

## **ThinkFirst For Teens Injury Prevention Program: Evidence-Based Practice—Are We Making a Difference?**

*Deborah Boy Gerhardstein, RN, BSN, MA*

### **Abstract**

A pre-test, post-test study was used to evaluate outcomes of implementing the ThinkFirst For Teens program to students at three Chicago suburban high schools. Results showed an increase in knowledge related to potential for injury and the importance of safety belt use, bicycle helmet use, avoiding violence, driving sober and generally making safe choices. An increase in coinciding stated safe behavior choices was also seen. Sixty-seven percent of students stated they were most influenced to make safe choices by hearing from someone who had been injured, while 26% were influenced by facts on injury prevention and 7% were influenced by the potential for being ticketed. A qualitative posttest was administered three months later that determined lasting positive impact.

### **Background of the Problem**

There are three common statements used when teaching injury prevention:

- 1) Injury is the leading cause of death for ages 1 through 44.
- 2) Teens and young adults, age 15-24 are in the highest risk group for injuries.
- 3) Most of these injuries are preventable.

Injury prevention specialists have been stating these same facts for far too many years. Laws have been put into place that mandate protective equipment and responsible practice. Parents and teachers warn about dangers. Vehicles and roadways are designed with safety in mind. Emergency medical systems provide quick access to emergency care. Yet injury prevails at the top of the charts as a leading cause of death, a leading cause of long-term disability, and a leading cause of health-related economic cost to society.

Injuries include unintentional injuries, such as those caused by motor vehicle crashes, and intentional injuries, such as violence and suicide. According to the National Center for Injury Prevention and Control (Centers for Disease Control and Prevention, 2004a), unintentional injury accounts for 46.6% of all deaths among 15 to 24 year olds, followed by homicide (15.8%) and suicide (12.1%) for a total of nearly 75% of deaths caused by events that could most often be prevented by people making safer choices in their actions. Motor vehicle crashes are the leading cause of injury, followed by violence, falls and sports.

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*Deborah Boy Gerhardstein, RN, BSN, MA, is the Executive Director of the ThinkFirst National Injury Prevention Foundation, Warrenville, Illinois. She completed this study through the Central DuPage Hospital ThinkFirst Chapter, Winfield, Illinois. For correspondence write Deborah Gerhardstein, ThinkFirst National Injury Prevention Foundation, 29W120 Butterfield Road, Suite 105, Warrenville, IL 60555. Email: [dbq@thinkfirst.org](mailto:dbq@thinkfirst.org). Copyright © 2007 by The American Association of Spinal Cord Injury Nurses.*

Underlying the cause of these injuries are actions, or behaviors: someone chooses to speed; refuses to wear a seatbelt; chooses to drive after drinking alcohol; refuses to wear a helmet; chooses to join a gang or resort to violence. And underlying these poor behavior choices, among teenagers, are developmental and experiential factors: an immature sense of invincibility, a lack of knowledge, inexperience and a misconception that what happens to them is a matter of fate, rather than a matter of choice.

The problems are evidence-based. The risk of motor vehicle crashes is higher among 16 to 19-year-olds than among any other age group (Centers for Disease Control and Prevention, 2005a). In fact, per miles driven, teenagers in this age group are four times more likely than older drivers to crash (Insurance Institute for Highway Safety, 2005). In 2004, 3,620 drivers age 15 to 20 were killed, and an additional 303,000 were injured in motor vehicle crashes (National Highway Traffic Safety Administration [NHTSA], 2004a). In 2002, the estimated economic cost of fatal and nonfatal crashes among 15 to 20-year-old drivers was over \$40 billion a year (Centers for Disease Control and Prevention, 2005a).

Alcohol is a major factor in many motor vehicle crashes, with a yearly cost of roughly \$51 billion, or 22% of the overall \$230 billion economic cost of all motor vehicle crashes (Blincoe, 2002). In 2004 there were 16,694 deaths due to alcohol-related crashes, an average of one alcohol-related fatality every 31 minutes (NHTSA, 2004b).

NHTSA estimates that alcohol was involved in 39% of all fatal crashes in 2004. Although the highest percentage of drivers involved in fatal crashes with a blood alcohol level (BAC) of .08 g/dL or higher were between the ages 21 and 24 (32%), 17% of impaired drivers were 16- to 20-year-olds (NHTSA 2004b). NHTSA also notes that for the same year, 29% of drivers 15 to 19 years of age who were killed in motor vehicle crashes had been drinking (NHTSA 2004a). Drugs other than alcohol, mainly marijuana and cocaine, are involved in approximately 18% of total motor vehicle driver deaths (Jones, Shinar & Walsh, 2003).

Non-compliance in safety belt use continues to be a factor in unnecessary death and injury. In 2003, an estimated 6,000 people were killed because they failed to wear safety belts, costing society \$18 billion in unnecessary expenses and lost productivity (NHTSA, 2005a).

In 2004, 58% of fatally injured 16- to 20-year-old vehicle occupants were unrestrained (Fatality Analysis Reporting System [FARS], 2004). Teens have the lowest rate of safety belt use compared with any other age group. According to the 2003 Youth Risk Behavior Surveillance System, 18% of students in grades 9-12 report they rarely or never wore safety belts when riding as a passenger in a car (Grubaum et al., 2004). In a phone survey conducted by NHTSA in the same year, only 49% of 16- to 19-year-olds reported they always wore a safety belt when riding in the back seat (NHTSA 2005b). This greatly increases their risk, as NHTSA reports indicate: 29% of unrestrained occupants are ejected from the vehicle, with 74% of those ejected dying from their injuries (NHTSA 2004b).

In 2004, 725 bicyclists were killed and an additional 41,000 were injured in traffic crashes (NHTSA 2004b). Among those 16 to 20 years of age, 49 were killed and 5,000 injured. Of the bicyclists killed in 2004, 83% were not wearing helmets, with the majority of these deaths being the result of traumatic brain injury (Insurance Institute for Highway Safety 2005a). Helmets have been estimated to reduce head injury risk by 85% (Thompson, Rivara & Thompson, 1989), yet 86% of high school students who ride state they rarely or never wear a bicycle helmet (Grunbaum et al., 2004).

Intentional injuries, including homicides, suicides and other acts of violence are also leading causes of preventable deaths and injuries. In 2002, more than 877,700 young people, ages 10 to 24, were injured from violent acts (CDC 2004a). Homicide is the second leading cause of death in

this age group. In 2001, 5,486 people ages 10 to 24 were murdered, averaging 15 each day (CDC 2004a). In the 2003 National Youth Risk Behavior Survey, 17% of students age 16 to 19 reported carrying a weapon (e.g., gun, knife, or club) on one or more of the 30 days preceding the survey (Grunbaum et al., 2004). In the same study, 33% reported they had been in a physical fight one or more times during the 12 months preceding the survey, with 4.2% resulting in injuries that required medical treatment. During the same time period, 9.2% had been threatened or injured with a weapon on school property. It is, therefore, not surprising that 5.4% had missed school because they felt unsafe at school, or on the way to or from school.

Physically, the most serious of all injuries incurred from motor vehicle crashes, violence, falls and sports are those to the brain and spinal cord, with traumatic brain injury being the leading cause of death and disability in children and young adults. Approximately 1.4 million brain injuries occur each year, causing 50,000 deaths, 235,000 hospitalizations and an additional 1.1 million emergency department visits (Langlois, Rutland-Brown, & Thomas, 2006). Direct medical costs and indirect costs, such as lost productivity, totaled an estimated \$60 billion in 2000 (Finkelstein, Corso, Miller, & associates, 2006). Approximately 11,000 Americans sustain a spinal cord injury each year, with an estimated 253,000 people living in the United States with a spinal cord injury (National Spinal Cord Injury Statistical Center, 2006). The damage to nerve tissue in these parts of the body causes permanent disability in the form of paralysis and brain disorders, both of which have no known cures. Brain and spinal cord injuries have devastated hundreds of thousands of individuals and their families, yet most young people seem to underestimate their own potential for being similarly injured. Healthy People 2010 proposes that educational efforts focus on educating students on the ramifications of the injuries, which are caused by the various behaviors indicated (U.S. Department of Health and Human Services, 2000).

Varied approaches to injury prevention are needed, as people learn in different ways, and are impressed at various levels of impact. For some, an informative warning from a parent is convincing in itself; for others it seems to take a near brush with death to evoke awareness. For a teenager, the messenger carries a degree of weight in decisions and actions taken. At a time of seeking to be independent, information from peers and peer-respected spokespersons is often respected as much, or more so, than information from parents, teachers, police and other persons of authority. Adolescents also have an inflated feeling of invincibility, doubting that harmful consequence could come to them because of any risk-taking behavior. The thrill, or ease, associated with a behavior quite often outweighs their perceived benefit of acting safely.

Effecting behavior change is a complex process, made more difficult when working with the adolescent stage of development. One health behavior model used in health and education for understanding behavior, and designing successful interventions is the Health Belief Model, first described in 1950, and further developed over the past several years. Developers of the Health Belief Model maintain that changes in behavior depend on whether individuals:

- 1) Perceive themselves to be susceptible to a particular health problem
- 2) See the problem as serious
- 3) Are convinced that treatment or prevention activities are effective yet not overly costly in terms of money, effort or pain
- 4) Are exposed to a cue to take a health action
- 5) Believe they have the ability to change their behavior (Glanz, Lewis, & Rimer, 1997)

In determining effective measures for reducing risk-taking behaviors that lead to injuries, it would therefore be beneficial to assess students' perceived susceptibility to injury, and determine what interventions are convincing to this age group.

One adjunct program being used in health and driver education classes across the country is ThinkFirst For Teens. A program of the ThinkFirst National Injury Prevention Foundation, ThinkFirst For Teens is a program that is presented to students by an injury prevention specialist and a person who has sustained a brain or spinal cord injury, known as a VIP speaker, or Voices

for Injury Prevention (National Injury Prevention Foundation, 2005). Video, slides and anatomical brain and spine models are used to explain the causes and ramifications of brain and spinal cord injuries, followed by the personal testimony of someone who has actually been injured and is dealing with a permanent disability. The objective is to increase student knowledge as to the high incidence and permanent effects of brain and spinal cord injuries, and convince them that it is within their power to make safe choices in order to reduce their risk for these devastating, yet largely preventable injuries.

To determine the impact of this program, students from three high schools were evaluated before and after the program intervention to determine changes in knowledge, self-reported safety behaviors, and influences that affected their attitude toward making safe choices.

### **Hypothesis**

High school students who have seen a ThinkFirst presentation demonstrate an increased understanding of their potential for injury, and an increase in safe behavior choices to prevent injury.

### **Review of the Literature**

Annual mortality and injury data is readily available through effective tracking systems such as the CDC National Center for Injury Prevention and Control's Injury Statistics Query and Reporting System (WISQARS), the NHTSA Fatality Analysis Reporting System (FARS) and General Estimates System (GES), the CDC National Center for Health Statistics (NCHS) National Vital Statistics Reports, and the U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS). Numerous reports, articles and fact sheets are produced each year summarizing data within various categories.

The Youth Risk Behavior Surveillance System (YRBSS), conducted biennially since 1991, monitors six priority health-risk behaviors among youth and young adults, including behaviors that contribute to unintentional injuries and violence (Grunbaum, et al., 2004). The YRBSS is a report of national, state, and local studies utilizing questionnaires given to students in grades 9-12. Although there have been improvements in selected risk behaviors over time, the 2003 YRBSS data indicates that far too many high school students continue to engage in health risk behaviors, including millions reporting carrying a weapon, involvement in a physical fight, and not wearing a safety belt. Variability in data from state to state, and from city to city can be compared to availability of effective interventions, differences in laws, policies and enforcement practices and other factors. YRBSS data is used by federal agencies to assess trends and progress related to health-risk behavior among high school students and to monitor progress toward several Healthy People 2010 health indicators and objectives.

Healthy People 2010, a comprehensive, nationwide health promotion and disease prevention agenda, was developed by teams of experts from a variety of federal agencies coordinated by the Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services (US Department of Health and Human Services, 2000). There are 10 leading health indicators, with Injury and Violence being one. Goals are grouped into 28 focus areas, each representing an important health concern with objectives and target improvements to be achieved by the year 2010.

The goal of focus area 15, Injury and Violence Prevention, is to reduce injuries, disabilities and deaths due to unintentional injuries and violence. The document states to reduce the number and severity of injuries, prevention activities must focus on the type of injury, such as spinal cord injuries that can be caused by an unintentional motor vehicle crash or an intentional gunshot. Education should be aimed at reducing risks of injury and preparing children to be knowledgeable adults. Twenty-five objectives under this focus area and an additional 19 related objectives in other focus areas pertain to injury prevention. Under focus area 7, Educational and Community-Based Programs, it is noted that educational and community-based programs play an integral

role in attaining these goals and improving health outcomes, and are fundamental for health promotion and quality of life. Two of the 12 objectives under this goal include 1) increasing the proportion of middle and senior high schools that provide preventive health education (including unintentional injury and violence) and 2) increasing the proportion of college and university students receiving information on health risk behaviors, also including injury and violence prevention.

In the School Health Guidelines to Prevent Unintentional Injuries and Violence (CDC, 2001), health recommendations, based on an in-depth review of research, theory, and current practice in injury and violence prevention, are summarized by the CDC, in collaboration with specialists from universities, and national, federal, state, local and voluntary agencies and organizations. The report notes that one fifth of the United States population can be found in schools, making school-based programs an efficient way of reaching a majority of children, adolescents and many adults in the country. In addition to having a responsibility to prevent injuries from occurring on school property and at school-sponsored events, schools can teach students safety skills needed throughout their lives. Eight recommendations provide a framework for establishing school-wide strategies that include implementing health and safety curricula and instruction to help students develop the knowledge, attitudes, behavioral skills and confidence needed to adopt and maintain safe lifestyles, as well as using active learning strategies involving community resources in learning about injury prevention. It is stressed that school-based injury prevention programs should become a national priority to assure all youth attain their maximum educational potential and good health.

Rosenstock, Strecher and Becker (1988) state that people lack the motivation to take health-related protective actions because they do not think it is likely the health-threat will occur to them, they do not believe the occurrence would seriously upset their lives, they do not believe prevention or control of the situation is likely through personal intervention, or because they feel that the required effort on their part to avoid the problem exceeds the possible gain. The Health Belief Model is based on these facts, theorizing that for behavior change to succeed, people must have an incentive to take action, feel threatened by their current unsafe behavior, and believe that change will be beneficial by resulting in a valued outcome at an acceptable cost or amount of effort. Self-efficacy, or the confidence one has in their ability to perform the necessary behavior, is an expectancy of social learning theory the authors acknowledge is important to incorporate into the original HBM. Another added concept, cues to action, includes strategies to activate readiness to act by providing reminders and promoting awareness (Glanz, Marcus Lewis, & Rimer, 1997).

There have been few studies on outcomes of school-based injury prevention programs at the high school level. Shope, Elliott, Raghunathan and Waller (2001) conducted a randomized test of the effectiveness of an alcohol misuse prevention curriculum for 10th grade students and the effect on students' subsequent driving. The study followed intervention and control groups for an average of 7.6 years for alcohol-related crashes, showing significant treatment effect only during the first year of licensure, with the strongest effect among those drinking less than one drink per week prior to the curriculum. Findings suggest that a high school-based alcohol prevention program can positively affect subsequent driving, but highlight the need to start prevention early and extend interventions beyond the initial exposure to driving.

The Peacemakers Program, a school-based violence prevention intervention for grades 4 through 8, includes teacher-delivered curriculum and a remedial component implemented by school psychologists and counselors for referred students (Shapiro, Burgoon, Welker, & Clough, 2002). The pre-post-assessment showed significant, positive program effects on 6 of the 7 variables assessed, including knowledge of psychosocial skills, self-reported aggression and teacher-reported aggression, with a 41% decrease in aggression-related disciplinary incidents.

ThinkFirst For Kids is a six week curriculum-based injury prevention program for grades 1, 2, and 3 that teaches students about their brain and spinal cord, and how to protect themselves from injury. Lessons on bicycle safety, vehicle safety, playground safety, water safety and violence prevention are implemented by community health educators and classroom teachers, augmented by the animated Street Smart superhero and his friends, in video and in worksheets. In San Diego, Gresham, et al. (2001) conducted a randomized pretest-posttest comparative study showing significant increase in knowledge about the brain and spinal cord and safe behaviors to prevent injury, as well as a decrease in self-reported high-risk behaviors. Greene, et. al., (2002) conducted a similar study in Oregon on ThinkFirst For Kids, showing a significant increase in knowledge of injury prevention at all three grades in intervention schools, in comparison to control schools. Whener and Sutton (2005) conducted a ThinkFirst For Kids study in Pennsylvania, and noted a 21% increase in knowledge of safety issues and 10% reduction in reported risky behaviors among first graders, a 15% increase in knowledge and 8% reduction in risky behaviors among second graders, and an 11% knowledge increase and 6% reduction in risky behaviors among third graders.

A lack of studies testing the efficacy of health education-based injury prevention programs for teenagers, presented by people trained in injury prevention and people who have experienced a traumatic injury, as well as a need to substantiate years of positive responses from students and teachers to the ThinkFirst For Teens program, prompted the need for this study.

### **Methodology**

A pretest-posttest design was used for this study to determine the effects on the understanding of potential for injury, and the effects on stated safety behaviors of students participating in ThinkFirst For Teens. The study was conducted in three suburban school districts in the far-west Chicago suburbs of West Chicago, Bartlett and Carol Stream, Illinois. Data was collected within the classroom setting.

Three high schools were identified as study sites, one from each school district. The schools were chosen from those whose students did not have ThinkFirst For Teens offered in their middle schools. They were representative of large, suburban, four-year high schools comprised of largely middle-class students of mixed ethnicity and gender. Teachers contacted at each school were able to accommodate the study and precisely follow all necessary procedures. All 2005 spring-semester students in the state-mandated freshman health class were chosen in two schools, while driver education students from the same semester were chosen at the third school, to assure a representative sampling of all students. The study was done within the first 4 weeks of the semester.

### **Intervention**

ThinkFirst For Teens is a program of the ThinkFirst National Injury Prevention Foundation, founded by the American Association of Neurological Surgeons and the Congress of Neurological Surgeons. It was designed specifically for teenagers, and is presented through over 200 ThinkFirst chapters throughout the United States and several other countries in primarily high school health and driver education classes. It also is used by many chapters in middle schools and colleges, in a variety of classroom and assembly settings. The program is designed to be presented during the timeframe of one class period, ideally 50 minutes long, with flexibility to accommodate shorter or longer class times. All classes in the study were 50 minute formats.

The program is introduced by an injury prevention specialist, who is a nurse or other healthcare or education professional trained in injury prevention, and in presenting ThinkFirst For Teens. The purpose of the program, and the segments they are about to see, are briefly explained, setting the stage for the presentation. It is explained that ThinkFirst is concerned with helping them understand the facts about their risk for serious injuries, including brain and spinal cord injuries that do not have cures, but are highly preventable. They are told they will hear from several people who have become injured and are sharing their stories, in an effort to help others

learn from their circumstance, so they do not make the same mistakes they did. It is the hope that this information will enable them to make informed choices to protect themselves from similar injuries.

The first segment of the program is a 10-minute video featuring several teens and young adults who have sustained a brain or spinal cord injury. Short clips of each speaker, talking directly to the audience, give details of the circumstance of each injury, how it has affected their life and how it could have been prevented. The accounts are realistic and heartfelt.

The second segment starts with the injury prevention specialist using anatomical models of the brain and spinal cord to explain the mechanism for injury and the ramifications of permanent disability. A gel-like brain shows the vulnerability of the vital organ, while the cross-section of the skull helps students visualize why the relatively thin bone is greatly assisted by the added protection of a helmet in preventing traumatic brain injury in a crash. Slides augment the 15-minute discussion that covers the four most common causes of injury: vehicle crashes, violence, falls and sports. The emphasis is on the facts and realities of injury, and explaining the best means of protection, rather than preaching to students as to what they should not do.

The third section of the program is the personal testimony from a VIP speaker. The speakers who participated in this study each had a spinal cord injury, used a wheelchair and drove themselves to the sites in their personal vehicles fitted with adaptive equipment. Each speaker is a trained ThinkFirst speaker who explains that prior to their injury, they were teenagers like everyone in the audience, never thinking something like this would happen to them. They talk about the choices they made, how the injury occurred, their experience in the hospital and rehabilitation, and the long and difficult process of recovery. The VIP explains the effects the injury has had on himself, his family and friends, and how he has had to learn to do things differently because of paralysis. The program is then opened for questions, and students and speakers move into meaningful dialogue addressing students concerns: do you still have the same friends; how did your parents react; are you in pain; can you still have kids; how do you go to the bathroom; what do you miss the most; do you regret what you did? The program ends by thanking students for listening and reminding them to “think first.”

### **Evaluation**

The program was evaluated by surveying students with pretest and posttest instruments. The test consisted of 20 multiple-choice questions related to their knowledge, attitudes and reported behaviors regarding safety and injury prevention, as well as 7 demographic questions (see appendix A, B). The pre-test was administered one day prior to the intervention, and the post-test was administered the day following the intervention. Teachers were given verbal and written instructions on administering the tests (see appendix C). To encourage students to feel comfortable in answering honestly, they were instructed not to put their name on the test, and were told their teachers would not see their tests. Each class collected the surveys and put them in a sealed envelope to assure privacy.

### **Limitations**

Limitations are inherent in self-report, versus observed behavior studies. Stated behaviors, although well-intended, may differ from actual behaviors. A second limitation is that although a second posttest was given three months later, the questions did not allow for comparison of the same data. It is not possible to determine if specific stated behaviors were sustained over an extended period of time. Lastly, a control group was not used to rule out the potential of improved scores without any intervention.

### **Analysis**

Pre-tests were matched to posttests on a classroom basis. To take an equal number of classes from each school, and to control for late arrivals in several first hour classes, only the data from the second through seventh class periods at each school were used, discarding the first class

and any classes beyond a seventh period. Data was entered by hand into the data analysis program Survey Pro, and results were calculated in raw numbers and percents for comparative analysis.

### **Three Month Post-test**

In an attempt to determine what impact the intervention continued to have with the passing of time, a qualitative study was conducted at each of the participating schools 3 months post-intervention. The survey was designed to determine what influencing factors were retained from the ThinkFirst intervention, rather than knowledge acquired from all lessons learned during the 3 month class time. Four questions were asked:

- 1) Early in the semester, a nurse, and a speaker with an injury, presented ThinkFirst to your class. What do you remember about the presentation?
- 2) Did the ThinkFirst program impact your behavior with respect to seatbelts, bike helmets, motorcycle helmets, drinking and driving, gang involvement, avoiding violent situations, or other safety measures? If so, how?
- 3) Was this a helpful program to have during this class?
- 4) Other comments.

Teachers were asked to distribute the test to students without making any comments other than instructing students to read the directions and complete the survey honestly. The same protocol for privacy that was used for the initial pre- and posttest was followed.

### **Findings**

Eight hundred students participated in the study, with analysis restricted to 525 pretests and 486 posttests. The discrepancy in numbers was due to absenteeism and to posttests that indicated the participant had not seen a ThinkFirst program; these were not used in the analysis.

In regard to demographics, 53% were 14 years of age, 27% 15 years, 17% 16 years and the remaining 3% 17 and 18 year-olds. Subject gender was 53% male and 47% female. In regard to race/ethnicity, 68% were white, 15% Hispanic, 10% Asian, 4% African-American, and 3% other. English was the first language for 87% and Spanish a first language for 7%, with 99% stating they understood English well.

Pre-test scores indicate a poor understanding of potential for injury with corresponding low numbers in self-reported safety behaviors. Asked about helmet use, 43.5% responded that it was not important to wear a helmet when riding a bicycle and 65% reported they never wore one. As to why they did not wear a helmet, 32% believed they would not crash, while 14% stated they would be fine in a crash without a helmet. Regarding safety belts, 53% said they felt it was very important to wear a safety belt in a vehicle, with only 46% reporting they always wore a safety belt. As to why they did not wear a safety belt, 39% stated they did not wear one when they were not going far. Ten percent stated they would either be fine in a crash without a safety belt or that they simply did not believe they would be involved in a crash. Fifty percent of students surveyed stated they would get in a car with a driver who has been drinking and only 47% stated they would plan to have a designated driver if they had been drinking any alcohol.

Regarding violence, 29% thought their risk for injury was high if they were hanging out with people who were in gangs or use violence. Only 28% stated it was important to always avoid violent situations.

As to general attitudes toward injuries and safety, only 22% of pretest scores indicated injuries were almost always preventable, while 31% stated they don't think about being safe. Only 34% felt it was very important to make safe choices to protect themselves. When asked what influenced them most in making safe choices, 51% indicated hearing from someone who had

been injured, 34% were most influenced by injury prevention facts and 15% were influenced by their potential for a ticket.

**Effects of the ThinkFirst For Teens Intervention**

Following the ThinkFirst For Teens intervention, post-test scores showed a significant increase in knowledge regarding potential for injury as well as stated safety behaviors they now planned to do. As the post-test was given the day following the intervention, certain questions were worded to reflect intended behaviors, for example, the pre-test question, “how often do you wear a helmet when riding a bicycle?” was asked in the posttest as, “How often will you wear a helmet when riding a bicycle?” In the case of this question, those answering “never” dropped from 65% to 26%, a 39% decrease, or 214 students. Those answering “always” increased by 10% and those answering “most of the time” increased by 10%, or 29% (141 students) now saying they will wear a helmet all or most of the time.

When asked “how important do you feel it is for you to wear a helmet when riding a bicycle?” those answering “very important” or “important” increased from a combined 22% (112 students) to 61% (292 students), a 39% increase (see Figure 1). Those indicating the reason they did not wear a helmet was because they either would not crash or would not be hurt if they crashed went from 46% of students to 23%, a decrease of 23%, or 124 students.

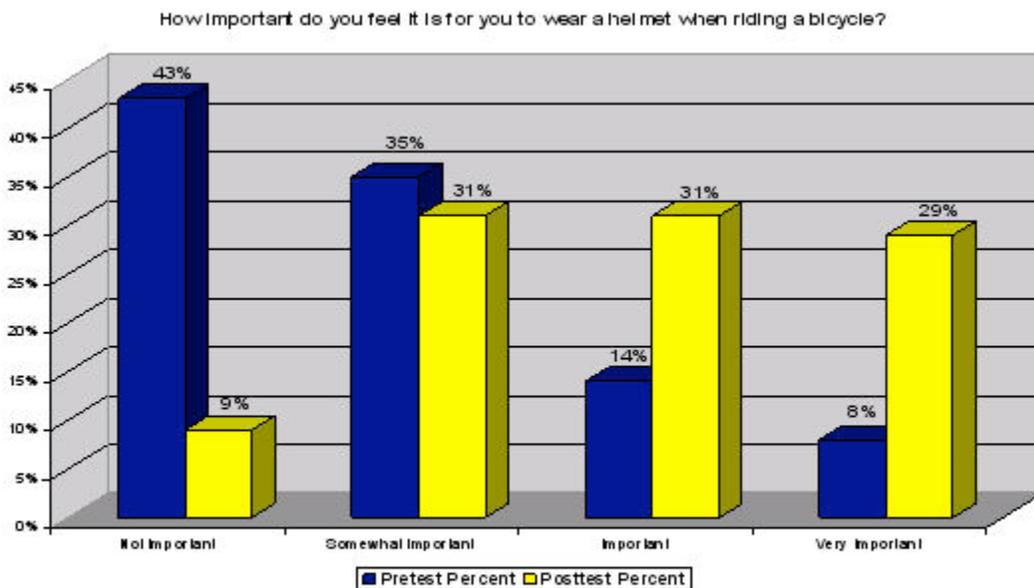


Figure 1

Safety belt use questions also showed a notable change, with a 20% increase (from 53% to 73%) answering it was very important to wear a safety belt in a vehicle. Pre-test scores showed 46% stating they always wore a safety belt which increased to 69% stating they planned to always wear a safety belt, a 22% increase in this stated behavior (see Figure 2). Eighty-one percent (81%) stated they wore a safety belt to protect themselves from injury (69% pre-test), 10% stated they wore a safety belt because a parent or teacher makes them (15.5% pre-test), and 9% stated because it is the law (15.5% pretest). As to why they don't wear one, there was a 10% decrease in students answering “because I am not going far,” and a 15% increase in students answering, “does not apply; I always wear one.”

**How often do you (now plan to) wear a safety belt?**

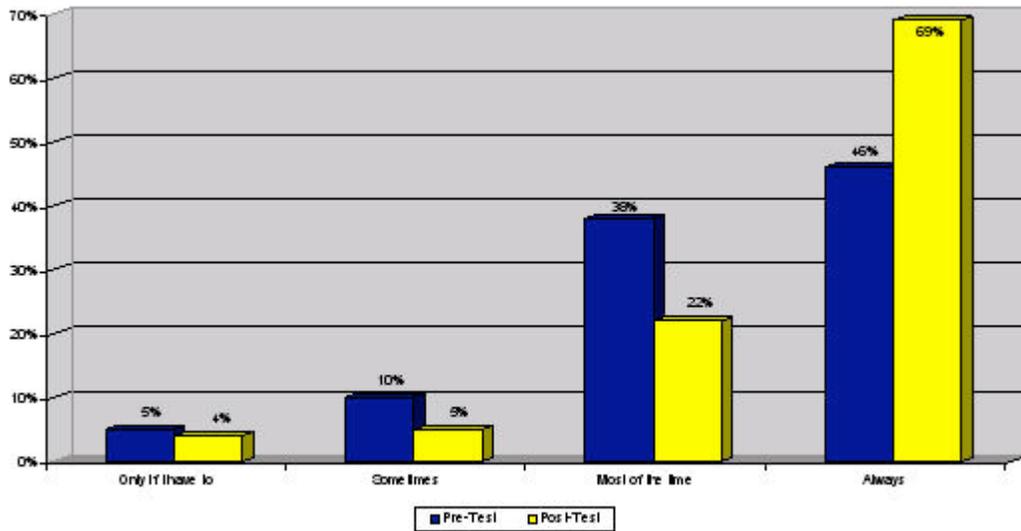


Figure 2

Questions regarding drinking and driving indicated there was an increase in understanding that any alcohol was unacceptable for the driver. Those who would refuse to get in a car with a friend who had had any alcohol increased by 10%, refuse to let a friend drive if they had any alcohol increased by 13% (see figure 3), and plan to have a designated driver if they planned to have any alcohol, increased by 13%. After the intervention, 79.5% stated they would never ride in a car driven by a friend who had been drinking, compared to 76.4% who stated the same in the pretest.

**If a friend had this number of beers, I would refuse to let him/her drive**

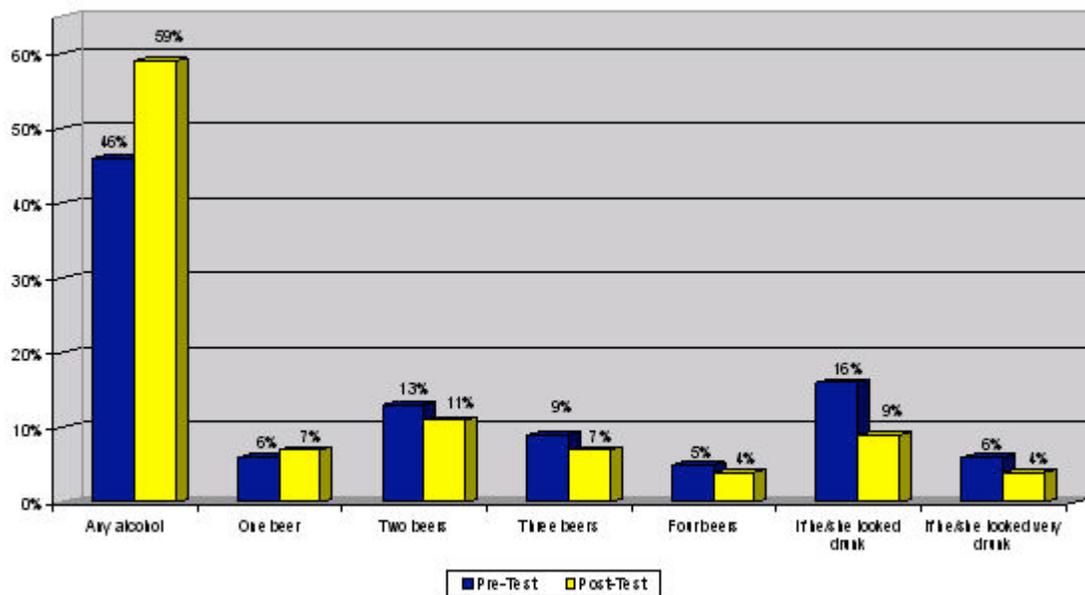


Figure 3

Post-test scores also indicated an increase in understanding of potential for injury in questions regarding violence. An additional 18% stated their risk for injury or death was very high when hanging out with people who are in gangs or use violence (from 29% to 47%, see Figure 4). Those stating it was important to always avoid violent situations increased by 11%.

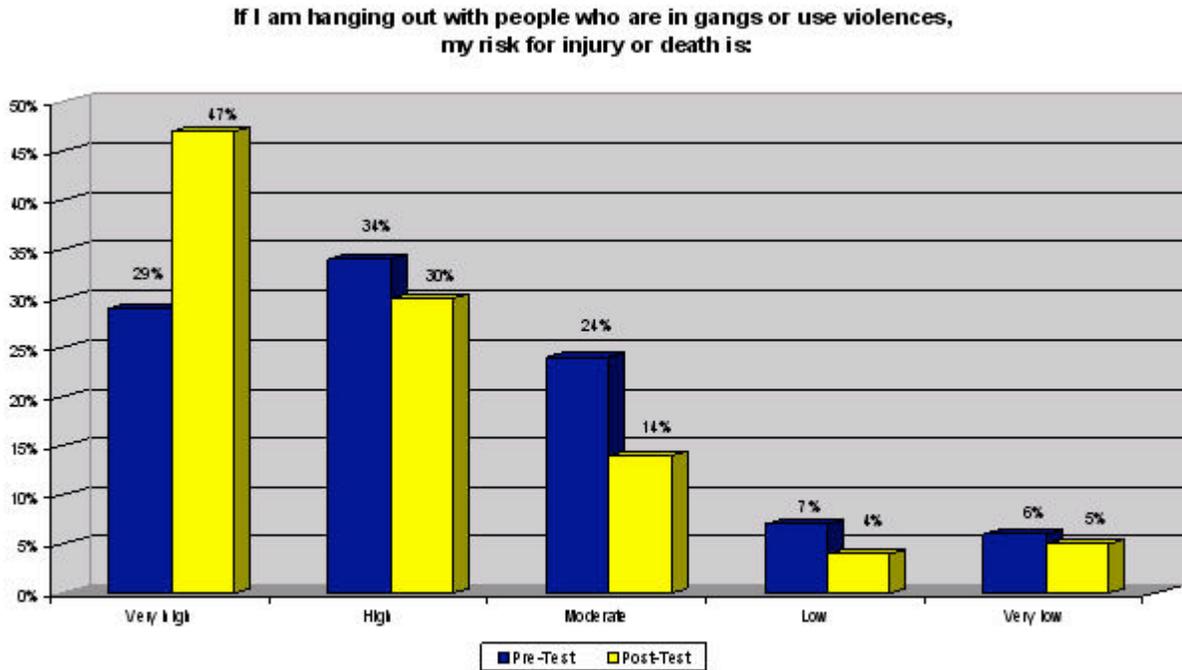


Figure 4

Understanding and stated behaviors pertaining to injury and making safe choices showed a notable improvement following the ThinkFirst For Teens intervention. Those stating injuries were almost always preventable increased by 28% (from 22% to 49%); when combined with those stating injuries are often preventable, percentages went from 68% pretest to 82% posttest. A full 98% of respondents stated on the posttest that they would either try to always make safe choices or consider their safety more often. Corresponding questions in the pretest showed 5% did not care about safety and 31% did not think about safety, while 64% stated they tried to be safe. There was a 22% increase in students stating making safe choices to protect themselves from injury was very important (see Figure 5).

**I think making safe choices to protect myself from injury is:**

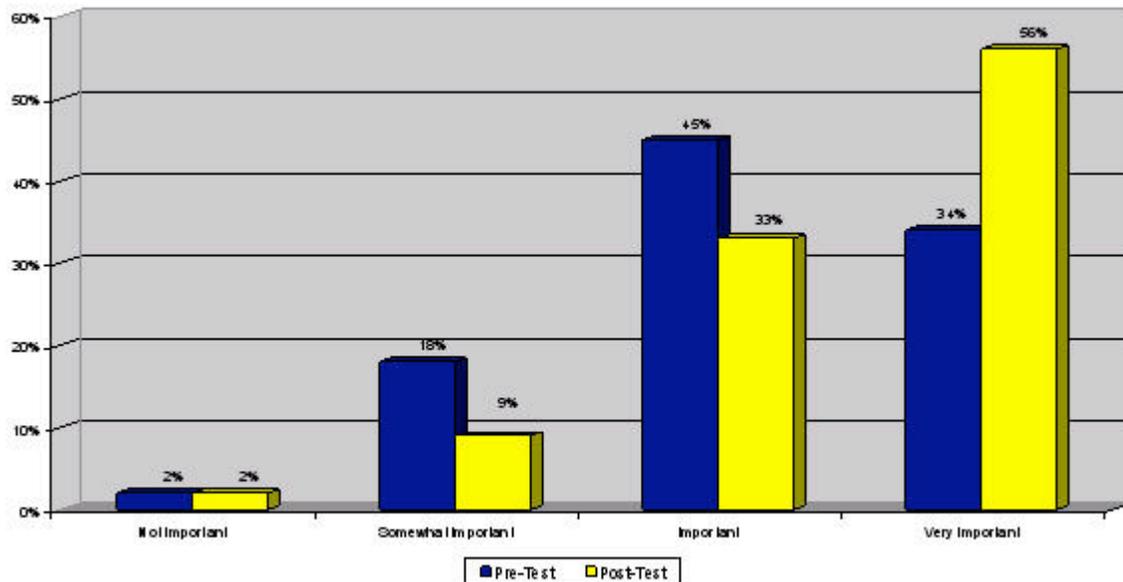


Figure 5

When asked “what has influenced you the most in making safe choices?” 67% chose ‘hearing from someone who has been injured.’ This was a 16% increase from the pretest scores. Another 26% stated they were most influenced by facts on injury prevention, with the remaining 7% stating potential for a ticket influenced them most (pretest scores were 34% and 15% respectively). See Figure 6.

**What has influenced you the most in making safe choices?  
(circle the most influential)**

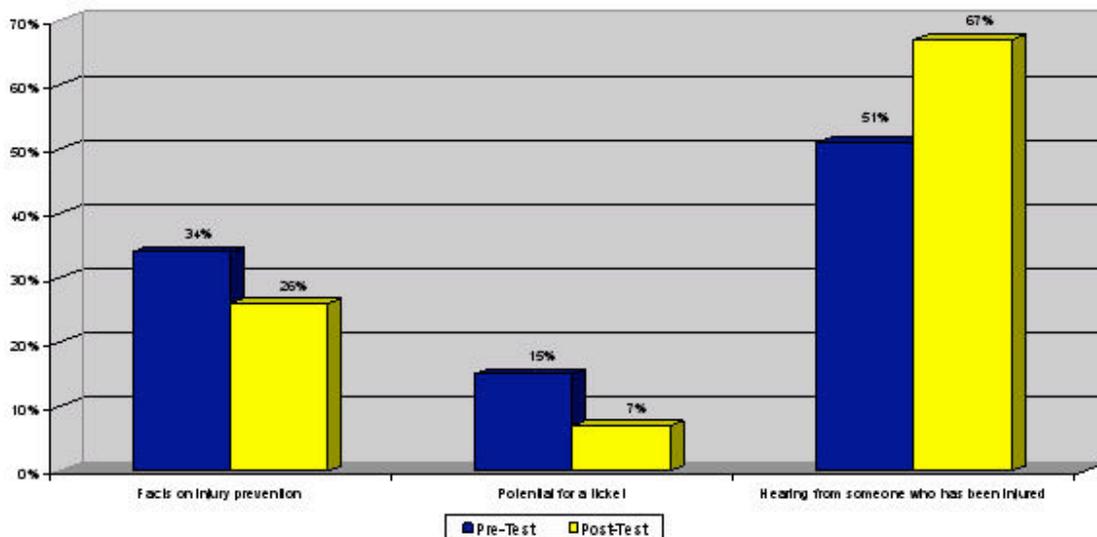


Figure 6

The 3-month posttest was collected from 5 classes, as one school only had only one class within the fifth and sixth hour class times requested randomly to be given this test. A total sample of 109 students included a breakdown of 46, 27 and 36 students from the three schools. Questions were open-ended, with students' answers varying from brief to inclusive of several answers. When asked what they remembered about the program, 83% commented on the speaker who was injured, 46% stated various safety messages they remembered, and 7% noted the video. Two students answered that they did not remember anything. When asked if the program impacted their behavior and how, 77% stated yes, giving various reasons. Of the 77% answering yes, 26% stated they now wear their seatbelt all the time or more often, 24% referred to realizing the risks or consequences of their actions, 17% referred to the program as reinforcing points they knew they should be following, and 14% specifically stated they now make safe choices or think first. Of the total sample of 109 students answering whether the program impacted their behavior, 14% answered no, because they already knew the information, and 9% simply stated no, or not really. Asked to check yes or no as to whether the presentation was helpful, 96% checked yes, 4% checked no. Thirty-one percent of students took the opportunity to add additional comments that stated appreciation, thanks, or that it was a good, very good or interesting program.

## **Conclusion**

### **Summary**

As injuries continue to be the leading cause of death and disability for teenagers, it is important to implement effective methods for reducing teenage risk for injury. Methods include, but are not limited to, vehicle, roadway and protective equipment design, educational programs and law enforcement. Effective educational programs include those that convince students to make positive behavior changes to protect themselves and others from injury. According to the Health Belief Model, changes in behavior depend on individuals perceiving themselves as susceptible to a serious problem, and believing they not only have the ability to change their behavior, but that these behaviors are effective and worth their effort. Healthy People 2010 promotes the inclusion of educational health and safety programs in the classroom, where students are among their peers, learning together.

The ThinkFirst For Teens study was implemented among high school students, using a quantitative pre-test to determine baseline understanding and behaviors, the intervention, being the ThinkFirst for Teens program, a comparative post-test administered the following day, and a qualitative post-test three months later. The educational intervention included facts on the incidence, causes and implications of injuries to teenagers, information on ways to protect themselves from injury, video testimony from several people living with traumatic brain or spinal cord injuries, and personal testimony from a guest speaker who explains how his injury occurred and what it has been like to have a spinal cord injury.

The study indicates an increase in understanding of potential for serious injury related to being unrestrained in a vehicle, drinking and driving, riding a bicycle without a helmet, and associating with people involved in gangs and violence. Surveys indicate an increase in the understanding that injuries are almost always preventable, as well as an increase in understanding their choice in behavior is very important in protecting themselves from injury. Data shows students believe they have the ability to change their behavior, with notable numbers of posttest scores indicating they plan to increase safety belt use, bicycle helmet use, use of a designated driver, and in general, an increase in their conviction to consider safety more often.

The effectiveness of students hearing directly from a speaker who has been injured is also apparent in the data. Students indicate they are influenced most by hearing from someone who has been injured, compared to being influenced by facts on injury prevention, or by their potential for a ticket. In the qualitative survey implemented three months after seeing the presentation, students remember the injured speaker far more than any other program component. Long term impact also shows three quarters of the students indicate ThinkFirst made a positive impact on

their behavior with respect to implementing safety measures, and nearly all students state the presentation is helpful.

### **Implications**

ThinkFirst For Teens, an injury prevention program presented by someone who actually has incurred a serious, disabling injury, has been shown to help students understand the realities of serious injuries enough to effect behavior change. The live, personal presentation is meaningful and compelling enough to engage students, make an impact, and be memorable over a period of time. The behavior changes that result from this program can lead to a reduction of injury and death in these students.

If a one-hour program is capable of impacting teenagers to the degrees indicated, it is conceivable that exposing children, teens and young adults to programs such as this several times throughout their formative years would further instill safety behaviors. As noted in the Health Belief Model, exposure to cues is a necessary component for behavior change, such as making safe choices. Educational injury prevention programs such as ThinkFirst that are incorporated into school health and driver education curricula could be one of the most effective means of reducing this leading cause of death and disability in the United States, as well as globally.

### **Suggestions for future research**

Few studies have been done on the effects of educational injury prevention programs. Repeating the study will further validate the findings of this study. Similar studies done with teens in middle school and older teens would help to see the impact at various ages and levels of experience. Comparative studies on the benefits of offering similar interventions at various grade levels, following students from elementary school through high school, would demonstrate the impact of repetition and reinforcement. Incorporating observational studies for safety belt or helmet use would further validate findings for specific behaviors.

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