Measuring Adolescent Behaviors Related to Intentional Injuries

PATRICK W. O'CARROLL, MD
YOSSI HAREL, PhD
RICHARD J. WAXWEILER, PhD

Dr. O'Carroll is Deputy Chief, Public Health Information Systems Branch, Information Resources Management Office, Centers for Disease Control and Prevention (CDC), Atlanta, GA. Dr. Harel is Professor, Department of Sociology, Bar Ilan University, Ramat Gan, Israel. Dr. Waxweiler is Special Assistant for Scientific Affairs, National Center for Injury Prevention and Control, CDC, Atlanta.

BY ANY TRADITIONAL MEASURE of public health importance, intentional injuries (injuries resulting from interpersonal violence including homicide or self-directed violence including suicide) are among the most important public health problems facing our nation. In 1985, the direct and indirect costs of deaths and hospitalizations resulting from intentional injuries were estimated to be $26 billion (1).

Victimization from intentional injuries is often a powerful indicator of risk for future victimization. Violence among family members or intimates is known to occur repeatedly (2,3). Exposure to interpersonal violence early in life can increase risk of violence later in life. Child abuse victims are at increased risk of behaving violently toward others and committing violent crimes (4,5). Adults who witness violence in their family as children are at increased risk for perpetration of physical abuse against, and for victimization from physical abuse by, their spouses or intimates (6,7). Attempted suicide is one of the strongest indicators of risk for death from a future suicide attempt (8-10).

Like many other public health problems, mortality and morbidity from interpersonal and self-directed violence can be reduced by decreasing the prevalence of related risk behaviors. Current information about the incidence and prevalence of the most important risk behaviors is needed to identify groups at high risk of intentional injuries, to develop interventions to decrease the incidence of related risk behaviors, and to evaluate the effectiveness of those interventions (11).

This paper describes the development of questions related to intentional injuries for the Youth Risk Behavior Surveillance System (YRBSS) questionnaire. The YRBSS Panel participants (see Appendix I, page 56) first identified the leading causes of mortality and morbidity associated with intentional injuries. Guided by national health objectives for the year 2000 (11), we developed questions that would elicit information on priority behaviors related to intentional injuries among adolescents.

Mortality from Intentional Injuries

Intentional injuries account for more than one-third of all injury-related deaths. Among youth, intentional injuries exact a disproportionately high toll, and the problem appears to be worsening (11).

Suicide is the eighth leading cause of death, accounting for 30,407 deaths in 1988 (12). Each year, suicide contributes to more than 640,000 years of potential life lost (YPLL), making suicide the fifth leading cause of premature death overall (13). Between 1950 to 1989, rates of suicide among adolescents 15–19 years of age have quadrupled, from 2.7 to 11.1 per 100,000 (14, and unpublished data on detailed mortality tapes from the National Center for Health Statistics). Suicide is the third leading cause of death among 15- to 24-year-olds (15).

In 1988, 22,032 people died from homicide, making it the twelfth leading cause of death (12). Homicide is the sixth leading cause of premature death, contributing to more than 600,000 YPLL before age 65 (13), and the leading cause of death among both black males and black females 15 to 34 years of age (15).

Homicide rates are disproportionately high among adolescents and young adults. During adolescence, homicide rates increase by a factor of 15, from 0.9 per 100,000 at age 10 to 13.9 per 100,000 by age 20 (16). Among young black males, in particular, homicide rates have increased sharply in recent years (17).

Morbidity from Intentional Injuries

In 1989, among persons ages 12 and older, an estimated 1.4 million assaults occurred that resulted in nonfatal injuries (18). Rates of injury from violent and abusive behavior were highest for males, blacks, people ages 19–24, people who were separated or divorced, people earning less than $10,000 per year, and residents of central cities (19).

Substantial numbers of people are permanently dis-

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abled as a result of injuries caused by violent behavior. More than 25 percent of the nation's 10,000 to 15,000 annual spinal cord injuries are caused by assaultive violence. The proportion of permanent disabling injuries that results from violent behavior varies by geographic location and among population subgroups (19).

Head and spinal cord injuries result in the most significant long-term physical, neurological, and psychosocial disabilities. Each year, between 10,000 and 20,000 persons sustain spinal cord injuries, resulting in estimated lifetime costs for medical treatment of $200,000 to $750,000 (20). Further, about 300,000 persons survive a head injury serious enough to result in hospitalization, including almost 80,000 persons with moderate to very severe trauma. Overall, 15- to 24-year-olds are at highest risk for head and spinal cord injuries.

An estimated 1.6 million children experience some form of abuse or neglect. Physical abuse, followed by emotional and sexual abuse, accounts for the greatest proportion of abuse incidents (21). Rates of physical abuse tend to be highest among older children and young adolescents, 5 to 14 years of age (22).

Many more nonfatal than fatal physical injuries occur from suicidal behaviors (23). In a large, population-based survey of adults, 3.0 percent of respondents reported having attempted suicide at some time in their lives (24), and 0.3 percent reported having attempted suicide in the preceding year (25). These percentages represent more than half a million adult suicide attempts each year.

Psychological trauma also may result from intentional injuries. "Survivors" of suicide—relatives and friends of those who have died from suicide—are at increased risk of suffering disturbed and prolonged grief reactions. Survivors of suicide often feel guilt about the deceased. Because of the social stigma associated with suicide, survivors may experience less social support than survivors of persons dying from other causes (26). Victims of interpersonal violence also suffer long-term psychological effects (27,28).

National Health Objectives

The National Health Objectives measured by the Youth Risk Behavior Surveillance System are given in Appendix III, page 67. Eleven of the objectives for the year 2000 presented in "Healthy People 2000" (11) are relevant to intentional injuries among adolescents. These objectives helped guide our selection of priority health outcomes and behaviors.

Among the health status objectives, objectives 7.1 and 7.2 call for reducing the incidence of homicides and suicides, respectively. Goals are specified for several subpopulations of adolescents. Other health status objectives relevant to intentional injuries among adolescents call for reducing the incidence of weapon-related violent deaths (objective 7.3), maltreatment of children younger than age 18 (objective 7.4), assault injuries among people ages 12 and older (objective 7.6), rape and attempted rape of females ages 12 and older (objective 7.7), and injurious suicide attempts among adolescents ages 14–17 (objectives 6.2 and 7.8).

Among the risk reduction objectives, objective 7.9 calls for reducing the incidence of physical fighting among adolescents ages 14–17. Objective 7.10 calls for reducing the incidence of weapon carrying by adolescents ages 14–17. Objective 7.11 calls for reducing the proportion of people who possess weapons that are stored inappropriately. Although a specific objective for adolescents is not identified, the rationale for this objective notes that parents can help reduce their children's immediate access to loaded firearms by locking away their weapons and ammunition.

Objective 7.16 calls for an increase in the proportion of elementary and secondary schools that teach nonviolent conflict resolution skills, preferably as part of quality school health education.

Priority Health Behaviors

To focus our development of YRBSS questions related to intentional injuries, we identified relevant risk behaviors and selected the following as the five highest priority behaviors: weapon carrying, physical fighting, attempted suicide, group violence, and instrumental violence. We based our decisions on health outcome data, intervention potential, availability of other sources of information, estimated prevalence of the behavior, and relevance to national health objectives (11). In particular, weapon carrying, physical fighting, or both, are associated with the most serious injuries from interpersonal violence in adolescence, and attempted suicide is by definition a necessary risk behavior for self-directed intentional injury.

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related violent deaths (11). Weapon carrying may increase significantly the risk that a violent argument will result in death, disability, or other serious injury. The immediate accessibility of a firearm or other lethal weapon may be the factor that turns a violent altercation into a lethal event (29,30).

Physical fighting among adolescents sometimes is considered a normal part of growing up. However, physical fighting is a prominent cause of injuries and homicides in this age group (31).

Attempted suicide is a potentially lethal health event, a risk factor for future completed suicide, and a potential indicator of other health problems such as substance abuse, depression, or adjustment and stress reactions (32). Thus, although the incidence of attempted suicide may be monitored as an important health outcome in itself, attempted suicide also may be considered a key risk behavior, necessarily on the causal pathway of each incident of completed suicide.

Gang violence has been publicized widely in the media. Some adolescents believe that joining gangs will be helpful for self-protection because group members assist and protect those involved in physical fights. However, gang members are at considerable risk of both perpetrating and being the victim of violent altercations.

We defined instrumental violence as physical violence deliberately used to accomplish a specific goal, such as hitting a spouse to exert control in a marriage or using violence to control "territory" for selling illegal drugs. Patterns of instrumental violence established during adolescence may become lifelong patterns resulting in repeated episodes of violence and injuries.

YRBSS Questions

We developed nine questions to measure priority behaviors related to intentional injuries. (See Appendix II, Youth Risk Behavior Surveillance System Questionnaire for the specific questions, page 60). Weapon carrying is measured with two questions. One question (No. 14) addresses frequency of any type of weapon carrying. This question can be used to measure objective 7.10 (11). The other question (No. 15) measures how often a gun is carried. A "30-day" recall period was selected for both questions to provide a current measure of these behaviors.

Three questions were developed to measure physical fighting. One question (No. 17) addresses with whom respondents fight. The question refers only to the last physical fight, since over time respondents may fight with different persons. The other two questions (No. 16 and No. 18) measure the frequency of physical fights and of physical fights that result in serious injury. A 12-month recall period was selected to obtain current measures of physical fighting. These two questions can be used to measure objective 7.9 (11). To provide information for designing specific preventive interventions, all three questions were designed to focus on situations that result in mutual fighting, not on physical attacks on someone for revenge or robbery.

Attempted suicide is measured with four questions. In the past, most prevalence estimates of suicidal behavior among adolescents have been based on responses to questions about ever having attempted suicide. Few studies have tried to either quantify the health impact of an adolescent's self-reported suicide attempt or determine whether an adolescent's perception of a suicide attempt includes overt injury or other sequelae. As a result, lifetime prevalence estimates of attempted suicide among adolescents are less clear and less consistent than those among adults. For example, some estimates for adolescents are higher than those for adults, ranging from about 9 percent (33,34) to 14 percent (35), and younger adolescents have reported higher levels of lifetime suicide attempts than older adolescents (34). Among adolescents and young adults, most self-reported suicide attempts probably do not result in injury or hospitalization (33,36,37).

To eliminate some of these inconsistencies between rates of attempted suicide among adolescents and adults, the four YRBSS questions on attempted suicide are patterned after structured interview questions conducted by researchers investigating adult suicide (38,39). The wording and structure of the questions were modified slightly to make them more appropriate for adolescents and for a self-administered questionnaire, while still permitting comparison of results. The questions are interdependent and ordered to help adolescents distinguish among suicidal thoughts (No. 19), suicide plans (No. 20), attempted suicide (No. 21), and injurious outcomes from attempted suicide (No. 22). The question on injurious attempts can be used to measure objectives 6.2 and 7.8 (11). A 12-month recall period was selected for all four questions.

Since only a limited number of questions on behaviors related to intentional injuries could be included in the YRBSS questionnaire, we could not measure two other priority behaviors—group violence and instrumental violence. We also could not measure the use of weapons in fights, ownership of weapons, accessibility of weapons, weapon carrying by friends, and the specific nature and severity of injurious suicide attempts.

Discussion

Injuries related to interpersonal violence and suicidal behavior are among the most common and tragic health problems that occur among adolescents. Even adoles-

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cents who are not touched directly by interpersonal violence are affected by the threat of such violence. The quality of life is obviously diminished in a society where fear for one's personal safety is considered an inevitable, if intermittent, part of daily living.

Surprisingly, little information is available about behaviors that result in intentional injuries. The YRBSS is the first surveillance system to monitor periodically priority behaviors related to intentional injuries among national, State, and local samples of adolescents. The system provides an opportunity to examine the relationship between these behaviors and other categories of risk behaviors. The YRBSS also will serve as the primary data source for monitoring four national health objectives related to intentional injuries (11).

Community- and school-based interventions designed to reduce the prevalence of physical fighting, weapon carrying, attempted suicide, and other priority behaviors related to intentional injuries among adolescents may help prevent such injuries. The cornerstones identified for achieving intentional injury-related national health objectives for the year 2000 (11) include increasing the percentage of elementary and secondary schools that teach nonviolent conflict resolution skills, preferably as a part of quality school health education; increasing referrals of high-risk adolescents to appropriate mental health services; and increasing comprehensive violence prevention programs throughout the nation.

References

1. Rice, D. P., and MacKenzie, E. J., Associates: Cost of injury in the United States: a report to Congress. Institute for Health and Aging, University of California, and Injury Prevention Center, Johns Hopkins University, San Francisco, CA, 1989.
2. Straus, M. A., and Gelles, R. J.: Societal change and change in family violence from 1975 to 1985 as revealed by two national surveys. J Marriage Fam 48: 465–479 (1986).
3. Gelles, R. J., and Straus, M. A.: Intimate violence: the definitive study of the causes and consequences of abuse in the American family. Simon and Schuster, New York, NY, 1988.
4. George, C., and Main, M.: Social interactions of young abused children: approach, avoidance, and aggression. Child Dev 50: 306–318 (1979).
5. Widom, C. S.: The cycle of violence. Science 244: 160–166, Apr. 14, 1989.
6. Hotaling, G. T., and Sugarman, D. B.: An analysis of risk markers in husband-to-wife violence: the current state of knowledge. Violence Vict 1: 101–124 (1986).
7. Jaffe, P., Wolfe, D., Wilson, S., and Zak, L.: Similarities in behav ioral and social maladjustment among child victims and witnesses to family violence. Am J Orthopsychiatry 56: 142–146 (1986).
8. Buglass, C. D., and Horton, J.: The repetition of parasuicide: a comparison of three cohorts. Br J Psychiatry 125: 168-174 (1974).
9. Roy, A.: Risk factors for suicide in psychiatric patients. Arch Gen Psychiatry 39: 1089-1095 (1982).
10. Pokorny, A. D.: Prediction of suicide in psychiatric patients: report of a prospective study. Arch Gen Psychiatry 40: 249-257 (1983).
11. Public Health Service: Healthy People 2000: national health pro motion and disease prevention objectives—full report, with commen tary. DHHS Publication No. (PHS) 91-50212, U.S. Department of Health and Human Services, Washington, DC, 1991.
12. Public Health Service: Advance report of final mortality statistics, 1988. Monthly Vital Statistics Report 39 (supp.), National Center For Health Statistics, Hyattsville, MD, 1990.
13. Premature mortality due to homicide and suicide—United States, 1984. MMWR Morb Mortal Wkly Rep 36: 531–534, Aug. 21, 1987.
14 Centers for Disease Control: Youth suicide in the United States, 1970–1980. Atlanta, GA, 1986.
15. Hammett, M., Powell, K. E., O'Carroll, P. W., and Clanton, S. T.: Homicide surveillance—United States, 1979-1988. MMWR Morb Mortal Wkly Rep 41 (SS–3): 1-33, May 29, 1992.
16. O'Carroll, P. W., and Smith, J. A.: Suicide and homicide. *In* Maternal and child health practices, edited by H. M. Wallace, G. Ryan, and A. C. Oglesby. Third Party Publishing, Oakland, CA, 1988, pp. 583–597.
17. Homicide among young black males—United States, 1978–1987. MMWR Morb Mortal Wkly Rep 39: 869-873, Dec. 7, 1990.
18. U.S. Department of Justice: Criminal victimization 1989. Bureau of Justice Statistics Bulletin, 1990. Publication No. NCJ–125615, Washington, DC, 1990.
19. Harlow, C. W.: Injuries from crime. U.S. Department of Justice, Washington, DC, 1989.
20. Institute of Medicine: Disability in America: toward a national agenda for prevention, edited by A. M. Pope and A. R. Tarlov. National Academy Press, Washington, DC, 1991.
21. Westat, Inc.: Study findings: study of national incidence of child abuse and neglect. U.S. Department of Health and Human Services, Washington, DC, 1988.
22. Froehlke, R. G., et al.: The epidemiology of child abuse in Georgia, January 1987 through June 1989. Presented at the 1991 Epidemic Intelligence Service Conference, Atlanta, GA, Apr. 8, 1991.
23. Attempted suicide among high school students—United States, 1990. MMWR Morb Mortal Wkly Rep 40: 633–635, Sept. 20, 1991.
24. Moscicki, E. K., et al.: Suicide attempts in the EpidemiologicCatchment Area Study. Yale J Biol Med 61: 259–268 (1988).
25. Moscicki, E. K., et al.: Suicidal ideation and attempts: the Epidemiologic Catchment Area Study. *In* Report of the Secretary's Task Force on Youth Suicide. Vol. 4. Strategies for the prevention of youth suicide. Alcohol, Drug Abuse, and Mental Health Administration, DHHS Publication No. (ADM) 89–1622, Washington, DC, 1989, pp. 115–128.
26. Hauser, M. J.: Special aspects of grief after a suicide. *In* Suicide and its aftermath: understanding and counseling the survivors, edited by E. J. Dunne, J. L. McIntosh, and K. Dunne-Maxim. W. W. Norton and Company, New York, NY, 1987, pp. 57–70.
27. Newberger, E. H.: Child abuse. *In* Violence in America, edited by M. L. Rosenberg and M. A. Fenley. Oxford University Press, New York, NY, 1991, pp. 51–78.
28. Stark, E., and Flitcraft, A. H.: Spouse abuse. *In* Violence in America,

edited by M. L. Rosenberg and M. A. Fenley. Oxford University Press, New York, NY, 1991, pp. 123–157.
29. Sloan, J. H., et al.: Handgun regulations, crime, assaults, and homicide: a tale of two cities. N Engl J Med 319: 1256–1262, Nov. 10, 1988.
30. Loftin, C., McDowall, D., Wiersema, B., and Cottrey, T. J.: Effects of restrictive licensing of handguns on homicide and suicide in the District of Columbia. N Engl J Med 325: 1615–1620, Dec. 5, 1991.
31. University of Los Angeles at California and Centers for Disease Control: The epidemiology of homicides in the City of Los Angeles, 1970–79. Centers for Disease Control, Atlanta, GA, 1985.
32. Alcohol, Drug Abuse, and Mental Health Administration: Report of the Secretary's Task Force on Youth Suicide. DHHS Publication No. (ADM) 89–1621–4, Washington, DC, 1989.
33. Smith, K., and Crawford, C.: Suicidal behavior among "normal" high school students. Suicide Life-Threat Behav 16: 313–325 (1986).
34. Harkavy Friedman, J. M., Asnis, G. M., Boeck, M., and DiFiore, J.: Prevalence of specific suicidal behaviors in a high school sample. Am J Psychiatry 144: 1203–1206 (1987).
35. American School Health Association, Association for the Advance ment of Health Education, and Society for Public Health Education, Inc.: The National Adolescent Student Health Survey: a report on the health of America's youth. Third Party Publishing Company, Oakland, CA, 1989, p. 31.
36. O'Carroll, P. W.: An investigation of a cluster of suicide attempts. *In* Proceedings of the 20th Annual Conference of the American Association of Suicidology, edited by R. I. Yufit. American Associa tion of Suicidology, Denver, CO, 1988, pp. 262–264.
37. Meehan, P. J., Lamb, J. A., Saltzman, L. E., and O'Carroll, P. W.: Attempted suicide among young adults: progress toward a meaning ful estimate of prevalence. Am J Psychiatry 149: 41–44 (1992).
38. Paykel, E. S., Myers, J. K., Lindenthal, J. J., and Tanner, J.: Suicidal feelings in the general population: a prevalence study. Br J Psychia try 124: 460–469 (1974).
39. Ramsay, R., and Bagley, C.: The prevalence of suicidal behaviors, attitudes, and associated social experiences in an urban population. Suicide Life-Threat Behav 15: 151–167 (1985).