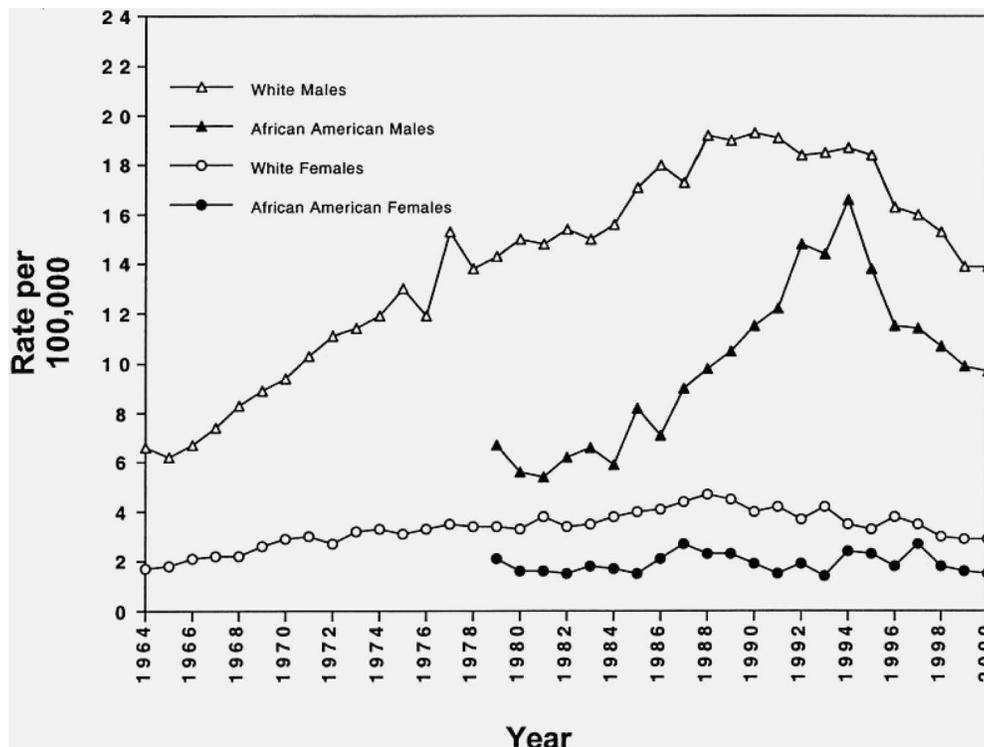


Figure 1. Mortality rates for suicide, ages 15–19 years, by sex, race and year (1964–2000).

(From Gould MS, Greenberg T, Velting DM, Shaffer D. Youth suicide risk and preventive interventions: a review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2003;42(4):386–405.)

Question 12. So far we have been looking at the frequency of adolescent suicide. However, the overall public health impact of a particular disease or condition depends not only on its frequency but also on its impact. What are some of the impacts of adolescent suicide?

Question 13. On the basis of information that you have examined up to now, do you think that adolescent suicide should be considered a public health priority?

Question 14. Does the information that you have examined up to now give you clues to ways in which adolescent suicide can be prevented?

Identifying Risk Factors

In the previous section we examined adolescent suicide rates by age, sex, race and time. This descriptive approach can provide important information about which demographic groups are at highest risk and about trends in suicide rates over time. However, prevention of suicide requires that we have more detailed information about which adolescents are at high risk of suicide. Once risk factors for suicide are identified, it is possible to design interventions aimed at preventing suicide.

Epidemiologists can use cohort studies or case–control studies to identify risk factors. In a **cohort study**, persons with the study factor and persons without the study factor are followed over time to determine who develops the disease of interest. If the incidence of the disease is higher among those with the study factor than among those without the study factor, and if chance, bias and confounding can be excluded as explanations for the higher incidence, then we can conclude that the study factor is a risk factor for the disease. For example, we could follow a group of smokers and a group of nonsmokers over time to see who develops lung cancer. If it is found that smokers have a higher incidence of lung cancer than nonsmokers, and if chance, bias and confounding are excluded as possible explanations, then we could conclude that smoking is a risk factor for lung cancer. Cohort studies are usually an excellent way to study risk factors. However, it may be necessary to study large numbers of people and follow them over long periods of time, especially if the disease of interest is rare or has a long latent period.

Case–control studies can be done with a much smaller number of study participants and over a shorter period of time than cohort studies. In a **case–control study**, a group of persons with the disease of interest (cases) and a group of persons without the disease of interest (controls) are enrolled. For both cases and controls, information is obtained (by interview, questionnaire, medical record review, laboratory test or other method) about whether the person experienced the exposure in the past. For example, we could assemble a group of 300 persons with lung cancer and a group of 300 persons without lung cancer and question them about their past smoking history. If a history of cigarette smoking is more common among cases than among controls, and if chance, bias and confounding are excluded as possible explanations of the association, then we could conclude that smoking is a risk factor for lung cancer.

Both cohort studies and case-control studies have been used to study risk factors for adolescent suicide. In this section, we will examine in detail a case-control study by David A. Brent and collaborators, the results of which were published in 1999. In this study, the cases were 140 adolescents ages 13 to 19 who committed suicide in western Pennsylvania. There were 119 male and 21 female cases. There were 131 controls, persons in the same age group randomly selected from the community and matched to the cases on age, gender, race, county of origin and socio-economic status. Of the controls 91 were male and 40 were female.

For the cases, information about possible risk factors was obtained by a method called **psychologic autopsy**. This method involves interviewing informants (parents, siblings and friends of the young people who committed suicide) to obtain information about possible risk factors. In this study, the informants were asked about stressors, current and past psychiatric illness, family history of psychiatric illness and availability of firearms. The controls and their parents were interviewed directly to obtain the same type of information. Selected results for males are shown in Table 3. Because there were many fewer females in this study, the results for females were not as reliable and so they are not shown here. However, on the whole, results for females were similar to those for males.

Table 3. Current Psychiatric Diagnoses and Stressors in Male Suicides and Controls

	Number of Subjects		Odds ratio
	Suicides (n = 119)	Controls (n = 91)	
Mood Disorder	51	7	9
Anxiety Disorder	15	1	13
Substance Abuse	42	4	12
Conduct/Antisocial Disorder	41	6	7
Past Suicide Attempt	44	1	53
Conflict with Parents	40	12	3
Conflict with Boyfriend or Girlfriend	41	16	3
Loss of Boyfriend or Girlfriend	43	17	3
Legal or Disciplinary Problems	47	14	4
Lifetime Abuse	42	1	49
Nonintact Family	71	27	4

Table 3 indicates that 51 of the 119 males who committed suicide had a mood disorder at the time they committed suicide, whereas 7 of the 91 male controls had a mood disorder. With this information it is possible to construct a 2×2 (two by two) table, as below.

	Suicides	Controls
Mood Disorder	51 (a)	7 (b)
No Mood Disorder	68 (c)	84 (d)
Total	119	91

The odds ratio from this 2×2 table is equal to $\frac{a/c}{b/d}$, which is equal to $\frac{51/68}{7/84} = 9$. The odds

ratio, which is a way of summarizing the comparison between cases and controls, indicates that the odds of having a mood disorder was nine times as large among suicides as among controls. Results for the other risk factors can be interpreted in a similar fashion.

Question 15. Calculate the odds ratio for substance abuse. Explain in words the answer you get.

Question 16. Examine the results in Table 3. According to this study, what are the two strongest risk factors for suicide in males?

Question 17. In this study the investigators used the psychologic autopsy method for obtaining risk factor information about persons who committed suicide, and they used direct interview to obtain risk factor information about controls. Discuss the advantages and disadvantages of these data collection methods.

Not all associations are causal associations. For example, we may observe that people who never or rarely eat oatmeal have a much higher risk of heart attacks than people who frequently eat oatmeal. We could then conclude that there is an association between oatmeal and heart attacks. However, we cannot conclude that not eating oatmeal *causes* you to be at higher risk of heart attacks. It may be that people who eat little oatmeal also exercise less than people who eat lots of oatmeal and that it is the exercise, not the oatmeal, that protects against heart attacks.

Question 18. Consider the association between substance abuse and suicide. Table 3 indicates that there is a strong association: The odds ratio of substance abuse was 12 times as high in males who committed suicide as in controls. Present at least one explanation for a causal association, and one explanation for a noncausal association, between substance abuse and suicide.

Question 19. If the association between substance abuse and adolescent suicide in males is not causal, will preventing substance abuse result in lower rates of suicide in males?

The goal of identifying risk factors is to search for things that can be modified so that the negative outcome (in this case, suicide) can be prevented. For example, when smoking was identified as a risk factor for lung cancer, it was possible to encourage people to stop smoking (or never to start smoking) and in this way to prevent some people from getting lung cancer. In other situations risk factors are not modifiable, but they may be markers that indicate which people should be targeted for preventive interventions. For example, having fair skin is a risk factor for skin cancer. Although skin color is not modifiable, knowing that light-skinned people are at high risk may help target cancer prevention information to the groups who could benefit the most. Also, information about markers for high risk can help target screening programs appropriately.

Question 20. Suppose you are a public health program planner and you are considering the results of the study shown in Table 3. How would knowing about this risk factor help you design interventions to prevent suicide in male adolescents? Be sure to consider whether the risk factor is modifiable or whether it is a marker of high risk. For each risk factor, think of at least one intervention that could help prevent suicide in young males.

Evaluating Primary Prevention Programs for Suicide

When health care professionals talk about the primary prevention of a disease, they are referring to measures that can be taken to prevent the illness in the first place. Primary prevention means what people can do to make themselves less susceptible, or at risk, for a particular illness. Getting a vaccine for measles, mumps and rubella would be an example of a primary prevention measure against these three infectious illnesses. Eating a diet low in fat and cholesterol and exercising regularly would be examples of primary prevention measures against heart disease.

Primary prevention strategies can be designed to target the individual, a whole population or both. A mass media campaign involving radio and television advertisements to promote condom use would be an example of a primary prevention strategy that would target the population, and HIV counseling for someone who is not HIV positive would be an example of primary prevention that is targeted to an individual. Primary prevention is applied to those who do not have the disease to begin with.

To combat the public health problem of suicide, many suicide prevention programs have been developed to decrease the number of cases of suicide and suicide attempts. Primary prevention strategies have been implemented to prevent suicide and attempted suicide. Examples include lessons taught by a health teacher in school, suicide prevention workshops offered in school or at a youth center, and a suicide prevention hotline. Programs designed to reduce stressors for adolescents or find companions for the elderly could also be considered intervention programs to prevent suicide, because stress and loneliness are factors that could put one at higher risk for

committing suicide. Some of these programs have been evaluated to determine if they are effective; however, there has not been a great deal of research. Below are some examples of primary prevention strategies that were intended to reduce the number of adolescent suicides.

- Identification of risk factors (e.g., clinical depression, stressors)
 - Many of these risk factors are related to each other
- Restricted access to suicide tools
- Detection and treatment of psychiatric disorders associated with suicide
- Immediate psychologic assessment of adolescents expressing suicidal intent
- Increased suicide awareness and prevention training for primary health care providers
- Peer-group interventions and increased suicide-related education
- Increased family and adult suicide education
- Increased access to public support services and public awareness

Primary prevention programs can be divided into nonclinical interventions and clinical interventions. Nonclinical interventions involve educational strategies and peer intervention programs, whereas clinical interventions usually involve counseling from a psychiatrist, psychologist or other trained mental health professional. The next part of this lesson will discuss research that has been done to evaluate these different types of programs.

Nonclinical Interventions

School-based suicide awareness programs and crisis intervention services such as crisis hotlines are common examples of nonmedical suicide prevention programs. Crisis hotlines have not been found to be very effective, although they are somewhat effective with young white women, who are more likely than other demographic groups to use these hotlines. Research has not confirmed why this demographic group is more likely to use crisis hotlines. Experts, however, do believe that these crisis hotlines are helpful in reaching out to individuals who are not reached by traditional mental health professionals. The philosophy behind these programs is to provide interpersonal communication for someone who does not know where else to turn.

Another type of primary prevention strategy is suicide education programs that are offered in schools or youth centers. The objectives of these programs are to raise awareness of the problem of adolescent suicide, train participants to identify peers who may be at risk for suicide and educate participants about community resources that are available for mental health. Overall, research has shown that school-based interventions have not been very successful in reaching their goals. However, the research that has been done to evaluate these programs is somewhat limited. Mental health professionals agree that more research is needed to accurately evaluate the effectiveness of these programs.

One study evaluated a suicide prevention program that lasted six weeks. Researchers compared 300 students who attended the program with 200 students in the same geographic area who did not attend the program, and the study found that students who went through these programs had only a slight increase in knowledge of suicidal symptoms but did not express a change in attitude toward suicide. The study found that girls who participated in the program had better attendance than boys, and girls were more likely than boys to have an increase in knowledge of suicide. A similar study done by the same researchers also found that boys were more likely than girls to express hopelessness and inability to cope after participating in these programs.

A similar study done in New Jersey was conducted to evaluate a three-hour suicide prevention program that was being run by mental health professionals and educators. In this study 1,000 students who participated in the program were compared with 1,000 students who did not participate. Most students found the program to be helpful and reported that they were more likely to seek help from a mental health professional, for either themselves or someone else, after attending the program. However, only 41% of the participants reported that the program was interesting. A small portion of the participants even reported that suicide can be a possible option for resolving problems they might have and that suicidal confessions from friends should never be disclosed to others. Females, as in the other study, and people of color were more likely than white males to rate the program favorably.

Question 21. On the basis of experiences that you may have had in health class or elsewhere, why do you think suicide education programs have not been found to be effective?

Question 22. Evaluations of both crisis intervention programs and school-based programs found that these programs affect people of different sexes and races differently. What are some reasons that may account for these differences?

Naturally the effectiveness of suicide prevention programs should not be based on just two studies. More studies are certainly needed to draw final conclusions. However, critics of these programs claim that the public health professionals who developed these suicide education programs did not adequately incorporate findings from previous research. Researchers who evaluated these programs infer that the problem with these school-based programs is that they do not discuss mental disorders, such as depression and anxiety disorders, as a link to suicide. Instead these programs tend to emphasize stressors that may trigger one to contemplate and attempt suicide.

Question 23. Why do you think these programs emphasize stress as a risk factor when the research shows that depression and other forms of mental illness are stronger risk factors for suicide? What are some potential negative effects that can result from programs that focus too much on stress as a risk factor for suicide?

Another criticism of programs such as these is that they are offered in school and therefore do not target adolescents who are incarcerated or have dropped out of school. Adolescents of these groups are on average more likely to commit suicide.

Some school-based programs, however, have reported successful results in increasing knowledge and changing attitudes about suicide. These programs were based on evaluating a group of teens who were prone to suicide and suicide attempts and having them go through assessment sessions. Another group of teens went through these assessment sessions and were also placed in classes that dealt with issues of personal growth and self-esteem. The assessment sessions alone were found to be effective in reducing suicide risk behaviors, depression, hopelessness, stress and anger. The classes were also effective in increasing self-esteem and developing a social support system. The question remains whether change in attitude and increased knowledge will really decrease the number of suicides.

The bottom line is that any public program that is developed should be based on sound research. Programs based on good intentions alone not only may be a waste of money, time and resources but also may cause unintended negative effects.

Another nonmedical strategy is limiting access to tools that allow one to attempt suicide. Gun control, for example, could be considered a primary prevention strategy, because guns are the primary tool used by adolescents for suicide. Although restriction of guns does not change an individual's intent to commit suicide, it does decrease the opportunity for that person to do so. The evidence at this point is limited and somewhat contradictory. The suicide rate is lower in states with stricter gun control laws. On a related note, suicide deaths from carbon monoxide poisoning in the United States and the United Kingdom decreased when the technology in automobiles and oil refineries improved to reduce carbon monoxide emissions. However, the adolescent suicide rate in Finland continues to grow at the same rate as that of the United States, and Finland has very strict gun control laws. The current consensus on this issue is that gun control should not be the primary strategy to prevent suicides, but it can help reduce the number of suicides.

In addition to limiting access to suicide tools, some argue that there should be restrictions on information that may encourage an adolescent to consider suicide. Some controversial pieces of literature that give instructions on how to commit suicide have been published. Other health professionals blame the media for sensationalizing stories of suicide, particularly of adolescents, and argue that these stories of suicide may influence other adolescents to commit suicide. Many public health professionals believe that these sensationalist stories have contributed to the suicide clusters that have been observed. Mental health professionals do not advocate complete censorship of these stories, but they do advise reporters to be more responsible when reporting such stories.

Question 24. What are your views on this issue? What are some legal or constitutional issues related to controlling the public distribution of this kind of literary material? Are there certain institutions or facilities where this type of literature should be controlled, maybe even banned?

Clinical Interventions

Psychotherapy has been found to be effective in reducing the incidence of suicide in people identified as being at risk for suicide. The logic is that stress and mental disorders, particularly clinical depression, are associated with suicide attempts and completed suicides. Psychotherapy also gives people the coping skills to deal with everyday environmental stressors that may trigger them to consider suicide as an option for escaping from their problems. However, not all types of psychotherapy have shown effectiveness.

Researchers found that a two-week outpatient program designed to help adolescents improve their coping and adaptive skills and problem-solving skills did not yield very promising results. Researchers who evaluated more intensive long-term programs have reported these programs to be more successful than the short-term interventions. One program that was studied was developed for preteens, and this program had a multiyear follow-up. Another program was a three-month program that treated teens. Both of these programs were found to be effective.

Psychotherapy also treats patients who are clinically depressed, are drug abusers or have made previous suicide attempts. All of these factors are associated with suicide deaths. Mental health experts believe that if one treats the underlying cause, then one can help prevent suicide. One problem with this strategy is that experts are not really sure whether drug abuse and clinical depression are truly causes of suicide deaths. Although there is a strong association between suicide and both drug abuse and clinical depression, it is not clear whether this association is a causal one.

Question 25. What are some potential problems with a suicide intervention program that focuses primarily on substance abuse issues?

In the case of clinical depression, it has been found that suicide intervention programs that focus on alleviating general depression symptoms rather than on decreasing suicidal intent are successful. These studies suggest that depression continues to be an important risk factor to look for when identifying and treating suicidal individuals. However, depression was found to be more strongly correlated with suicide attempts than with actual suicide deaths. Not all individuals who attempt suicide actually want to complete it, and not all patients who are diagnosed with depression have suicidal intentions. Suicide attempters, however, still require counseling from highly trained mental health professionals. Even though some suicide attempters do not want to die, previous suicide attempts are still the most reliable predictor of suicide.

Question 26. Why is it that some people who attempt suicide do not necessarily want to die?

Screening for Teens Who May Be Suicidal

In addition to primary prevention strategies, public health professionals also implement secondary prevention strategies to combat a public health problem. Secondary prevention involves detecting an illness at an early stage, often before the individual is aware of it. Screening, which tests

individuals for a particular disease that may pose a public health threat, is a very important part of secondary prevention. Screening for infectious diseases allows health care professionals to treat the identified cases and prevent those who have the disease from spreading it to those who do not.

Screening procedures have been used to identify individuals who are suicidal. The purpose of these screening programs is to identify adolescents who have had thoughts of suicide and refer them immediately to a qualified mental health professional. Screening finds those adolescents who have some of the common risk factors associated with suicide.

Question 27. Why is trying to identify someone who is suicidal much more difficult than diagnosing diseases such as diabetes, heart disease or tuberculosis? What do you think a screening test for suicide could be based on?

Question 28. Based on what has already been discussed about suicide, what are some risk factors that educators or health care professionals could look for in a student who may be considered suicidal?

Many schools have adopted school-based screening programs that seek to identify teens who may be suicidal and require referral to a mental health professional. The American Academy of Child and Adolescent Psychiatry (AACAP) recommends looking for certain indicators that may cause a student to be referred for mental health evaluation. These symptoms do not necessarily mean a student is suicidal, but their presence may justify referral to a mental health professional. Table 4 gives a list of these indicators, which may be early warning signs of suicidal thoughts.

Table 4. Indicators for Referral to Mental Health Professionals

- Changed eating habits
 - Social withdrawal
 - Unusual violent and rebellious activity, including running away
 - Substance abuse
 - Atypical neglect of personal appearance
 - Dramatic changes in personality or affect
 - Boredom, difficulty in concentrating, poor and declining school performance
 - Complaints of illness (e.g., headaches, fatigue, stomachaches)
 - Anomie or hopelessness
 - Inability to tolerate praise
-

Question 29. How would the suicide education programs for students mentioned previously be considered a secondary prevention strategy as well as a primary prevention strategy?

Although research has not supported the effectiveness of suicide education for teens, research has found that suicide education programs for educators and health care professionals does increase the knowledge of suicide and of warning signs of suicide. AACAP has suggested signs that may occur when someone is actually planning to commit suicide. Table 5 gives some of these signs.

Table 5. Signs of a Decision to Commit Suicide

- Preoccupation with suicide or death
 - Verbal hints or statements suggesting despair or imminent departure
 - Complaints of being “rotten inside”
 - Distribution or discarding of favorite possessions, cleaning room or putting affairs in order
-

Not all individuals who decide to commit suicide will exhibit these characteristics, but these are helpful signs and symptoms to look for. Other predictors are some of the risk factors mentioned before. There is a strong correlation between depression and suicide completion, although the correlation is stronger for suicide attempts. Research shows that a history of previous suicide attempts is the best predictor for a suicide attempt, even though not every suicide attempter necessarily wants to die.

Conclusion

This lesson is an example of how public health professionals deal with a particular public health problem that is emerging or already exists. Descriptive epidemiologic research is first done to understand how the problem affects different segments of the population. Analytic epidemiology helps researchers look for possible cause-and-effect relationships, which is the second part of epidemiologic research. Once cause-and-effect relationships are determined from a substantial amount of research, public health professionals can develop programs that will help prevent future occurrences, or incidence, of the disease. Primary prevention programs are developed to prevent individuals from getting the illness to begin with, and secondary prevention programs are designed to identify individuals who have the illness so that they can be treated immediately.

Suicide is only one example of how public health professionals develop public health intervention programs. These programs should be based on sound research, but some of the examples used in this lesson demonstrate that this is not always the case. Epidemiologic research, however, does play a vital role in developing public health intervention programs.

Assignment

Write a report about the suicide prevention programs that are being used in your school. Your report should contain both a description and an analysis of the program. Include information on the curriculum that is taught in your health education classes, any possible partnerships your school may have with a youth organization or mental health facility for adolescents, or a peer training program that your school may have. Discuss how students are referred to mental health professionals because of possible suicidal thoughts.

Using the information that you collect, write an evaluation of the program. This evaluation should be based on what you have learned about suicide as a public health problem and the research that has been done so far about suicide, particularly the research that evaluates suicide prevention strategies. With the information gathered from your research, discuss the validity of this prevention program. Is the program based on previous research, or is it a program that has only good intentions? Do the philosophy and the logic behind the program make sense? These are questions you should be asking yourself when you are writing this evaluation.

Finally, your evaluation should include suggestions and recommendations that can be made to improve the suicide education and prevention programs in your school. Your suggestions should be based on what you have learned from this lesson, as well as additional readings on suicide and suicide prevention programs. An assignment such as this not only helps you increase your awareness of a public health problem like suicide but also enhances your understanding of how school policies are developed.

Teacher's Annotated Version of Lesson

Introduction

What is public health? According to the Institute of Medicine's Committee for the Study of the Future of Public Health, the mission of public health is to "fulfill society's interest in assuring conditions in which people can be healthy." According to the Association of Schools of Public Health, "public health carries out its mission through organized, interdisciplinary efforts that address the physical, mental and environmental health concerns of communities and populations at risk for disease and injury. Its mission is achieved through the application of health promotion and disease prevention technologies and interventions designed to improve and enhance quality of life."

Epidemiology is the basic science of public health. Some important public health functions are shown below, along with ways in which epidemiology contributes to their accomplishment.

Public Health Function	Role of Epidemiology
Estimating the magnitude of a problem	Estimating the frequency of the problem
Setting public health priorities	Combining information about the frequency of the problem with information about the impact of the problem
Identifying groups who are at risk	Performing studies (usually case-control studies and cohort studies) to identify groups at risk
Primary prevention	Evaluating interventions aimed at modifying risk factors
Secondary prevention	Evaluating interventions aimed at detecting individuals at an early stage of disease
Tertiary prevention	Evaluating interventions aimed at minimizing the consequences of a problem on people who are already affected by the problem

In this module we will examine adolescent suicide as a public health problem and explore the ways in which epidemiology can contribute (and has contributed) to the public health approach to teen suicide.

Quantifying the Problem

When we refer to a public health problem, we are referring to situations that are potentially harmful to society as a whole. Sometimes the focus is on a disease or condition (e.g., cancer, depression, human immunodeficiency virus/acquired immunodeficiency syndrome [HIV/AIDS], homelessness), and at other times the focus is on an environmental or behavioral risk factor (e.g., smoking, air pollution).

Question 1. Can you think of some diseases that are of public health importance?

There are countless examples. Here are just a few: tuberculosis, infant mortality, motor vehicle accidents, Lyme disease, severe acute respiratory syndrome (SARS), Alzheimer's disease, autism, sexually transmitted diseases, stroke, tooth decay, asthma, obesity, coronary heart disease.

Point out that the public health approach is appropriate not only for medical conditions but for psychologic and social problems as well.

Question 2. Can you think of some risk factors that are of public health importance?

Some examples are lack of exercise, injection drug use, unprotected sex, high-fat diet, excessive sun exposure, radon, high blood pressure.

The first step in approaching a potential public health problem is to quantify its magnitude. This is done by estimating the prevalence and the incidence of the problem. **Prevalence** is defined as the proportion of a population that is affected by the problem at a given point in time. For example, say we were interested in knowing the prevalence of asthma among school-age children. We select a sample of school-age children, test them for asthma and discover that 6% of them have asthma. We could then conclude that the prevalence of asthma among school-age children is 6%. Prevalence is like a cross-sectional snapshot of a population at one point in time and is useful for estimating the burden of disease and for planning health services. It is not useful for the identification of risk factors because it is not a measure of the appearance of *new* cases of the disease in the population.

Incidence is defined as the proportion of a population that develops new cases of the disease over a given period of time, for example, one year. Say we were interested in the incidence of asthma among school-age children. We select a sample of school-age children who do not have asthma and follow them for one year. We discover that 1% of the children developed asthma over the year. We could then conclude that the one-year incidence of asthma in school-age children is 1%. Incidence is useful for the identification of risk factors. For example, if we found that the incidence of asthma is four times as high in children whose parents smoke as in children whose parents do not smoke, we could conclude that exposure to second-hand smoke is a risk factor for childhood asthma.

Question 3. Why is it important to begin the public health approach to a problem by quantifying it?

Knowing how many and what proportion of people are affected by a problem allows one to estimate how important it is and how its importance compares with other problems.

Question 4. Another important step in setting public health priorities is to understand the impact of the problem. Can you think of some ways of quantifying the impact of a problem?

The impact of a problem can be measured in terms of mortality, suffering and inability to perform social roles (e.g., work, school). Also, some conditions (e.g., Alzheimer’s disease) can impose hardships on the families of the person who is affected. Finally, societal costs can be quantified. For example, what is the cost of providing medical treatment and rehabilitation for the problem? What is the cost to society of premature death caused by the problem?

Question 5. Look back at the definitions of prevalence and incidence presented earlier. When considering a problem such as suicide, would you use prevalence or incidence to quantify the magnitude of the problem?

Only incidence can be used with a problem like suicide. Suicide is an event, not a state of being like having diabetes or HIV infection. Therefore, it is not meaningful to say that a certain proportion of a population “has” suicide at a given point in time.

Table 1 shows data about deaths due to suicide in the United States in 2000. The first column shows selected five-year age groups. The second column is the mortality rate for suicide (per 100,000 population). The third column indicates what proportion of all deaths was attributable to suicide.

Table 1. Suicide Mortality in Selected Age Groups, by Age Group, United States, 2000

Age Group (yrs)	Mortality Rate (per 100,000)	Percent of All Deaths
10–14	1.5	7.2
15–19	8.2	12.0
20–24	12.8	13.4
25–34	12.8	11.8
35–44	14.6	7.3
45–54	14.6	3.4
55–64	12.3	1.2

National Vital Statistics Report 2002;50(16):13–14—available at the following Web site:
<http://www.cdc.gov/nchs/pressroom/02facts/final2000.htm>

Question 6. Examine the first two columns in Table 1. If you were to consider only the mortality rates, would you conclude that suicide is an important public health problem for children and teens aged 10–19?

The mortality rates are higher in the older age groups than in children and teens aged 10–19. On the basis of only the mortality data, therefore, you might conclude that adolescent suicide is not a public health priority.

Question 7. Describe how the mortality rates vary by age group. Then describe how the percent of all deaths varies by age group. Explain the differences in the two patterns.

The mortality rate increases after age 19 and then stays fairly stable. The proportion of deaths attributable to suicide increases to age 20–24, then declines. The most likely explanation is that although the mortality rates are fairly stable, other causes of death become more important as people age, so that suicide accounts for a smaller proportion of deaths at the older ages.

Question 8. How does consideration of the percent of all deaths affect your conclusion about whether suicide should be regarded as an important public health problem in children and teens aged 10–19?

Although mortality rates for suicide are lower among children and teens, suicide accounts for a higher proportion of deaths in these younger individuals. On that basis, it would be justifiable to consider suicide an important public health problem.

Question 9. Table 2 shows suicide death rates by age, sex and race. Summarize the information in the table. Does this information provide clues to which groups should be targeted by preventive interventions?

In both age groups, blacks have lower rates than whites, and females have much lower rates than males. White males have the highest rates in both age groups. They might be considered the most important target group.

Table 2. Suicide Mortality Rate (per 100,000) in Persons Aged 10–19, by Age Group, Sex and Race, United States, 2000

Age Group (yrs)	Black Males	Black Females	White Males	White Females
10–14	2.2	*	2.4	0.7
15–19	9.7	1.5	13.9	2.9

* Number too small for reliable estimates.

National Vital Statistics Report 2002;50(16):13–14—available at the following Web site:
<http://www.cdc.gov/nchs/pressroom/02facts/final2000.htm>

In the United States, death certificates are available for almost all deaths. Death certificates include information on demographic characteristics of the person who died as well as information on cause of death. Funeral directors complete part of the death certificate, and physicians complete the section on cause of death. In cases in which homicide, suicide or accident was the cause of death, the medical examiner or coroner completes the death certificate. The local registrar checks the death certificate and sends it to the state registrar, who sends a copy to the National Center for Health Statistics (NCHS). The NCHS compiles the information and publishes mortality rates. The numbers in Tables 1 and 2 are derived from the published mortality information.

Question 10. Do you think death due to suicide in young people is accurately reported? What are some limitations of using death certificate data for the purpose of estimating the magnitude of the suicide problem in young people?

Sometimes it is difficult to determine whether suicide was the cause of death, especially when the circumstances of death (e.g., poisoning, motor vehicle crash, drug overdose) could point to suicide, homicide or accident. Also, social stigma or religious concerns may influence what cause of death gets recorded on the death certificate. Suicide mortality rates therefore may be underestimated.

Question 11. Examine Figure 1. What patterns do you observe?

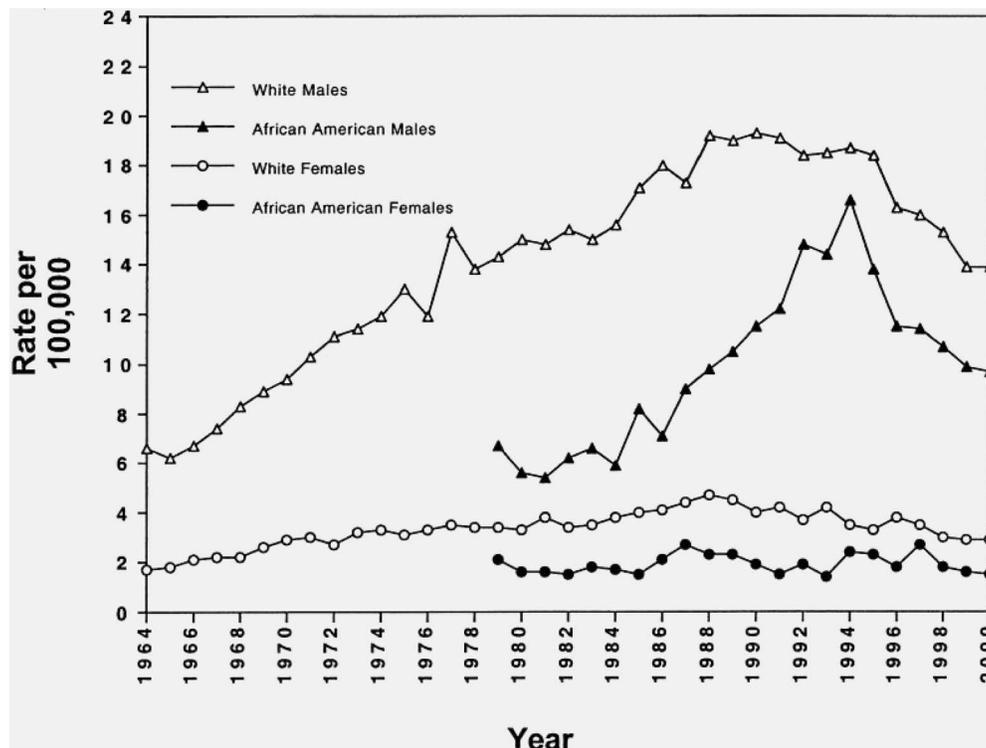


Figure 1. Mortality rates for suicide, ages 15–19 years, by sex, race and year (1964–2000).

(From Gould MS, Greenberg T, Velting DM, Shaffer D. Youth suicide risk and preventive interventions: a review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2003;42(4):386–405.)

Males had higher suicide rates than females in all years. Whites had higher suicide rates than blacks in all years. For males, suicide rates increased steadily until around 1994, when they began to decline. The decline was more dramatic for black males than white males. For black and white females, suicide rates stayed fairly constant over the 36-year period.

Question 12. So far we have been looking at the frequency of adolescent suicide. However, the overall public health impact of a particular disease or condition depends not only on its frequency but also on its impact. What are some of the impacts of adolescent suicide?

Some impacts are:

- **Grief, suffering and guilt of families and friends of suicide victims**
- **Social cost related to loss of a large number of years of potential life**
- **Economic cost related to loss of a large number of years of productivity**

Question 13. On the basis of information that you have examined up to now, do you think that adolescent suicide should be considered a public health priority?

Most students will probably conclude, based on frequency and impact, that adolescent suicide should be considered a priority. However, you may use this question as an opportunity for a broader discussion regarding the setting of social priorities.

Question 14. Does the information that you have examined up to now give you clues to ways in which adolescent suicide can be prevented?

Descriptive statistics can give clues to which groups are at particularly high risk and who should therefore be targeted by prevention programs. However, to design effective preventive programs, it is necessary to identify which people within the broad sex–race groupings are most at risk for suicide. The identification of such risk factors can be achieved by different kinds of epidemiologic studies—generally case–control and cohort studies.

Identifying Risk Factors

In the previous section we examined adolescent suicide rates by age, sex, race and time. This descriptive approach can provide important information about which demographic groups are at highest risk and about trends in suicide rates over time. However, prevention of suicide requires that we have more detailed information about which adolescents are at high risk of suicide. Once risk factors for suicide are identified, it is possible to design interventions aimed at preventing suicide.

Epidemiologists can use cohort studies or case–control studies to identify risk factors. In a **cohort study**, persons with the study factor and persons without the study factor are followed over time to determine who develops the disease of interest. If the incidence of the disease is higher among those with the study factor than among those without the study factor, and if chance, bias and confounding can be excluded as explanations for the higher incidence, then we can conclude that the study factor is a risk factor for the disease. For example, we could follow a group of smokers and a group of nonsmokers over time to see who develops lung cancer. If it is found that smokers have a higher incidence of lung cancer than nonsmokers, and if chance, bias and confounding are excluded as possible explanations, then we could conclude that smoking is a risk factor for lung cancer. Cohort studies are usually an excellent way to study risk factors. However, it may be necessary to study large numbers of people and follow them over long periods of time, especially if the disease of interest is rare or has a long latent period.

Case–control studies can be done with a much smaller number of study participants and over a shorter period of time than cohort studies. In a **case-control study**, a group of persons with the disease of interest (cases) and a group of persons without the disease of interest (controls) are enrolled. For both cases and controls, information is obtained (by interview, questionnaire, medical record review, laboratory test or other method) about whether the person experienced the exposure in the past. For example, we could assemble a group of 300 persons with lung cancer and a group of 300 persons without lung cancer and question them about their past smoking history. If a history of cigarette smoking is more common among cases than among controls, and if chance, bias and confounding are excluded as possible explanations of the association, then we could conclude that smoking is a risk factor for lung cancer.

Both cohort studies and case–control studies have been used to study risk factors for adolescent suicide. In this section, we will examine in detail a case–control study by David A. Brent and collaborators, the results of which were published in 1999. In this study, the cases were 140 adolescents ages 13 to 19 who committed suicide in western Pennsylvania. There were 119 male and 21 female cases. There were 131 controls, persons in the same age group randomly selected from the community and matched to the cases on age, gender, race, county of origin and socioeconomic status. Of the controls 91 were male and 40 were female.

For the cases, information about possible risk factors was obtained by a method called **psychologic autopsy**. This method involves interviewing informants (parents, siblings and friends of the young people who committed suicide) to obtain information about possible risk factors. In this study, the informants were asked about stressors, current and past psychiatric illness, family history of psychiatric illness and availability of firearms. The controls and their parents were interviewed directly to obtain the same type of information. Selected results for males are shown in Table 3. Because there were many fewer females in this study, the results for females were not as reliable and so they are not shown here. However, on the whole, results for females were similar to those for males.

Table 3. Current Psychiatric Diagnoses and Stressors in Male Suicides and Controls

	Number of Subjects		Odds Ratio
	Suicides (n = 119)	Controls (n = 91)	
Mood Disorder	51	7	9
Anxiety Disorder	15	1	13
Substance Abuse	42	4	12
Conduct/Antisocial Disorder	41	6	7
Past Suicide Attempt	44	1	53
Conflict with Parents	40	12	3
Conflict with Boyfriend or Girlfriend	41	16	3
Loss of Boyfriend or Girlfriend	43	17	3
Legal or Disciplinary Problems	47	14	4
Lifetime Abuse	42	1	49
Nonintact Family	71	27	4

Table 3 indicates that 51 of the 119 males who committed suicide had a mood disorder at the time they committed suicide, whereas 7 of the 91 male controls had a mood disorder. With this information it is possible to construct a 2×2 (two-by-two) table, as below.

	Suicides	Controls
Mood Disorder	51 (a)	7 (b)
No Mood Disorder	68 (c)	84 (d)
Total	119	91

The odds ratio from this 2×2 table is equal to $\frac{a/c}{b/d}$, which is equal to $\frac{51/68}{7/84} = 9$. The odds

ratio, which is a way of summarizing the comparison between cases and controls, indicates that the odds of having a mood disorder was nine times as large among suicides as among controls. Results for the other risk factors can be interpreted in a similar fashion.

Question 15. Calculate the odds ratio for substance abuse. Explain in words the answer you get.

The odds ratio is equal to $\frac{a/c}{b/d}$, which is equal to $\frac{42/77}{4/87} = 11.9$. This indicates that the

odds of being a substance abuser was almost 12 times as large among suicides as among controls.

Question 16. Examine the results in Table 3. According to this study, what are the two strongest risk factors for suicide in males?

Having a prior suicide attempt is the strongest risk factor, with an odds ratio of 53. This result indicates that the odds of a previous suicide attempt was 53 times as large in males who committed suicide as in controls. Lifetime history of abuse was the second strongest risk factor, with an odds ratio of 49.

Question 17. In this study the investigators used the psychologic autopsy method for obtaining risk factor information about persons who committed suicide, and they used direct interview to obtain risk factor information about controls. Discuss the advantages and disadvantages of these data collection methods.

The advantage of the psychologic autopsy method is that it allowed the investigators to obtain retrospective information about the person who committed suicide. Without a method such as this, it would be impossible to obtain risk factor information, because the cases have committed suicide and are not able to answer questions about themselves. The method may be prone to bias, however. It may be that parents, siblings and friends are not able to validly report information about the stressors that the young person experienced in the time before his or her suicide. In addition there are possible problems with the direct interview of controls. For example, control subjects may have been unwilling to reveal personal or sensitive information to the interviewer. In general it is preferable to use the same data collection method for cases and controls. However, this is not possible in a case-control study of a condition like suicide, in which the cases are not available to provide risk factor information about themselves. To ensure comparability in such a situation would require collecting information about the control subjects from their family and friends.

Not all associations are causal associations. For example, we may observe that people who never or rarely eat oatmeal have a much higher risk of heart attacks than people who frequently eat oatmeal. We could then conclude that there is an association between oatmeal and heart attacks. However, we cannot conclude that not eating oatmeal *causes* you to be at higher risk of heart attacks. It may be that people who eat little oatmeal also exercise less than people who eat lots of oatmeal and that it is the exercise, not the oatmeal, that protects against heart attacks.

Question 18. Consider the association between substance abuse and suicide. Table 3 indicates that there is a strong association: The odds ratio of substance abuse was 12 times as high in males who committed suicide as in controls. Present at least one explanation for a causal association, and one explanation for a noncausal association, between substance abuse and suicide.

Causal explanation: Substance abuse may cause emotional or neurologic changes that lead people to commit suicide. Noncausal explanations: Both substance abuse and suicide are related to some other factor (e.g., depression) that is the cause of suicide. In that case depression would be said to confound the association of substance abuse and suicide. Adolescents who have suicidal feelings may be more likely to abuse drugs as a result of these feelings (reverse causality).

Question 19. If the association between substance abuse and adolescent suicide in males is not causal, will preventing substance abuse result in lower rates of suicide in males?

No. If A does not cause B, then removing A will not eliminate B. In epidemiologic terms, if confounding is the explanation for the association between a risk factor and an outcome (e.g., substance abuse and suicide), then intervening on the risk factor will have no effect on the outcome. Thus although substance abuse is highly associated with adolescent suicide, if this association is not causal, then providing treatment for substance abuse will not reduce the incidence of suicide.

The goal of identifying risk factors is to search for things that can be modified so that the negative outcome (in this case, suicide) can be prevented. For example, when smoking was identified as a risk factor for lung cancer, it was possible to encourage people to stop smoking (or never to start smoking) and in this way to prevent some people from getting lung cancer. In other situations risk factors are not modifiable, but they may be markers that indicate which people should be targeted for preventive interventions. For example, having fair skin is a risk factor for skin cancer. Although skin color is not modifiable, knowing that light-skinned people are at high risk may help target cancer prevention information to the groups who could benefit the most. Also, information about markers for high risk can help target screening programs appropriately.

Question 20. Suppose you are a public health program planner and you are considering the results of the study shown in Table 3. How would knowing about this risk factor help you design interventions to prevent suicide in male adolescents? Be sure to consider whether the risk factor is modifiable or whether it is a marker of high risk. For each risk factor, think of at least one intervention that could help prevent suicide in young males.

Mood disorders, anxiety disorders, substance abuse, and conduct or antisocial disorders are modifiable risk factors if they are detected and appropriately treated. Knowing that someone has a history of a past suicide attempt can be a powerful marker for high suicide risk. In fact many experts believe that suicide attempts can often be interpreted as cries for help. The other risk factors (conflict with parents or friends, loss of boyfriend or girlfriend, legal or disciplinary problems, current or past abuse and

nonintact family) are probably not modifiable in a public health approach, but they can be important markers for individuals at high risk of suicide.

Evaluating Primary Prevention Programs for Suicide

When health care professionals talk about the primary prevention of a disease, they are referring to measures that can be taken to prevent the illness in the first place. Primary prevention means what people can do to make themselves less susceptible, or at risk, for a particular illness. Getting a vaccine for measles, mumps and rubella would be an example of a primary prevention measure against these three infectious illnesses. Eating a diet low in fat and cholesterol and exercising regularly would be examples of primary prevention measures against heart disease.

Primary prevention strategies can be designed to target the individual, a whole population or both. A mass media campaign involving radio and television advertisements to promote condom use would be an example of a primary prevention strategy that would target the population, and HIV counseling for someone who is not HIV positive would be an example of primary prevention that is targeted to an individual. Primary prevention is applied to those who do not have the disease to begin with.

To combat the public health problem of suicide, many suicide prevention programs have been developed to decrease the number of cases of suicide and suicide attempts. Primary prevention strategies have been implemented to prevent suicide and attempted suicide. Examples include lessons taught by a health teacher in school, suicide prevention workshops offered in school or at a youth center, and a suicide prevention hotline. Programs designed to reduce stressors for adolescents or find companions for the elderly could also be considered intervention programs to prevent suicide, because stress and loneliness are factors that could put one at higher risk for committing suicide. Some of these programs have been evaluated to determine if they are effective; however, there has not been a great deal of research. Below are some examples of primary prevention strategies that were intended to reduce the number of adolescent suicides.

- Identification of risk factors (e.g., clinical depression, stressors)
 - Many of these risk factors are related to each other.
- Restricted access to suicide tools
- Detection and treatment of psychiatric disorders associated with suicide
- Immediate psychologic assessment of adolescents expressing suicidal intent
- Increased suicide awareness and prevention training for primary health care providers
- Peer-group interventions and increased suicide-related education
- Increased family and adult suicide education
- Increased access to public support services and public awareness

Primary prevention programs can be divided into nonclinical interventions and clinical interventions. Nonclinical interventions involve educational strategies and peer intervention programs, whereas clinical interventions usually involve counseling from a psychiatrist, psychologist or other trained mental health professional. The next part of this lesson will discuss research that has been done to evaluate these different types of programs.

Nonclinical Interventions

School-based suicide awareness programs and crisis intervention services such as crisis hotlines are common examples of nonmedical suicide prevention programs. Crisis hotlines have not been found to be very effective, although they are somewhat effective with young white women, who are more likely than other demographic groups to use these hotlines. Research has not confirmed why this demographic group is more likely to use crisis hotlines. Experts, however, do believe that these crisis hotlines are helpful in reaching out to individuals who are not reached by traditional mental health professionals. The philosophy behind these programs is to provide interpersonal communication for someone who does not know where else to turn.

Another type of primary prevention strategy is suicide education programs that are offered in schools or youth centers. The objectives of these programs are to raise awareness of the problem of adolescent suicide, train participants to identify peers who may be at risk for suicide and educate participants about community resources that are available for mental health. Overall, research has shown that school-based interventions have not been very successful in reaching their goals. However, the research that has been done to evaluate these programs is somewhat limited. Mental health professionals agree that more research is needed to accurately evaluate the effectiveness of these programs.

One study evaluated a suicide prevention program that lasted six weeks. Researchers compared 300 students who attended the program with 200 students in the same geographic area who did not attend the program, and the study found that students who went through these programs had only a slight increase in knowledge of suicidal symptoms but did not express a change in attitude toward suicide. The study found that girls who participated in the program had better attendance than boys, and girls were more likely than boys to have an increase in knowledge of suicide. A similar study done by the same researchers also found that boys were more likely than girls to express hopelessness and inability to cope after participating in these programs.

A similar study done in New Jersey was conducted to evaluate a three-hour suicide prevention program that was being run by mental health professionals and educators. In this study 1,000 students who participated in the program were compared with 1,000 students who did not participate. Most students found the program to be helpful and reported that they were more likely to seek help from a mental health professional, for either themselves or someone else, after attending the program. However, only 41% of the participants reported that the program was interesting. A small portion of the participants even reported that suicide can be a possible option for resolving problems they might have and that suicidal confessions from friends should

never be disclosed to others. Females, as in the other study, and people of color were more likely than white males to rate the program favorably.

Question 21. On the basis of experiences that you may have had in health class or elsewhere, why do you think suicide education programs have not been found to be effective?

This is a very open-ended and subjective question that can have many answers. Students are asked to share their experiences with the class about their reactions to the suicide education programs they may have received while in school and other institutions for adolescents.

Question 22. Evaluations of both crisis intervention programs and school-based programs found that these programs affect people of different sexes and races differently. What are some reasons that may account for these differences?

Socialization of males and females in society is still very different, so boys and girls may react differently to a given situation. Cultural norms may cause people of different racial and ethnic groups to react differently to a situation.

Naturally the effectiveness of suicide prevention programs should not be based on just two studies. More studies are certainly needed to draw final conclusions. However, critics of these programs claim that the public health professionals who developed these suicide education programs did not adequately incorporate findings from previous research. Researchers who evaluated these programs infer that the problem with these school-based programs is that they do not discuss mental disorders, such as depression and anxiety disorders, as a link to suicide. Instead these programs tend to emphasize stressors that may trigger one to contemplate and attempt suicide.

Question 23. Why do you think these programs emphasize stress as a risk factor when the research shows that depression and other forms of mental illness are stronger risk factors for suicide? What are some potential negative effects that can result from programs that focus too much on stress as a risk factor for suicide?

Many of these programs focus more on stress as a risk factor, as opposed to mental disorders such as depression, because they are trying to remove the stigma of suicide by making students feel that it is something that can happen to anyone. Many program developers thought that this approach may make it easier to get teens to talk about the issue.

The downside to implementing a strategy such as this is that students may think suicide really is something that can happen to anyone. This may result in overreporting of students with suicidal thoughts. Some researchers fear that it may even cause some adolescents to view suicide as a viable solution for their problems.

Another criticism of programs such as these is that they are offered in school and therefore do not target adolescents who are incarcerated or have dropped out of school. Adolescents of these groups are on average more likely to commit suicide.

Some school-based programs, however, have reported successful results in increasing knowledge and changing attitudes about suicide. These programs were based on evaluating a group of teens who were prone to suicide and suicide attempts and having them go through assessment sessions. Another group of teens went through these assessment sessions and were also placed in classes that dealt with issues of personal growth and self-esteem. The assessment sessions alone were found to be effective in reducing suicide risk behaviors, depression, hopelessness, stress and anger. The classes were also effective in increasing self-esteem and developing a social support system. The question remains whether change in attitude and increased knowledge will really decrease the number of suicides.

The bottom line is that any public program that is developed should be based on sound research. Programs based on good intentions alone not only may be a waste of money, time and resources but also may cause unintended negative effects.

Another nonmedical strategy is limiting access to tools that allow one to attempt suicide. Gun control, for example, could be considered a primary prevention strategy because guns are the primary tool used by adolescents for suicide. Although restriction of guns does not change an individual's intent to commit suicide, it does decrease the opportunity for that person to do so. The evidence at this point is limited and somewhat contradictory. The suicide rate is lower in states with stricter gun control laws. On a related note, suicide deaths from carbon monoxide poisoning in the United States and the United Kingdom decreased when the technology in automobiles and oil refineries improved to reduce carbon monoxide emissions. However, the adolescent suicide rate in Finland continues to grow at the same rate as that of the United States, and Finland has very strict gun control laws. The current consensus on this issue is that gun control should not be the primary strategy to prevent suicides, but it can help reduce the number of suicides.

In addition to limiting access to suicide tools, some argue that there should be restrictions on information that may encourage an adolescent to consider suicide. Some controversial pieces of literature that give instructions on how to commit suicide have been published. Other health professionals blame the media for sensationalizing stories of suicide, particularly of adolescents, and argue that these stories of suicide may influence other adolescents to commit suicide. Many public health professionals believe that these sensationalist stories have contributed to the suicide clusters that have been observed. Mental health professionals do not advocate complete censorship of these stories, but they do advise reporters to be more responsible when reporting such stories.

Question 24. What are your views on this issue? What are some legal or constitutional issues related to controlling the public distribution of this kind of literary material? Are there certain institutions or facilities where this type of literature should be controlled, maybe even banned?

This is another open-ended and subjective question that can elicit a variety of answers. The question involves the age-old debate between an individual's personal liberties and protecting the health and safety of other lives. Limiting certain types of

literature would be considered censorship. However, many would agree that reporters should be socially responsible with how they present certain stories. The challenge is how this should be regulated without imposing on reporters' rights and professionalism. It could also be argued that there should be some limitation on literature made available to populations who are considered more vulnerable—for example, an institution that has many patients who are suicidal. The question centers on how much regulation there should be.

Clinical Interventions

Psychotherapy has been found to be effective in reducing the incidence of suicide in people identified as being at risk for suicide. The logic is that stress and mental disorders, particularly clinical depression, are associated with suicide attempts and completed suicides. Psychotherapy also gives people the coping skills to deal with everyday environmental stressors that may trigger them to consider suicide as an option for escaping from their problems. However, not all types of psychotherapy have shown effectiveness.

Researchers found that a two-week outpatient program designed to help adolescents improve their coping and adaptive skills and problem-solving skills did not yield very promising results. Researchers who evaluated more intensive long-term programs have reported these programs to be more successful than the short-term interventions. One program that was studied was developed for preteens, and this program had a multiyear follow-up. Another program was a three-month program that treated teens. Both of these programs were found to be effective.

Psychotherapy also treats patients who are clinically depressed, are drug abusers or have made previous suicide attempts. All of these factors are associated with suicide deaths. Mental health experts believe that if one treats the underlying cause, then one can help prevent suicide. One problem with this strategy is that experts are not really sure whether drug abuse and clinical depression are truly causes of suicide deaths. Although there is a strong association between suicide and both drug abuse and clinical depression, it is not clear whether this association is a causal one.

Question 25. What are some potential problems with a suicide intervention program that focuses primarily on substance abuse issues?

Researchers have found a correlation between drug abuse and suicide, but they have not concluded whether substance abuse is a cause of suicide attempts. It could be that adolescents who are already suicidal turn to substance abuse. Furthermore, focusing on substance abuse may be a good way to screen for some teens who may be suicidal, but it does not deal with the many suicidal teens who do not abuse substances.

In the case of clinical depression, it has been found that suicide intervention programs that focus on alleviating general depression symptoms rather than on decreasing suicidal intent are successful. These studies suggest that depression continues to be an important risk factor to look for when identifying and treating suicidal individuals. However, depression was found to be more strongly correlated with suicide attempts than with actual suicide deaths. Not all individuals who attempt suicide actually want to complete it, and not all patients who are diagnosed with depression have suicidal intentions. Suicide attempters, however, still require counseling from highly trained mental health professionals. Even though some suicide attempters do not want to die, previous suicide attempts are still the most reliable predictor of suicide.

Question 26. Why is it that some people who attempt suicide do not necessarily want to die?

Some individuals attempt suicide as a means to cry for help. Either these individuals do not know how to express their feelings in a way that can be heard effectively by others or they do not know where to turn, which is why many of them choose ways of killing themselves that are not as effective (sleeping pills, slitting of the wrist, etc.) Suicide attempts become a way for them to express their need to reach out to someone who will listen and help.

This explanation, however, does not apply to everyone who attempts a suicide but does not complete it. The research shows that a previous suicide attempt is the best predictor for future suicide completion. Simply, those who have tried to commit suicide before are very likely to try again, and the next time these individuals try, they may actually complete it. Anyone who has attempted a suicide should receive immediate counseling and therapy to prevent another attempt.

Screening for Teens Who May Be Suicidal

In addition to primary prevention strategies, public health professionals also implement secondary prevention strategies to combat a public health problem. Secondary prevention involves detecting an illness at an early stage, often before the individual is aware of it. Screening, which tests individuals for a particular disease that may pose a public health threat, is a very important part of secondary prevention. Screening for infectious diseases allows health care professionals to treat the identified cases and prevent those who have the disease from spreading it to those who do not.

Screening procedures have been used to identify individuals who are suicidal. The purpose of these screening programs is to identify adolescents who have had thoughts of suicide and refer them immediately to a qualified mental health professional. Screening finds those adolescents who have some of the common risk factors associated with suicide.

Question 27. Why is trying to identify someone who is suicidal much more difficult than diagnosing diseases such as diabetes, heart disease or tuberculosis? What do you think a screening test for suicide could be based on?

Unlike for many illnesses that have physical causes, for suicide there is no concrete diagnostic tool based on a medical procedure, device or laboratory test. Screening involves looking for signs and symptoms in someone who may be suicidal. These symptoms can also be symptoms of illnesses other than suicide, and not everyone will pick up on them. The screening procedure for identifying someone who is suicidal is much more subjective.

Question 28. Based on what has already been discussed about suicide, what are some risk factors that educators or health care professionals could look for in a student who may be considered suicidal?

Some factors to look for are depression, anxiety disorders and history of substance abuse. Not every student with these risk factors is suicidal, but one is more likely to identify suicidal teens among those who have these characteristics.

Many schools have adopted school-based screening programs that seek to identify teens who may be suicidal and require referral to a mental health professional. The American Academy of Child and Adolescent Psychiatry (AACAP) recommends looking for certain indicators that may cause a student to be referred for mental health evaluation. These symptoms do not necessarily mean a student is suicidal, but their presence may justify referral to a mental health professional. Table 4 gives a list of these indicators, which may be early warning signs of suicidal thoughts.

Table 4. Indicators for Referral to Mental Health Professionals

- Changed eating habits
 - Social withdrawal
 - Unusual violent and rebellious activity, including running away
 - Substance abuse
 - Atypical neglect of personal appearance
 - Dramatic changes in personality or affect
 - Boredom, difficulty in concentrating, poor and declining school performance
 - Complaints of illness (e.g., headaches, fatigue, stomachaches)
 - Anomie or hopelessness
 - Inability to tolerate praise
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Question 29. How would the suicide education programs for students mentioned previously be considered a secondary prevention strategy as well as a primary prevention strategy?

One objective of these suicide education programs is not only to encourage students who need or want counseling to seek it but also to identify any of their peers who may be exhibiting symptoms of being suicidal. Because students are being taught to look for such symptoms and therefore make a referral, this could be considered a type of screening measure.

Although research has not supported the effectiveness of suicide education for teens, research has found that suicide education programs for educators and health care professionals does increase the knowledge of suicide and of warning signs of suicide. AACAP has suggested signs that may occur when someone is actually planning to commit suicide. Table 5 gives some of these signs.

Table 5. Signs of a Decision to Commit Suicide

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- Preoccupation with suicide or death
 - Verbal hints or statements suggesting despair or imminent departure
 - Complaints of being “rotten inside”
 - Distribution or discarding of favorite possessions, cleaning room or putting affairs in order
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Not all individuals who decide to commit suicide will exhibit these characteristics, but these are helpful signs and symptoms to look for. Other predictors are some of the risk factors mentioned before. There is a strong correlation between depression and suicide completion, although the correlation is stronger for suicide attempts. Research shows that a history of previous suicide attempts is the best predictor for a suicide attempt, even though not every suicide attempter necessarily wants to die.

Conclusion

This lesson is an example of how public health professionals deal with a particular public health problem that is emerging or already exists. Descriptive epidemiologic research is first done to understand how the problem affects different segments of the population. Analytic epidemiology helps researchers look for possible cause-and-effect relationships, which is the second part of epidemiologic research. Once cause-and-effect relationships are determined from a substantial amount of research, public health professionals can develop programs that will help prevent future

occurrences, or incidence, of the disease. Primary prevention programs are developed to prevent individuals from getting the illness to begin with, and secondary prevention programs are designed to identify individuals who have the illness so that they can be treated immediately.

Suicide is only one example of how public health professionals develop public health intervention programs. These programs should be based on sound research, but some of the examples used in this lesson demonstrate that this is not always the case. Epidemiologic research, however, does play a vital role in developing public health intervention programs.

Assignment

Write a report about the suicide prevention programs that are being used in your school. Your report should contain both a description and an analysis of the program. Include information on the curriculum that is taught in your health education classes, any possible partnerships your school may have with a youth organization or mental health facility for adolescents, or a peer training program that your school may have. Discuss how students are referred to mental health professionals because of possible suicidal thoughts.

Using the information that you collect, write an evaluation of the program. This evaluation should be based on what you have learned about suicide as a public health problem and the research that has been done so far about suicide, particularly the research that evaluates suicide prevention strategies. With the information gathered from your research, discuss the validity of this prevention program. Is the program based on previous research, or is it a program that has only good intentions? Do the philosophy and the logic behind the program make sense? These are questions you should be asking yourself when you are writing this evaluation.

Finally, your evaluation should include suggestions and recommendations that can be made to improve the suicide education and prevention programs in your school. Your suggestions should be based on what you have learned from this lesson, as well as additional readings on suicide and suicide prevention programs. An assignment such as this not only helps you increase your awareness of a public health problem like suicide but also enhances your understanding of how school policies are developed.

In this assignment students are asked to find out what type of policies their school implements for suicide prevention, including what type of referral system the school has for teachers and guidance counselors, what affiliations the school has with mental health institutions, and what curriculum on suicide and suicide prevention is taught in health class. This is assuming, of course, that their school has a suicide prevention program.

Students can obtain relevant information by interviewing a teacher or health professional who is familiar with the school's suicide prevention program. Another option is

to invite a knowledgeable teacher or health professional to present the suicide prevention program to the class.

Students will have the opportunity to evaluate the suicide prevention program that exists in their school by applying what they have learned from this lesson. The evaluation should discuss many of the risk factors associated with suicide. It should also deal with the research that has been done on suicide and suicide prevention, which includes programs that were found to be effective as well as those not found to be effective. If the students' school does not have a suicide prevention program or is lacking a particular component of the suicide prevention program such as primary prevention, students can create an outline that will help develop this program.

Students should work in groups of three to five for this report, because the assignment can be an extensive one. Students should also do additional reading about the subject of suicide and suicide prevention. The CDC, for example, has ample information on their Web site, available at www.cdc.gov.