

Evidence-Based Health Promotion Programs for Schools and Communities

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Abstract: Healthy People 2020 includes an objective to increase the proportion of elementary, middle, and senior high schools that provide comprehensive school health education to prevent health problems in the following areas: unintentional injury; violence; suicide; tobacco use and addiction; alcohol or other drug use; unintended pregnancy, HIV/AIDS, and sexually transmitted infections (STI); unhealthy dietary patterns; and inadequate physical activity. These specific goals are part of the efforts of Healthy People 2020 to increase the proportion of elementary, middle, and senior high schools that have health education goals or objectives that address the knowledge and skills articulated in the National Health Education Standards. A focus on Pre-K through 12 health education is a prerequisite for the implementation of a coordinated, seamless approach to health education as advocated by the Healthy People Curriculum Task Force and incorporated into the Education for Health framework.

To help accomplish these goals, this article views the role of education as part of the broader socioecologic model of health. A comprehensive literature review was undertaken to identify evidence-based, peer-reviewed programs, strategies, and resources. The results of this review are presented organized as sexual health, mental and emotional health, injury prevention, tobacco and substance abuse, and exercise and healthy eating. Evidence-based implementation strategies, often considered the missing link, are recommended to help achieve the Healthy People 2020 objective of increasing the prevalence of comprehensive school health education programs designed to reduce health risks for children.

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Introduction

Healthcare providers are often asked to identify the best programs to address the current challenges of today's society. Healthy People 2020 provides a framework for healthcare providers and communities to improve health outcomes and decrease health disparities. One of the objectives of Healthy People 2020 is to increase the proportion of elementary, middle, and high schools that provide comprehensive health education to prevent health problems in the following areas: unintentional injury; violence; suicide; tobacco use and addiction; alcohol or other drug use; unintended pregnancy, HIV/AIDS, and STD [STI] infections; unhealthy dietary patterns; and inadequate physical activity.¹ Many of the leading health indicators identified by Healthy

People 2020¹: (e.g., responsible sexual behavior, mental health, physical activity, overweight and obesity, tobacco use, substance abuse, environmental quality, immunization, access to health care, and injury and violence) can be addressed, in part, by providing health education.

These specific goals are part of the efforts of Healthy People 2020 to increase the proportion of elementary, middle, and senior high schools that have health education goals or objectives that address the knowledge and skills articulated in the National Health Education Standards. These specific goals are part of the efforts of Healthy People 2020 to increase the proportion of elementary, middle, and senior high schools that have health education goals or objectives that address the knowledge and skills articulated in the National Health Education Standards. This focus on Pre-K through 12 health education is a prerequisite to the implementation of a coordinated, seamless approach to health education as advocated by the Healthy People Curriculum Task Force and incorporated into the Education for Health framework. Schools can play an important role in addressing these priorities using a comprehensive, coordinated, and sequenced approach to health education as implied by the

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Table 1. The National Health Education Standards

Standard 1	Students will comprehend concepts related to health promotion and disease prevention to enhance health.
Standard 2	Students will analyze the influence of family, peers, culture, media, technology, and other factors on health behaviors.
Standard 3	Students will demonstrate the ability to access valid information, products, and services to enhance health.
Standard 4	Students will demonstrate the ability to use interpersonal communication skills to enhance health and avoid or reduce health risks.
Standard 5	Students will demonstrate the ability to use decision-making skills to enhance health.
Standard 6	Students will demonstrate the ability to use goal-setting skills to enhance health.
Standard 7	Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.
Standard 8	Students will demonstrate the ability to advocate for personal, family, and community health.

Education for Health framework discussed in other articles in this theme issue.

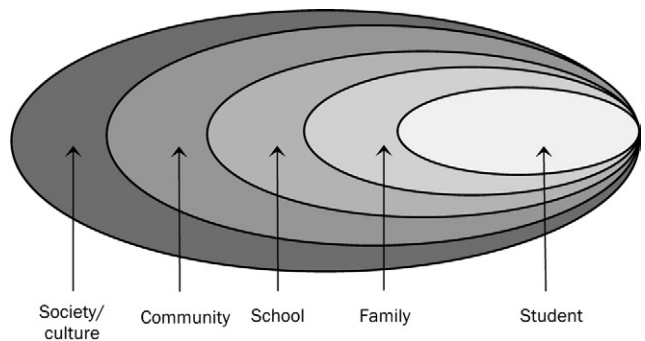
Schools have recognized that a health curriculum is part of their mission (Table 1). Model standards exist for areas of education, including English/language arts, science, math, and social studies. In order to complement the education standards, the National Health Education Standards were created. Health-enhancing behaviors for students in all grade levels are outlined for teachers, administrators, and policymakers in order to assist with planning and implementation of curricula. Tangible and concrete expectations are one of the essential objectives of the NHES.

Standard 1 of the *National Health Education Standards: Achieving Excellence* (2007) states: “Students will comprehend concepts related to health promotion and disease prevention to enhance health.”² In addition, Standards 2 through 8 emphasize the influence of family, peers, culture, media, and technology on health outcomes for students. The national standards set forth by schools will help students practice health-enhancing behaviors and reduce health risks into adulthood.² Education is an important determinant of health.³ Today, children are less likely to graduate from high school than were their parents.⁴ Schools with coordinated school health programs have healthier students who are better learners with improved academic scores and school completion.^{5,6} Education can decrease health disparities by increasing health knowledge and healthy behaviors.⁷ Fur-

thermore, greater educational attainment leads to better employment opportunities and higher income, which is also linked to better health outcomes.^{7,8} Finally, education is linked with psychosocial factors that influence health.⁷

The social–ecologic model⁹ is a framework for examining the multiple and inter-related effects of the individual and his or her environment. This model is used frequently in a variety of settings. Specifically, the CDC uses a four-level, social–ecologic model to better understand violence and the effect of potential prevention strategies.¹⁰ By using this model to create and evaluate prevention programs, it is possible to address the complex reciprocal relationship that exists between the individual (student) on one hand, and family, school, community, and society and culture on the other (Figure 1). Prevention strategies should include a continuum of activities that address multiple levels of the model. These activities should be developmentally appropriate and conducted across the life span. This approach is more likely to sustain prevention efforts over time than any single intervention.¹⁰

The WHO Health Promoting Schools Framework¹¹ defines a health-promoting school as one that organizes



Individual (student): The first level identifies the biological and personal-history factors. For example, individual factors include age, education, income, and history of abuse or neglect.

Relationship (family): The second level includes the family and peers who influence the individual's behavior and experience.

School: For the purposes of this manuscript, school has been separated from community levels because of the important role the school plays in prevention programs and health promotion. This is the setting in which young people spend the majority of their time and it therefore has a great impact on their behavior and understanding.

Community: The fourth level consists of workplaces, neighborhoods, and organizations.

Society/culture: The final level consists of societal and cultural norms and values that have an impact on behavior. In addition, this level includes broad aspects including overall health, economic status, and educational and social policies.

Figure 1. Social–ecologic model (adapted from the CDC)

policies, procedures, infrastructure, and activities to protect and promote the health and well-being of its students, teachers, administrators, staff, and community. There are four strategies outlined by the WHO's Global School Health Initiative to increase the number of health-promoting schools. First, use research to improve school health programs. Second, build capacity to advocate for improved school health programs. Third, strengthen national capacities. Finally, create networks and alliances for the development of health-promoting schools.¹¹

The purpose of this paper is to identify programs and resources to address the goals set forth in Healthy People 2020 and to increase comprehensive school health education. In addition, a discussion has been included regarding implementation strategies as they relate to the school health and prevention programs. Collaboration between health professionals and schools is an important element for improving school-based health programs.

Methods

The present study focuses on the identification of programs and strategies that have been identified through review of the literature and sources such as Blueprints for Violence, Substance Abuse and Mental Health Services Administration's National Registry of Evidence-based Programs and Practices, the CDC, Office of Juvenile Justice and Delinquency Prevention, the Office of Safe and Drug Free Schools through the U.S. Department of Education, National Cancer Institute, National Institute on Drug Abuse, and the Collaborative for Academic, Social, and Emotional Learning. Keywords used in the searches were *school-based*, *programs*, *evidence-based*, *prevention*, *health education*, and specific topics such as *sexual health*, *sex education*, *STI/STD*, *pregnancy*, *obesity*, *nutrition*, *physical activity*, *violence*, *aggression*, *emotional health*, *substance use*, *child safety*, *risk taking behavior*, and *health promotion*. The search was limited by age parameters (preschool [2–5 years]; child [6–12 years]; adolescent [13–18 years]); grade level; year of publication (2000–2010); and English language. Databases used included PubMed, CINAHL, PsycINFO, and MEDLINE.

In addition to computer searches, the ancestry approach was utilized. Inclusion criteria included programs that were school-based and community-based. Additional criteria looked at readiness for dissemination ratings, quality of research ratings, and replication studies if identified. An important goal of the present study is to identify evidence-based programs. During the past decade, the value of making recommendations using the best available evidence has been emphasized. Evidence-based medicine was initially proposed by Dr. David Sackett and colleagues¹² and is defined as the judicious use of the best current evidence in making decisions about the care of the individual patient. Programs that are evidence-based are ones in which the effectiveness of the program has been evaluated by peer review. Programs cited in this manuscript are ones that have been peer reviewed and/or included on federal lists and registries. The use of evidence-based programs improves quality, increases the likelihood for producing the desired result of the program, and leads to efficient resource allocation within schools and communities. This focus is in line with the school health objectives in Healthy People 2020 as well as with the

WHO Health Promoting Schools Framework. The authors have identified evidence-based programs and strategies that can be implemented in schools and communities to advance Healthy People 2020 initiatives.

Sexual Health

Sexual health encompasses the prevention of sexually transmitted infections (STIs) and pregnancy. In addition, according to the WHO's working definition of sexual health as "a state of physical, emotional, mental and social wellbeing in relation to sexuality," sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination, and violence.¹³ In 2009, approximately half of all high school students in the U.S. reported having had sex at least once, 14% having had four or more sexual partners during their lifetime, and two thirds having had sex by the spring semester of their senior year. In 2009, more than one third of sexually active high school students did not use a condom during their most recent sexual encounter.¹⁴ In 2006, the CDC¹⁵ reported that an estimated 5250 young people aged 13–24 years in the 33 states were diagnosed with HIV/AIDS. This number represents approximately 14% of the people diagnosed that year.

Programs that were found to be effective have many characteristics in common. Program content focused on clear health goals, including the prevention of STI/HIV, pregnancy, or both. Content also concentrated on specific types of behavior leading to these health goals (e.g., abstaining from sexual intercourse or using condoms in order to prevent STI/HIV and pregnancy). In addition, effective programs addressed sexual psychosocial risk and protective factors that affect sexual behavior (e.g., knowledge, perceived risks, values, attitudes, perceived norms, and self-efficacy).¹⁶ Effective programs were found to be based on theoretic approaches that have been demonstrated to be effective in influencing other health-risk behaviors.^{16,17} A review of existing literature identified multiple programs that were found to be effective in guiding behavioral change as it related to sexual health. See Table 2 for sexual health programs.^{18–41}

Mental and Emotional Health

It is estimated that 6 to 9 million children have a serious emotional disturbance.⁴² In 2006, there were 3.2 million youth between the ages of 12 and 17 years (12.8% of the population in that age range) who reported at least one Major Depressive Episode (MDE) in their lifetime and 2.0 million youth (7.9%) who had an MDE during the preceding year.⁴³ Young children experience mental

Table 2. Programs for the prevention of pregnancy and/or STIs

Program	Primary focus	Age (years)	Setting	Outcomes
Postponing Sexual Involvement (PSI)/ Human Sexuality Educational Series ^{18–23}	Pregnancy and STI/HIV prevention	12–13	School-based	Delayed start of sexual activity Increased condom use
Reducing the Risk ^{20,24,25}	Pregnancy and STI/HIV prevention	12–18	School-based	Increased condom use Increased contraceptive use Decreased unprotected sex
Self Center (School-Linked Reproductive Health Services) ^{20,26–30}	Pregnancy and STI/HIV prevention	12–18	School and community-based	Delayed onset of sexual activity Increased contraceptive use Decreased rate of pregnancy
Be Proud! Be Responsible! A Safer Sex Curriculum ^{31,32a}	STI/HIV prevention	13+	Community-based	Reduced number of partners Reduced unprotected sex Increased condom use
iCuide! (Take Care of Yourself) ^{33,34}	STI/HIV prevention	13+	School-based; Community-based	Reduced frequency of sex Reduced number of partners Increased condom use Decreased unprotected sex
Focus on Youth (FOY) plus ImPACT ^{35,36}	STI/HIV prevention	13+	Community-based	Reduced sexual intercourse Reduced unprotected sex
Becoming a Responsible Teen (BART) ^{37,38}	STI/HIV prevention	15+	Community-based	Reduced frequency of sex Reduced initiation of sex Decreased unprotected sex
Get Real about AIDS ³⁹	HIV prevention	15+	School-based	Reduced number of partners Increased condom use
SiHLE: Sistas Informing, Healing, Living, Empowering ^{40a}	Pregnancy and STI/HIV prevention	15+	Community-based	Reduced number of partners Increased condom use Decreased unprotected sex Decreased pregnancy rate Decreased STD rate
HORIZONS ^{41b}	STI/HIV prevention	15–21	Community-based	Reduced chlamydial infection Increased condom use

^aFound effective for boys only.^bFound effective for girls only.

STD, sexually transmitted disease; STI, sexually transmitted infection

health challenges as well. According to estimates, between 9% and 14% of children aged 0–5 years experience social and emotional problems that negatively affect their functioning and development.⁴⁴ It is estimated that one of five children and adolescents aged 9–17 years experience symptoms associated with a mental health or behavioral diagnosis⁴⁵; however, fewer than 20% received needed mental health services.⁴⁶

Supporting emotional health for children is critical in promoting academic and lifetime success. According to the CDC Division of Adolescent and School Health, if left

untreated, “mental health disorders in children and adolescents lead to higher rates of suicide, violence, school dropout, family dysfunction, juvenile incarcerations, alcohol and other drug use, and unintentional injuries.”⁴⁷ More specifically with respect to violence, serious violent offenders were more likely to report having mental health problems than either nonserious offenders or nonoffenders.⁴⁸

Youth violence is the second-leading cause of death for young people between ages 10 and 24 years. In a 2007 nationwide survey, 36% of high school students reported

Table 3. Programs for mental and emotional health

Program	Primary focus	Age (years)	Setting	Outcomes
Families and Schools Together (FAST) ^{50,51}	Mental health promotion	0–12	School-based	Decreases problem behaviors Improves academics
The Incredible Years: Parent, Teacher, Child Training Series ⁵²	Violence juvenile delinquency	2–10	School, community, and primary care clinics	Promotes social and emotional competence
PeaceBuilders ⁵³	Violence prevention Aggression	5–11	School	Promotes social and emotional competence
Promoting Alternative Thinking Strategies (PATHS) ⁵⁴	Violence/aggression	5–11	School	Promotes social and emotional competence
Primary Project ⁵⁵	Mental health promotion	5–12	School-based	Improves children's self-confidence, social skills, learning skills, and other school-related competencies
Olweus Bullying Prevention Programs (BPP) ⁵⁶	Bullying	5–14	School	Reduce or prevent bullying
Too Good for Violence ⁵⁷	Violence prevention	6–12	School	Personal and prosocial behaviors
Coping Power Program ⁵⁸	Violence prevention Aggression	8–14	Community and school	Promote social competence
Responding in Peaceful and Positive Ways ⁵⁹	Violence prevention	11–16	School	Healthy and safe children, teaches conflict resolution strategies and skills
Midwestern Prevention Program (MPP) ⁶⁰	Violence prevention	11–18	School and community	Decrease drug abuse Prevent violence

being involved in a physical fight during the prior 12 months. U.S. emergency departments reported treating 631,000 violence-related injuries involving young people aged 10–24 years in 2007.⁴⁹

The Surgeon General's report⁴⁸ on youth violence indicated that even though there had been a decline in youth violence since 1993, the incidence of violent behavior remained high. There is a need to confront youth violence with systematic, research-based approaches. It is imperative that schools and communities implement programs that have proven to be effective in addressing youth violence. Table 3 contains a list of model programs that have been reviewed and identified as effectively addressing the issues of self-esteem, social and emotional competence, bullying, and violence.^{50–60}

Injury Prevention

There were more than 73,000 unintentional injury deaths among children aged 0–19 years during the period 2000–2005.⁶¹ Transportation-related injuries as a group accounted for 66% of the unintentional injury deaths within this age range.⁶¹ Of those deaths, motor vehicle- and traffic-related deaths were the most prevalent.^{61–63} Even

more children, 9.2 million annually, sustained nonfatal injuries, with falls accounting for the largest number.⁶¹ According to the CDC, injuries are among the most under-recognized, under-reported public health problems occurring in the U.S. today. Approximately 20 children die every day from a preventable injury, exceeding the number of deaths of children from all diseases combined.⁶¹ Injuries requiring medical attention or resulting in restricted activity affect approximately 20 million children and adolescents and produce medical costs of \$17 billion annually. The total cost of unintentional injuries is almost \$300 billion annually.⁶⁴ Unintentional injuries are also a major cause of disabilities, which can have a long-lasting impact on all facets of children's lives.⁶¹

According to the WHO, there are six basic principles that are found in most of the effective child injury prevention programs: legislation, regulations, and enforcement (i.e., speed limits); product modification (i.e., non-tip lanterns, candle holders); environmental modifications (barriers); supportive home visits; promotion of safety devices; and education and teaching of skills.⁶⁵

Additional characteristics of effective injury prevention programs have been identified through the comparison of multiple programs. These include the use of multiple strat-

Table 4. Programs for injury prevention—general

Program	Primary focus	Age (years)	Setting	Outcomes
Safe Block Project ⁶⁷	Injury prevention	General population	Community-based	Increase in smoke detector use Increased safety knowledge
Safe n' Sound ⁶⁸	Injury prevention	Parents of children aged 0–5 years	Clinic-based	Adoption of new prevention behavior
Statewide Child Injury Prevention Program (SCIPP) ⁶⁹	Injury prevention	Parents of children aged 0–5 years	Community-based	Reduction in passenger motor-vehicle injuries
The Safe Kids/Healthy Neighborhoods ^{70,71}	Injury prevention	Parents of children aged 5–16 years	School-based; community-based	Decreased injury rates
Think First for Kids (TFFK) ⁷²	Injury prevention	6–9	School-based	Increased knowledge about safety and injury prevention

egies consistent with an underlying theory of behavior change, integrated in the community, tailored to address unique community characteristics such as ethnicity or SES, and stakeholders involved in program development.⁶⁶

Programs have been created to address multiple injury and safety issues. The programs in Table 4 are identified as general injury prevention programs because they target multiple areas, including playground safety, vehicle safety, falls, assaults, guns, burns, poisoning, and drowning.^{67–72} These programs tend to be long-term, comprehensive, and can be tailored to the needs of the community.

There are multiple areas for injury prevention programming; however, for the purposes of this manuscript, bicycle injury, motor-vehicle crashes, and firearm injury prevention will be addressed individually.

Bicycle injuries and deaths are a main cause of traumatic brain injury, other injuries, and death among children. From 1990 to 2005, an estimated 6,228,700 individuals aged ≤18 years were treated for bicycle-related injuries.⁷³ Children with head injuries were more than three times as likely to require hospitalization and were almost six times more likely to have their injuries result in death.⁷³ From 1999 to 2002, the average annual cost of bicycle fatalities in children and youth aged birth to 19

years was \$1.03 billion, and the average annual cost of bicycle injuries was \$3.6 billion. In 2009, 85% of children (9th–12th grade) who had ridden a bicycle within the previous 12 months had rarely or never worn a bicycle helmet.¹⁴ Properly worn helmets greatly reduce the risk of head and brain injury.⁷⁴ See Table 5 for bicycle injury prevention programs.^{75–77}

Motor-vehicle crashes are the leading cause of death among children in the U.S.⁷⁸ In the U.S. in 2005, 1335 children aged ≤14 years died as occupants in motor-vehicle crashes and approximately 184,000 children were injured.⁷⁸ The National Highway Traffic Safety Administration reports that placing children in age- and size-appropriate car seats and booster seats reduces serious and fatal injuries by more than half.⁷⁸ See Table 6 for vehicle safety programs.^{79–81}

Firearm injury prevention is addressed as part of this section because of the separate issue of unintentional firearm injuries and deaths. Between 2005 and 2006, a total of 279 children, aged birth to 18 years, were unintentionally killed by firearms.⁸² During the same period of time, 5457 children in the same age cohort sustained unintentional nonfatal injuries from firearms.⁸³ Although the deaths and nonfatal injuries were not all caused by play with firearms found inadvertently, inter-

Table 5. Programs for injury prevention—bicycle injury

Program	Primary focus	Age (years)	Setting	Outcomes
The MORE HEALTH Bicycle Safety Project ⁷⁵	Helmet use	Parents/caregivers for those aged 5–8 years	School-based	Increase in helmet use
Be Bike Smart ⁷⁶	Helmet use	Parents/caregivers for those aged 5–14 years	School-based	Increase in helmet use (high-income group only)
The Seattle Bike Helmet Campaign ⁷⁷	Helmet use	Parents/caregivers for those aged 5–15 years	School-based Community-based	Increase in helmet use Reduction in bicycle-related injuries

Table 6. Programs for injury prevention—motor vehicle restraint use among children

Program	Primary focus	Age (years)	Setting	Outcomes
Bucklebear ⁷⁹	Safety seat use	Pre-school	School-based	Increase in safety seat use
Junglemobile ⁸⁰	Safety seat and restraint use	3–11	Community-based	Increase in safety seat use Increased knowledge
The Children's Traffic Safety Program ⁸¹	Safety restraint use	5–18	School-based; Community-based	Increase in safety restraint use (only in low-income schools with good program implementation)

ventions aimed at prevention of injuries and deaths related to gun play is warranted.^{84,85} Unintentional firearm injury prevention strategies rely on several of the WHO basic principles outlined previously: behavior oriented, product design oriented, and legislative strategies.¹¹

Several programs have been created to address firearm safety, including the Eddie Eagle Gun Safe Program⁸⁶; the Straight Talk about Risks (STAR) program⁸⁷; and the Steps to Prevent Firearm Injury (STOP 2) program.⁸⁸ The Eddie Eagle Gun Safe Program has had no formal or systematic evaluation⁸⁹ and has been criticized for being unrealistic with respect to developmental level.⁹⁰ In addition, STOP 2 does not have outcome or evaluation information available.⁹¹ Although STAR was found to be developmentally and culturally sensitive, effectiveness was not shown.⁹² Gun Safety: It's No Accident, the Emergency Nurses Association gun safety training program, has shown that children learn the firearm safety training message; however, this study was limited by the small sample size.⁹¹ There continues to be a gap in evidence-based programming for firearm safety.

Tobacco and Substance Use

Tobacco use is the leading cause of preventable death in the U.S. and the majority of initial tobacco use occurs prior to age 18 years.¹⁴ Nationwide, 26.0% of high school students had reported current cigarette use, current smokeless tobacco use, or current cigar use.^{14,93} Individuals who begin smoking prior to age 18 years are more likely to become heavy users and are less likely to quit.⁹⁴

Effective prevention programs in the U.S. target children and adolescents prior to the onset of tobacco use and therefore avoid the difficulties of trying to quit after they become addicted to nicotine. The CDC developed recommendations for schools to prevent tobacco use and addiction.⁹⁵ Only a few schools have fully implemented these programs even though there is strong evidence to support school-based tobacco prevention.⁹⁶ See Table 7 for tobacco use prevention programs.

Alcohol and illicit drug use are associated with many serious problems, including violence, injury, and HIV infection. Alcohol consumption among youth in the U.S. is a major public health problem. In the 2007, the Youth Risk Survey found that 45% of high school students during the preceding 30 days reported drinking some amount of alcohol,⁹⁷ and those aged 12–20 years drank 11% of all alcohol consumed in the U.S.⁹⁸ Similar to tobacco use, the use of illicit drugs typically begins before adulthood. School settings offer the opportunity to provide a prevention curriculum prior to the onset of use.⁹⁹ See Table 8 for substance use prevention programs.^{100–108}

Exercise and Healthy Eating

From 1980 to 2008, obesity in children increased from 5% to 17%.¹⁰⁹ It has been reported that obesity among non-Hispanic African-American children could be as high as 29%.¹⁴ Children who are obese are more likely to be obese as adults.¹¹⁰ This is a major public health threat to the well-being of children. Children who have BMIs in the overweight to obese range have a higher incidence of

Table 7. Recommendations for school health programs to prevent tobacco use⁹⁵

1 Develop policies on tobacco use
2 Provide instructions about the short- and long-term negative physiologic and social consequences of tobacco use, social influences on tobacco use, peer norms regarding tobacco use, and refusal skills
3 Provide tobacco-use prevention education in kindergarten throughout 12th grade
4 Provide program-specific training for teachers
5 Involve parents or families in support of school-based programs to prevent tobacco use
6 Support cessation efforts among students and all school staff who use tobacco
7 Assess the tobacco-use prevention program at regular intervals

Table 8. Programs for tobacco and substance abuse prevention

Program	Primary focus	Age (years)	Setting	Outcomes
Protecting You/Protecting Me ^{100–103}	Prevention of alcohol use	≥6	School-based	Reduction of alcohol use Alcohol use risk reduction Increased protective factors
Life Skills Training ^{104,105}	Prevention of substance use and violence	8–13	School-based	Reduction of use Increased knowledge Improved drug refusal skills
CASASTART ¹⁰⁶	Prevention of alcohol use	8–13	School-based	Reduced alcohol and drug use, reduced drug trafficking, decreased association with delinquent peers, improved school performance, reduced violent offenses
Class Action/Project Northland ¹⁰⁷	Prevention of substance use	11–17	School-based	Decreased likelihood of alcohol use Decreased binge drinking
Project ALERT ¹⁰⁸	Prevention of substance use	13–17	School-based	Decreased likelihood of substance use Behavior change, attitude, resistance and skill building

problems related to type 2 diabetes, high blood pressure, and psychological problems.¹¹¹ Current literature supports the positive effects of good nutrition on brain development and mental health. On a cellular level, diet and exercise play a role in neuronal function. High-calorie diets or diets with high levels of trans and saturated fats create an environment in which cognitive abilities are compromised.¹¹² A recent study¹¹³ noted that limited exercise in school-aged children is associated with poorer performance on standardized test scores. Healthy eating and exercise not only directly affect an individual's long-term health but also may pass on positive benefits to future generations. A recent study¹¹⁴ found that risk for diabetes and early death was increased if the paternal grandparents had access to an abundance of food rather than limited supplies.

Given all the potential positive outcomes of healthy eating and exercise, the Surgeon General's Vision for a Healthy and Fit Nation 2010¹¹⁵ has appropriately emphasized the importance of supporting the community and family to ensure healthy nutrition, physical activity, and access to healthy food choices and recreational activities for all citizens. In addition, the CDC initiated the Common Community Measures for Obesity Prevention Project¹¹⁶ and proposed six strategies for addressing the obesity problem. The strategies include increasing affordable healthy foods and beverages; supporting healthy food and beverage choices; encouraging breast feeding; encouraging physical activity; creating safe communities that support physical activity; and encouraging communities to organize for change. In addition to the strategies, there are specific suggested measurements to ensure that strategies can be implemented.

A recent systematic review of school-based interventions for preventing obesity was conducted.¹¹⁷ This report evaluated the effectiveness of interventions that focused on improving diet and physical activity in children aged 4–18 years. Direct comparisons among programs were not possible given the vast heterogeneity of the studies (i.e., study designs, participants, interventions, and outcomes measured varied). Although it was reported that there was insufficient evidence to assess the effectiveness of the programs, the authors concluded that combined diet and physical activity interventions may prevent obesity in children in the long run.

Despite the importance of obesity prevention, there is currently a lack of evidence-based programs available for implementation. Given the substantial long-term consequences of obesity, future research will need to address this pressing need.¹¹⁷ Table 9 lists programs that have been shown to increase physical activity and promote healthy lifestyle choices.^{118–122} Additional resources include Action for Health Kids: Tips for Schools,¹²³ Exemplary Physical Educational Curriculum (EPEC),¹²⁴ Health Education via Animated Eagle Book Series (CDC-TV),¹²⁵ U.S. Preventive Services Task Force (USPSTF) on Obesity,¹²⁶ and School Health Index.¹²⁷

Implementation Strategies

Implementation has been coined “the missing link” when disseminating evidence-based programs into service settings to benefit children, families, and the community. Without following the developers' guidelines and ensuring fidelity of the program, an evidence-based program often will not produce the intended results.^{128,129} A team

Table 9. Programs for exercise and health

Program	Primary focus	Age (years)	Setting	Outcomes
CATCH (Coordinated Approach to Child Health) ^{118,119}	Physical activity, healthy food choices, and prevent tobacco use	4–14	Schools	Prevent obesity and tobacco use
SPARK (Sports, Play and Active Recreation for Kids) ¹²⁰	Physical activity	4–18	Schools and communities	Increased physical activity
TAKE 10! ¹²¹	Physical activity	5–11	Schools	Increased physical activity
We Can (Ways to Enhance Children's Activity and Nutrition) ¹²²	Education	8–13	Parents, caregivers, and communities	Healthy eating, increased activity, decreased TV/video watching

approach to implementing evidence-based programs will often enhance the success of the program.

Fixsen and Blasé¹²⁹ identified six stages of successful implementation of evidence-based programs. The stages consist of exploration, installation, initial implementation, full implementation, innovation, and sustainability. These stages are not linear but are complex and fluid, moving from full implementation back to initial implementation, depending on staff turnover that often occurs in high-risk communities/schools. In addition, core components of implementation include careful staff selection, pre-service, in-service training, ongoing coaching and consultation, staff performance evaluation, data systems, facilitative administrative supports, and system interventions for successful implementation.^{129,130} Identifying key stakeholders and short- and long-term goals and resources are essential first steps when implementing evidence-based programs. It is important to take the time at the onset to ensure that the groundwork has been laid and that an effective system has been developed to monitor progress. Implementation strategies should be evaluated for effectiveness and outcomes should be reviewed. Evidence-based implementation methods should be used in conjunction with evidence-based programs to achieve optimum quality outcomes.

The CDC's Division of Adolescent and School Health created the Health Education Curriculum Analysis Tool (HECAT) to assist schools in choosing or developing the best possible health education curricula. The HECAT builds on the National Health Education Standards and the CDC's Characteristics of Effective Health Education Curricula. The HECAT provides guidance and tools to help appraise curriculum content, the feasibility of curriculum implementation, and the affordability and cost of curricular materials. The extensive resources of the HECAT can be found at www.cdc.gov/healthyyouth/HECAT/index.htm.

Terzian and colleagues¹³¹ have developed a guide to help schools and practitioners in maintaining the fidelity of evidence-based programs. This guide recommends that programs that have been “packaged” with clear and concise implementation methods and a good fit for the school will be more likely to have positive outcomes for the students and the school.¹³¹ In addition, online resources have been identified to provide access to additional evidence-based programs that are appropriate for schools and communities (Table 10).

Conclusion

One of the objectives of Healthy People 2020—to provide comprehensive school health education to prevent health problems in the areas of sexual health, emotional health, healthy living and safety, and injury prevention—is fundamental to the success of improved health and for an overall enhanced quality of life for children. Data reveal that children remain vulnerable to substantial risk of mortality and morbidity that can result from problems associated with these areas. Health education in schools provides an opportunity to promote health and reduce risk. Federal agencies have endorsed the importance of school health promotion, and national health education standards have been developed to guide prevention programs. School health promotion and disease prevention programs are most effective when they are developmentally appropriate and when they take into account the relationships among the student, family, school, community, and society.

Although the identification of effective evidence-based programs is essential to enhancing school health education, the effective implementation of programs is crucial to their success. The establishment and utilization of evidence-based programs take time, and the likelihood for success is enhanced when programs are implemented consistently. Resources and adequate funding will be

Table 10. Online resources for identifying evidence-based programs

<p>The Substance Abuse and Mental Health Services Administration's (SAMHSA) National Registry of Evidence-based Programs and Practices (NREPP): a searchable online registry supporting mental health promotion, substance abuse prevention, and mental health and substance abuse treatment. nrepp.samhsa.gov/</p>
<p>Blue Prints for Violence Prevention: a project of the Center for the Study and Prevention of Violence (CSPV) at the University of Colorado. The project aims to identify violence and drug prevention programs that meet a high scientific standard of effectiveness. www.colorado.edu/cspv/blueprints/</p>
<p>The Office of Juvenile Justice and Delinquency Prevention: The Model Programs Guide is designed to assist practitioners and communities in implementing evidence-based prevention and intervention programs that can make a difference in the lives of children and communities. www.ojjdp.ncjrs.gov/mpg/</p>
<p>The Collaborative for Academic, Social, and Emotional Learning (CASEL): a nonprofit organization that works to advance the science and evidence-based practice of social and emotional learning (SEL), especially in schools. www.casel.org/programs/selecting.php</p>
<p>CDC Division of Adolescent and School Health (DASH): DASH promotes the health and well-being of children and adolescents to enable them to become healthy and productive adults. www.cdc.gov/healthyyouth/index.htm</p>

needed to support and refine evidence-based programs at the local, state, and federal levels. A long-term commitment by the public, politicians, and the healthcare and educational systems will be needed to ensure positive outcomes from these programs for years to come.

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