School-Based Prevention-Evolution of Evidence-Based Strategies

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Introduction

Several important milestones have been achieved over the past several years that can and will have a profound impact on how substance use prevention will be implemented in the future, particularly as implemented in schools.

The first of these events was the publication of the Society for Prevention Research's Standards of Knowledge for the Science of Prevention. In this document the Society for Prevention Research (2011) the authors laid out the goals and content of prevention science. "The primary goal of prevention science is to improve public health by identifying malleable risk and protective factors, assessing the efficacy and effectiveness of preventive interventions and identifying optimal means for dissemination and diffusion. The field involves the study of human development and social ecology as well as the identification of factors and processes that lead to positive and negative health behaviors and outcomes. Theories of human development are used to design interventions (programs and policies) that target the reduction of risk and the enhancement of protective factors at the individual, familial, peer, community, and environmental levels. … Prevention science is the foundation for health education and health promotion as well as preventive interventions" (p. 3).

The second event was the publication at the same time, 2011, of the European Drug Prevention Quality Standards (European Monitoring Centre for Drugs and Drug Addiction, 2011) that sets out quality standards for prevention professionals in the planning for a target population, assessing needs and available resources to meet these needs, implementing appropriate interventions and monitoring and evaluating their outcomes. It also addresses sustainability, stakeholder involvement, and ethical practices.

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A third event was the publication of the International Standards on Drug Use Prevention by the United Nations Office on Drugs and Crime in 2013. This document established rigorous criteria for assessing research evidence of effectiveness and summarizes the scientific evidence, describing effective interventions and policies and their characteristics by the targeted age group (prenatal and infancy, early childhood, middle childhood, adolescence, and late adolescence and adulthood) and setting (family, school, workplace, community and health sector).

These milestones are important for two major reasons. First, they underscore the evolution of a new field of study, prevention science, and the significant advances made in prevention research methodologies that have provided for rigorous controlled studies that could be replicated with positive outcomes. Second, they lay out the framework for the development of a new field of science with its own lexicon, theories, methodologies, and practice (Bosworth & Sloboda, 2015).

History of Prevention Science

Until the establishment of the National Institute on Drug Abuse (NIDA) in 1974, existing prevention efforts were generally found to have limited impact. Among the advances in shaping more effective prevention programming was the extensive epidemiologic research base that was developed and sustained by NIDA. This work provided information regarding the origins and pathways of substance use that has been summarized by Hawkins, Catalano, and Miller (1992). Other important influences on the direction prevention research was to take through the 1980s and 1990s were theoretically derived behavioral models such as the Social Learning Theory and the Theory of Planned Behavior that specify those attitudes, perceptions and beliefs leading to substance use and other problem behaviors that become the target of prevention interventions (Coie et al., 1993). Other theories of social control have also played important roles in the development of environmental or policy interventions particularly for the use of tobacco and alcohol (Ashe, Jernigan, Kline, & Galaz, 2003; Holder, 2000, 2001; Liang, Chaloupka, Nichter, & Clayton, 2003; Luke, Stamatakis, & Brownson, 2000; Ross & Chaloupka, 2003). Finally are learning theories that provide the foundation for instructional strategies and implementation including cognitive theory (e.g., Renner et al., 1976), the development of relevant and appropriate educational goals (e.g., Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956), and constructivism (Bruner, 1960).

In addition, the emergence of the "ecobiodevelopmental (EBD) framework" for explaining human behavior (Fishbein, Rose, Darcey, Belcher, & VanMeter, 2016; Shonkoff, 2010) has prompted a reconceptualization of prevention that builds on and more fully transforms the concepts of risk and protection to those of vulnerability and resilience (Sloboda, Glantz, & Tarter, 2012). These frameworks serve to elucidate the etiology of behavioral problems such as substance use indicating that how we develop our attitudes, beliefs, and behaviors in response to the world around us is influenced by our interface with our microlevel and macrolevel environments. Key

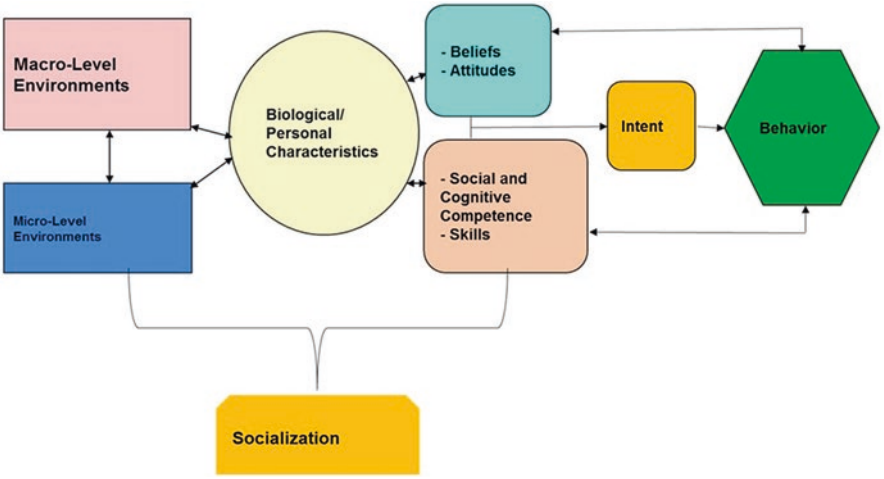

Fig. 1 The etiology model and human motivation and change process. This model shows how the various environmental levels, personal characteristics and the socialization process interact in the decision-making that takes place before the use of any substance and performance of other problem behaviors. Colombo Plan International Centre for Credentialing and Education of Addiction Professionals (ICCE). (2015). Introduction to the Universal Prevention Curriculum Series for Implementers, (p. 229). Colombo, Sri Lanka: Colombo Plan

microlevel environments include family and school. Merging this framework with the theoretical behavioral models and what we know about learning processes suggests an approach to prevention that addresses the needs of primary socialization agents: parents, teachers, peers, employers, etc., and the contexts or settings in which they function. A simplified example of such a framework is provided below in Fig. 1.

Genetic and other biological factors play a significant role in the achievement of developmental benchmarks, that is, the goal of each stage of development, from infancy to early adulthood that includes: intellectual ability, language development, cognitive, emotional, and psychological functioning, and attainment of social competency skills. The extent to which developmental benchmarks are met determines our level of vulnerability to influences from our environment. Such vulnerability can vary within an individual and across developmental periods. Children who do not reach early developmental benchmarks are most likely the most vulnerable as failure to achieve these early benchmarks signifies their difficult in reaching later ones. Environmental factors can both lessen or enhance this vulnerability. As environmental experiences are associated with heightened stress or adversity, the risk for substance use is increased. The environmental influences are viewed at two major levels, those in close proximity to the individual—microlevel environments—and those that are more distant—macrolevel environments. It is the combination of these environmental influences and personal characteristics of individuals that shapes beliefs, attitudes, and behavior. What is also important to note in this figure is that the two levels of influence—the macrolevel and microlevel—do not operate independently to influence our behavior, but they also impact one another. For

instance, family stability and even parenting behaviors can be challenged when one or both caregivers are unemployed for long periods of time. This process suggests that prevention is a socialization agent in two ways. First, in working with family, school staff, and workplace and second by directly targeting populations through the media, school curricula, and the enforcement of policies, regulations and laws.

Until the late 1980s and early 1990s, substance use interventions used a public health framework to define both the targets of the interventions and the mechanisms that were applied in the interventions. However, the application of this framework that consisted of three levels of intervention: primary, secondary, and tertiary, reflecting the disease status of the individual, group, or population being addressed, did not satisfactorily meet the needs of those designing programs for substance use or mental health problems. Gordon (1983) suggested moving to a more empirically based approach, one that weighs the risk to an individual of getting a disease against the costs associated by participating in an intervention. This new model was adapted as "the mental health intervention spectrum" by the Institute of Medicine Committee on Prevention of Mental Disorders and published in the Committee's report, Reducing Risks for Mental Disorders (Mrazek & Haggerty, 1994). Three levels of prevention were defined: universal, selective, and indicated, each addressing the varying degrees of risk found in the targeted population.

Universal programs are designed to address general populations while selective programs target those segments of the population that present greater than normal risk to develop a disorder and indicated programs focus on those subgroups that exhibit signs or symptoms of developing a disorder. This nomenclature is currently in use among psychoactive substance use prevention researchers and practitioners. This designation remains in effect today and influences not only the design of interventions but also how these interventions are evaluated.

The new transactional ecological framework is useful to redefine risk and protective factors as the interface between the individual and the microlevel and macrolevel environments as well as between the two levels of environments themselves. This new way of looking at vulnerability will warrant new methods for assessing the need for prevention, identifying the target population, selecting an appropriate intervention, and then, evaluating the short-, intermediate-, and long-term outcomes of the intervention.

History of Introducing Effective Substance Use Prevention Interventions into Schools

The school as a microlevel environment is an appropriate setting for prevention strategies for several reasons. The most obvious is that the school is where children in the USA spend a great proportion of their time. In addition, the school remains a major socialization institution to reinforce societal values, norms, and acceptable

behaviors. Furthermore, the school is a protective environment for children (Schaps & Solomon, 2003) where they should feel safe.

In order to learn the nature and extent of school-based activities that are provided to address a number of problem behaviors such as substance use, violence, accidents, and risky sexual behaviors, Gottfredson and Gottfredson (2001) conducted a survey of principals of a national probability sample of 848 public, private, and catholic schools. They found that the typical school offered a large range of such activities, from 0 to 66 within individual schools, with an average of 14 activities per school. These activities included rules and policies; information on topics such as substance use, health, mental health, and violence; and curriculum instruction. However, as the authors point out, the effectiveness of most of these activities in reducing or eliminating problem behaviors had not been demonstrated.

The process of translating effective prevention approaches to these problem behaviors, and specifically, psychoactive substance use, however, did not begin until the mid-1990s. Concern about moving the findings from prevention research from the research setting to the community prompted the NIDA-sponsored first National Conference of Drug Abuse Prevention Research: *Putting Research to Work for the Community* in 1996. The conference was designed to foster a dialogue between researchers and practitioners. One of the major outcomes of that conference was a booklet, *Preventing Drug Use among Children and Adolescents: A Research-Based Guide* (Sloboda & David, 1997). As Bukoski writes, "This publication clearly established the beginning of the evidence-based drug abuse prevention movement that has emerged across the country …" (Bukoski, 2003, p. 6). The guide was written to translate research for community-based practitioners including findings regarding the origins and pathways to substance use and abuse and planning prevention interventions. One part of the guide examined the consistent elements of effective prevention programming drawn from NIDA-funded research. These elements or principles set the stage for a number of other events that promoted evidence-based prevention programming. With the publication of the guide, the US Department of Education (DOE) Safe and Drug-Free Schools and Communities Act (SDFSCA) and the Center for Substance Abuse Prevention of the SAMHSA created review processes through which programs are added to lists of effective and exemplary programs. These include SAMHSA's National Registry of Evidence-Based Programs and Practices and the Department of Justice Office of Juvenile Justice and Delinquency's BluePrints. Most of these interventions are school-based, representing the history of the field that has been more school-centered, particularly when addressing psychoactive substance use issues.

Prior to this time, the SDFSCA program had come under scrutiny and criticism as to how it funded over $6 billion for school-based programming to improve school safety (Sherman, 2000). In response to such pressure and after NIDA's publication of the guide in 1997, the SDFSCA staff issued the *Principles of Prevention* in 1998. The Principles require local school districts and other recipients of SDFSCA funds to develop programs that are based on (1) an assessment of the incidence of violence and illegal drug use, (2) analysis of data regarding risk factors, (3) established set of performance measures to ensure a safe and drug-free environment, and (4) sound

research that demonstrates the program is effective (either selected from SDFSCA and SAMHSA lists or with other documentation of effectiveness). In addition, school districts were expected to evaluate the extent to which these programs met established performance measures (US Department of Education, 1998).

Dissemination of information about these effective prevention interventions (EPI) by several Federal agencies, including the DOE, SAMHSA, OJJDP Model Programs Guide, and nonprofits had not been fully successful with respect to their adoption. Over time, surveys showed an increase in the availability of these EPIs in middle schools from an estimated 34.6% of schools providing EPI in 1999, to an estimated 42.6% in 2005, and 46.9% in 2008 (Ringwalt et al., 2002, 2009, 2010; US Department of Education, 1998). Among high schools, however, in the 2008 survey, only an estimated 10.3% were delivering EBI (Ringwalt et al., 2008). Sloboda and colleagues (2008) reported similar findings for middle schools with somewhat lower percentages in high schools. These studies also showed that many more middle and high schools reported that they provided "locally" developed (home-grown) or "non-EPI" curricula.

It is clear that these dissemination efforts had not been systematic, nor guided by research as to the most appropriate target audiences involved in local decision-making, nor about the most important information they need in order to make informed decisions. Crowley and colleagues (Crowley, Greenberg, Feinberg, Spoth, & Redmond, 2012) conducted one of the few studies to report on "how building stakeholders' knowledge in regard to selecting and implementing EPI was part of capacity building in the PROSPER project" (Crowley et al., 2012, p. 96). Over a 5-year period, they found that PROSPER stakeholders had increased knowledge about the standards of evidence for EPI over controls. They speculated that this was due to the fact that PROSPER staff provided the stakeholders with all the information they needed about effective interventions.

Rohrbach and colleagues (Rohrbach, Ringwalt, Ennett, & Vincus, 2005), in their national study of substance use prevention coordinators, found that the significant factors involved in district-level decisions to adopt EPI included (1) Input from a state substance use prevention group; (2) Use of information disseminated by NIDA or the Center for Substance Abuse Prevention; (3) Use of local needs assessment data; (4) Consideration of research showing which curricula are effective; and (5) A greater allocation of a prevention coordinator's time to substance use prevention activities. They also found that adoption was positively associated with large, urban schools, more administrative effort on prevention programming, and a history of organizational innovativeness. The researchers speculated that such large schools were likely to have had more resources to devote to EPI preparation. In a literature review (Durlak & DuPre, 2008) on behavioral health promotion programs in real-world settings, a number of organizational-level factors were found in successful programs, including: organizational climate (e.g., willingness to try new approaches); effective leadership; and practices that allow shared decision-making and open communication. All of these organizational factors also have an impact on adoption decisions (Sloboda, Dusenbury, & Petras, 2014).

Powers and colleagues (Powers, Bowen, & Bowen, 2010) cite multiple articles that show how few practitioners in schools are using EPI educational and social service practices. They report on the program characteristics that are likely to serve as barriers to the implementation of such practices in schools. Among 51 school-based practices, barriers appear to include: high startup costs, challenging training and staffing requirements, and a lack of easily accessible information about programs in places where school personnel are likely to find it. While the Powers et al. (2010) study detailed some of the potential barriers to implementation, their findings do not reflect "the view from the ground"—i.e., what factors do local stakeholders consider important to their decisions? For example, it is not known to what extent the recent drop in funding has had on the adoption and continuation of EBI in schools. Other factors not considered include costs, training, characteristics of the practices, time commitments, stakeholders' perceptions of the seriousness of the local problem, the types and sources of information they need, and school and district characteristics.

On the other hand, some schools do implement prevention programs effectively. Payne and associates (Payne, Gottfredson, & Gottfredson, 2006) found that implementation quality was associated with both school and program factors. Those that were found to have high-quality implementation engaged in local (within schools) program selection, integrated prevention programming into school operations, had principal support, had the organizational capacity (capacity for program development, teacher–principal communication, amenability to implementation, and no obstacles to implementation), and had the means for standardization (e.g., use of an instructor's manual). Many of these findings are supported by other studies (Ringwalt, Ennett, Vincus, Rohrbach, & Simons-Rudolph, 2004; Rohrbach et al., 2005; Wenter et al., 2002).

The Application of Prevention Science to the Development of Evidence-Based Prevention Interventions

The term "prevention science" was introduced in 1993 by Coie et al. It was not until 2011 with the online publication of Standards of Knowledge for the Science of Prevention by the US Society for Prevention Research that the term became more widely accepted by prevention professionals, both researchers and practitioners. As mentioned in the introduction to this chapter, prevention science identifies those risk and protective factors or vulnerabilities that can be addressed through interventions, provides the tools necessary to assess the efficacy and effectiveness of preventive interventions, and identifies the most optimal means for dissemination and diffusion of effective interventions. Prevention science draws from multiple scientific disciplines including psychology, neurobiology, epidemiology, sociology, developmental psychology and dissemination science. It applies theories of human development and human behavior to the development of targeted interventions and to their evaluations.

Although the question "what "works" in prevention remains an unanswered issue the process for developing effective interventions is becoming clearer. Rohrbach (2014) has laid out the stages of intervention design. Drawing on models developed in public health such as the Precede-Proceed model (Green & Kreuter, 2005), her stages of the intervention design process include Stage 1: Adopting a Theoretical Foundation that requires first identify the target population so that the appropriate theory of human development and behavior and intervention objectives can be articulated; Stage 2: Building the Intervention that is informed by age-related learning theories and strategies, conducting formative research, and tailoring the specific needs of the target population; and Stage 3: Pilot Testing to examine the feasibility of delivering the intervention and to determine if the short-term objectives of the intervention are met. The next stages include taking the intervention to scale.

Rohrbach and Dyal (2015) point out that schools face many demands on them that impede the large-scale implementation of evidence-based prevention programs. Given these barriers, they lay out an approach that was used to scale up Project To No Drug Use. Factors that are key are careful planning identifying a "home" for the program, in what subject area or class could the program be delivered. Focus should first begin with teachers who have positive attitudes and are supportive of the program. Furthermore, they found that building partnerships between schools and local social service agencies particularly those that may have funding to assist in the implementation of the program and also involving social service staff in the training and delivery of the program provided support needed to bring the program into the schools.

The International Standards on Drug Use Prevention

Until 2013, terms that were applied to effective prevention interventions continued to be "research-based" or "science-based." With the push for evidence-based medical practice in the late twentieth century (Sackett, Rosenberg, McGray, Haynes, & Richardson, 1996), it was the United Nations Office on Drugs and Crime first defined and applied the term in the Office's International Standards on Drug Use Prevention [2013/2015] (cited in the United Nations Office on Drugs and Crime, 2013). The Standards used a rating system based on the rigor of the research methods applied in the evaluation process from "excellent," "very good," and "good" ratings for effectiveness supported by meta-analyses and systematic reviews, multiple randomized controlled trials and quasi-experimental methods, primarily time series analyses. Ratings of "good" and "adequate" were used for single randomized control trials or evaluations conducted through acceptable methodologies.

The International Standards document does not advocate for a particular program but rather presents the content, structure, and delivery strategy used in the evaluated interventions. The findings are presented within development age groups (infancy and early childhood, middle childhood, early adolescence, and late adolescence and adulthood) and developmental age groups within settings in which the interventions are delivered (family, school, workplace, community and the health

sector). What is presented below is an enhanced summary of the findings from the Standards document.

Evidence-Based Prevention Interventions for Schools

There are three aspects of the school environment that lend themselves specifically to substance use prevention intervention: (1) school culture, that is, norms, beliefs, and expectancies, and school bonding, that is, connecting the individual to the school experience and community; (2) school policy or social control, the most common approach establishing disciplinary policies and procedures; and (3) classroom curriculum or manualized programs.

School Culture and School Bonding

Earlier we discussed the etiology model that describes risk and protective factors associated with the initiation of substance use as an individual–environmental interaction (Fishbein et al., 2016; Sloboda, 2015; Tarter et al., 1999). Prevention programs that address this interaction intend to make the school environment more attractive to students to help students develop more prosocial attitudes and affiliations and to engage in more prosocial behaviors. The intent is to increase self-efficacy and school bonding and decrease the likelihood that students will use alcohol, tobacco, or other psychoactive substances (Campello, Sloboda, Heikkil, & Brotherhood, 2014). The intentions of these approaches include:

- Support an orderly school climate and normal functioning
- Enhance teachers' ability to management their classrooms effectively
- Socialize children in their roles as students, and
- Support a positive school ethos and a commitment to school and student participation
- Reduce disruptive and aggressive behaviors.

The common elements of effective strategies to create a positive normative environment for children include the following (Fletcher, 2015).

- Ensuring the school environment is inclusive and emotionally and physically safe
- Promoting positive relationships between students, teachers, and other school staff in which there is mutual respect, caring and a shared sense of belonging and commitment to the school experience
- Setting and supporting health norms, behaviors and relationships including creating nonsubstance using settings.

In general the content of these approaches include strategies to respond to and correct inappropriate behavior and those that acknowledge and reward appropriate behavior. Training of school staff to implement these programs is required to assure fidelity, consistency, and sustainability.

One of the earliest programs designed to change school culture is the Child Development Project (CDP) (now termed Caring School Community Program) designed by Eric Schaps of the Developmental Studies Center. This program targets children when they are 5–12 years old. It is designed to promote school bonding, to enhance students' interpersonal skills and commitment to positive values, and to develop both a classroom and schoolwide atmosphere of caring (safety, respect, and helpfulness). The long-term outcomes are the reduction or elimination of the use of alcohol, tobacco, and marijuana and involvement in violent behaviors and other risky behaviors. The three program components consist of (1) intensive classroom activities that focus on cooperative learning, a literature-based reading and language arts curriculum, and developmental discipline; (2) schoolwide activities designed to involve teachers, parents, students, and extended family members in building a caring school community; and (3) family activities that are designed to bring classroom experiences into the home, promoting communication between students and their families. The program was evaluated in the 1990s using a quasi-experimental design with six demonstration and six comparison schools (Battistich, Schaps, Watson, Solomon, & Lewis, 2000).

Although programs to impact school culture also increase school bonding, there are a number of programs that focus primarily on school bonding per se. Common elements or principles of school bonding programs include the following:

- Focusing on early years; that is, preschool to middle school.
- Enhancing competency in reading and math.
- Providing interpersonal skills to enable students to relate positively with peers and adults.
- Involving parents in communication and parenting skills and in school activities.

There are several effective programs that emphasize school bonding. Among these are the Skills, Opportunities and Recognition (SOAR) program (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999), Incredible Years (Webster-Stratton, Reid, & Hammond, 2001), and Early Risers Skills for Success (August, Lee, Bloomquist, Realmuto, & Hektner, 2003).

The SOAR program developed at the University of Washington by the Social Development Research Group emphasizes positive personal development and academic success. This goal is achieved by providing opportunities for active involvement of elementary school aged-children in their family and in school with consistent positive recognition for their positive attitudes and behavior. The program has components for students, teachers, and parents. The student component is designed to develop acceptable social skills both in school and at home. The teacher component focuses on improving classroom management and instruction methods to increase academic skills and behavior. The parent component emphasizes developmentally

appropriate parenting skills. Using a nonrandomized design with follow-up 6 years after the intervention, three treatment conditions were created: (1) full intervention group in which interventions occurred from grades 1 through 6; (2) late intervention group with interventions delivered in only grades 5 and 6; and (3) control group with no special intervention. Five hundred and ninety-eight students with parental consent were followed through age 18. It was found that students in the full implementation program had statistically significant improvements in their attachment to school and in their academic performance and had significantly lower rates of heavy drinking and violent behavior (Hawkins et al., 1999).

While these interventions address school climate and culture, there are interventions that address classroom climate. The most widely recognized intervention of this type is the Good Behavior Game. The purpose of this classroom management program, which targets children in elementary and early middle school, is to socialize them into their roles as students. In particular, the program seeks to reduce aggressive or otherwise disruptive classroom behavior by establishing a set of rules of appropriate conduct, teaching students how to behave and work together effectively as members of a team, and how to monitor their own as well as their team's behavior. The teacher also specifies incentives for positive behavior for both the individual student and the team as a whole. Evaluations have demonstrated that the program reduces substance use and violence, and enhances students' mental health (Kellam et al., 2014).

School Policy

Research examining school policies related to substance use within the school building have received relatively meager attention over the past two decades. School policies are especially appealing to address substance use as large numbers of the target population can be affected and the associated costs appear to be minimal. Evans-Whipp and colleagues (Evans-Whipp et al., 2004) conducted a review of school policies and found that most schools in developed countries have substance use policies that varied substantially in terms of how comprehensive they were and in how policies are enforced, whether punitive or remedial. They found that research studies that examined the outcomes from school policy focused on the use of tobacco that indicated the more comprehensive and enforced policies were related to lower rates of smoking.

Pentz (2003) suggests there are four types of formal regulations found in schools: (1) those that focus on the production or distribution of substances and those that regulate price and the conditions of use; (2) those that control the "flow of information" regarding substance use such as warning labels; (3) those that directly regulate consumption (e.g., use of prescriptions and monitoring use by physicians); and (4) those that declare use as illegal (e.g., minimum drinking age, sanctions against possession of illicit drugs.)

Common elements or principles of effective school policy approaches to impact substance use include the following:

- Reducing or eliminating access to and availability of tobacco, alcohol, or other drugs.
- Addressing infractions of policies with positive sanctions by providing counseling or treatment and special services to the students rather than punishing them through suspension or expulsion.
- Policies should not disrupt normal school functioning.
- Policies should address the full range of drug-using behaviors from initiation to progression to abuse and dependence and relapse.
- Policies should have a small number of focused goals.
- Policies should specify the substances that are targeted.
- Policies should reflect and be reflected in other community prevention efforts.
- The student body, faculty, and students should be involved in developing the policy.
- Policies should provide positive reinforcement for policy compliance.
- Policies should provide systematic training for policy administrators and educate the target population about participation in policy aims.

Direct interventions mentioned by Pentz (2003) with specific relevance for youth consist of drug testing in schools and athletic events. In 1995, the US Supreme Court upheld a school's right to conduct random drug tests of student athletes without any suspicion of use of drugs, and in 2002, the Supreme Court carried this decision further by upholding school districts' rights to extend testing to students participating in other extracurricular activities (Yamaguchi, Johnston, & O'Malley, 2003). However, to date there is no clear evidence that drug testing has an association with lower rates of substance use. The studies that were conducted have a number of methodological problems (Goldberg et al., 2003, 2007; James-Burdumy, Goesling, Deke, & Einspruch, 2010; Terry-McElrath, O'Malley, & Johnston, 2013; Yamaguchi et al., 2003). Goldberg and his group (Goldberg et al., 2003, 2007) have conducted two studies on the impact of drug testing on high school athletes, the Student Athlete Testing Using Random Notification. In the first study, although the researchers found that drug testing did result in decreased reported use of drugs, they caution against the use of this approach until a larger, randomized longitudinal study is conducted (Goldberg et al., 2003). The larger study was completed and the findings, based on self-report, indicate no differences between control and experimental students on past month drug use (Goldberg et al., 2007). The researchers conclude that drug testing is not an effective deterrent to drug use and actually may increase the risk factors that could be associated with future substance use.

Other environmental policies such as roadside testing for alcohol use; lower blood alcohol content (BAC) laws; higher minimum drinking laws; and drug and alcohol possession checks at school and public events can involve the school and other community organizations through direct involvement of school administrators in designing these policies or incorporating discussion of the legal consequences of alcohol use by minors in the school curriculum or special assemblies. Of these

approaches, road-side checks and testing, lower BAC, higher minimum drinking age laws, and identification checks for the purchase of tobacco have been evaluated and found to be effective in decreasing alcohol-related accidents and tobacco purchases by youth (Callinan, Clarke, Doherty, & Kelleher, 2010; Forster, Wolfson, Murray, Wagenaar, & Claxton, 1997; Hingson et al., 1996; Hingson, Heeren, & Winter, 2000; Holder, 1993; Wagenaar, Salois, & Komro, 2009; Wolfson et al., 1996).

Other types of effective policies that extend beyond the school building but that can involve the school focus on the vendor controlling availability and access by youth. These include removal of cigarette vending machines, alerting parents about laws against serving alcohol to minors, local alcohol server and tobacco sales staff training to ensure understanding of sale restrictions to minors and the need to "card" customers, "sting" operations to determine that these deterrents are implemented, and follow through on penalties for sales of alcohol and tobacco to underage youth (Altman, Rasenick-Douss, Foster, & Tye, 1991; Forster et al., 1997; Forster & Wolfson, 1998).

Classroom Curriculum

Probably the most frequently occurring prevention approach is the use of a classroom curriculum that focuses on the prevention of substance use. A survey of Safe and Drug Free Schools Coordinators in a sample of 81 school districts in 11 states conducted in 1999 indicated that 80% delivered a prevention curriculum to their students. Of these 80%, 26% include elementary, middle, and high school programs, 42% reported that their districts focus primarily on the elementary school level (generally kindergarten through 5th or 6th grade), 26% on the middle school level (generally 6th or 7th grades to 8th grade), and 6% on the high school level (generally 9th through 12th grades) (Bruckner et al., 2014; Hallfors, Sporer, Pankratz, & Godette, 2000). As such, many types of classroom curricula have been developed and evaluated over the past 25 years. Several researchers have conducted meta-analyses of the data from studies of both universal and indicated programs (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Faggiano, Minozzi, Versino, & Buscemi, 2014; Gottfredson & Wilson, 2003; Porath-Waller, Beasley, & Beimess, 2010; Tobler, 1986, 1992; Tobler, Lessard, Marshall, Ochshorn, & Roona, 1999) while others conducted program content analyses and surveys of prevention researchers (Dusenbury & Falco, 1995; Sloboda & David, 1997; United Nations Office on Drugs and Crime, 2013) to determine common elements of effective interventions. There have been consistent findings across all of these approaches.

Common elements of universal/indicated curriculum include the following:

- Dispelling misconceptions regarding the normative nature and expectancies of substance use (i.e., the prevalence and positive/negative effects of use).

- Impacting perceptions of risks associated with substance use for children and adolescents (i.e., emphasizing the effects students will experience now not when they are adults).
- Providing and practicing what are called life skills that include making decisions, especially about initiating or continuing substance use; communicating these decisions; and resistance skills to refuse the use of tobacco, alcohol, and illicit drugs using authentic scenarios.
- Providing interventions and boosters over multiple years into middle and high school when students are most at risk.

Most available evidence-based school curriculum programs are considered universal as they target general populations that include students at different levels of risk for initiating the use of alcohol, tobacco, or other psychoactive substances. There are a number of indicated programs that target students who are considered at higher risk to initiate the use of these substances because they are not doing well in school and are experiencing high numbers of absences, suspensions, or expulsions. There are few that could be considered selective programs, that is, that address students who may have initiated low levels of substance use or are expressing other problem behaviors.

There are several examples of effective universal curricula available. These include LST (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1995), Project ALERT (Ellickson, Bell, & McGuigan, 1993), and Project STAR (Pentz et al., 1989). LST developed at Cornell University by Botvin and his group has been one of the most cited effective universal curricula in the USA. LST is a program that enhances competencies of the participants. It consists of a 24-session elementary school program delivered over 3 years (3rd or 4th to 6th grades) and/or a 30-session middle school also to be delivered over 3 years (6th or 7th to 8th grades). The three major aims of the program are to provide students with skills that enable them to challenge common misconceptions regarding the use of tobacco, alcohol, and other drugs and to learn the skills needed to resist pressures to engage in the use of these substances, personal self-management skills that help them set and keep personal goals and to make well-thought out decisions, and other social skills to communicate effectively and clearly with their peers and adults. LST has been evaluated with a number of diverse populations with consistently good results. For instance, in one evaluation study in which 56 public schools were randomized to an experimental or control condition, 3597 participating students were followed to the 12th grade. The study found that 44% fewer students exposed to a program of 15 lessons in the 7th grade, ten booster lessons in the 8th grade, and five booster lessons in the 9th grade used drugs and 66% fewer used a combination of tobacco, alcohol, and marijuana (Botvin et al., 1995). In other studies conducted by this same group of researchers, it was found that even without the boosters in the 8th and 9th grades there had been a reduction of between 56% and 67% in the number of students becoming smokers who were nonsmokers at baseline without the two additional years of booster lessons. When the 2 years of booster lessons are added, the percentage of nonuse of tobacco increased to 87% (Botvin & Griffin, 2003).

Another curriculum that we will describe is Project Toward No Drug Abuse (Project TND). The purpose of this curriculum is to teach a number of skills, including self-control, decision-making, and substance use resistance, and to strengthen motivations not to use substances, which is another way of saying to increase anti-substance use attitudes. Project TND, which uses interactive methods, is taught in 12 weekly sessions of about 40 min each, and is thus designed to fit comfortably within a traditional 45–50 min class period. While it has been tested on students from early adolescence through young adulthood, it is designed primarily for universal and selective populations of adolescents in school settings. We are paying particular attention to this curriculum because it is one of relatively few that are available adolescent populations. Project TND has conducted seven randomized field trials that evaluated the effectiveness of the program on teen substance use and violence. Overall in 1-year follow-up participants who received Project TND compared to comparison groups experienced reductions in cigarette, marijuana, and "hard drug" use.

Like all evidence-based substance use prevention curricula, these programs are manualized and require training by those implementing them.

Interventions That Do Not Work

Despite the clear evidence that there exists a range of effective substance use prevention interventions designed for the school and classroom-culture and climate, development of effective policies—when enforced appropriately, and prevention curricula, many policy makers and school administrators continue to implement interventions that have either been found not to be effective or even iatrogenic or if they do institute evidence-based interventions fail to implement with fidelity to the intent of the intervention.

As early as 2000, Tobler summarized what does and does not work in interventions. She found the following content and delivery features that do not work.

- Content
  - Failure to include short-term consequences
  - Failure to address perceptions of peer drug use
  - Failure to address media influences on prodrug attitudes
  - Addressing only ethical/moral decision-making
  - Teaching values only
  - Failure to provide interpersonal skills, particularly drug refusal skills
  - Having only an intrapersonal focus
  - Focusing only on self-esteem building
- Delivery
  - Passive participation primary delivery strategy
  - Didactic or lectures only

  - Having teacher-centered class discussions
  - Having unstructured dialogue sessions
  - Depending primarily on effective classroom management techniques without a drug program

  The International Standards adds to this list:

- Content
  - Providing information only on specific substances
  - Focus only on emotional education
  - Focus only on emotional education
  - Address only ethical/moral decision-making or values
- Structure
  - Fear arousal only
  - Unstructured dialogue sessions
- Delivery
  - Using untrained teachers
  - Using untrained teachers
  - Primarily using noninteractive methods
  - Use ex-drug users as testimonials

Recommendations for School-Based Prevention and Health Promotion

This chapter offers the following guidance to school administrators considering the implementation of substance use prevention programming in their schools.

1. Probably the most important recommendation is for the administrators to recognize that substance use is not the sole problem of the school. Findings from prevention research studies show that school-based programming is more effective when supported by community and/or family components such as PROSPER (Spoth et al., 2013) or Communities That Care (Hawkins, Oesterle, Brown, Abbott, & Catalano, 2014) that have demonstrated sustained effectiveness of prevention programming by building community prevention implementation systems.
2. In addition to what was presented above, there are a number of other issues that need to be thought about when selecting school-based substance abuse prevention interventions. Botvin and Griffin (2003) mention some key issues: timing of the interventions, delivery by peers and/or adults, use of interactive teaching approaches, targeting multiple substances, targeting minority groups, durability of interventions, and implementation fidelity.

Of particular importance is the last item, implementation fidelity. The issue of adaptation versus implementation fidelity is one of the great challenges to the prevention field. Implementation fidelity addresses the degree to which the curriculum content and delivery style consistently and completely match that of the original tested program. Often, a program taken from a research setting to the "real world" will undergo changes to meet the needs of the school or of the instructor. Understanding the curriculum design and key elements of the program is important. Sound training helps instructors comprehend why program design is essential and provides a basis for a commitment to prevention. The establishment of a monitoring system to assess program implementation and providing ongoing technical assistance would ensure fidelity of implementation. Tailoring or adapting an intervention by implementers or policy makers is a natural process. Such tailoring increases the likelihood that the participants will view the program as relevant and that our desired outcomes will be achieved. Tailoring includes addressing cultural beliefs, values, language, and visual images but does not mean altering the theoretical foundation of the intervention. It is important to remember, particularly for evidence-based interventions, to maintain the intent of the program by maintaining the full program. This represents a balance between fidelity, the delivery of a prevention intervention program as prescribed or designed by those who developed the program and adaptation, the modification of program content to accommodate the needs of a specific consumer or target group (Castro, Barrera, & Martinez, 2004). The Substance Abuse and Mental Health Services Administration (2017) has some pointers about adapting a program for a new community:

- Change capacity before changing the program. It may be easier to change the program, but changing local capacity to deliver it as it was designed is a safer choice.
- Consult with the program developer. Consult with the program developer to determine what experience and/or advice he or she has about adapting the program to a particular setting or circumstance.
- Retain core components. There is a greater likelihood of effectiveness when a program retains the core component(s) of the original intervention.
- Be consistent with evidence-based principles. There is a greater likelihood of success if an adaptation does not violate an established evidence-based prevention principle.
- Add, rather than subtract. It is safer to add to a program than to modify or subtract from it.

3. There is agreement in the prevention field that prevention is a process that takes place across the lifespan. The factors related to increasing the risks for initiating substance use occur across developmental stages suggesting that interventions should take place at key developmental points including infancy, early childhood, childhood, preadolescence, and adolescence. Early interventions with identified vulnerable children may be most effective in the long term. Yet the expected outcomes from interventions for each developmental stage are not clear.

4. Several studies and meta-analyses (Tobler, 1986, 1992; Tobler et al., 1999) suggest that interventions delivered by same age or slightly older peer leaders are more effective than when delivered by adults. On the other hand, as Botvin and Griffin (2003) point out peer leaders alone may not have the maturity to manage a classroom or to engage students in small group or open discussion, particularly when the program heavily emphasizes skills building. Their suggestion is to use peer leaders in supportive roles such as assisting with program activities with adults taking the lead in delivery. The information of peer-led substance use interventions is weak at this time. Experience with such programs as Sources of Strength, a peer-led suicide prevention program, supports this intervention structural suggestion (Wyman et al., 2010).
5. The sequencing of substance use suggests that the risk for using marijuana is increased if a young adolescent has used alcohol or tobacco, particularly if this use was initiated in childhood or early adolescence. Therefore, prevention programs should address multiple substances. The social tolerance is unequal for each of these substances and some programs may be less effective for one or more of these substances (Werch & Owen, 2002).
6. Finally, school administrators should be mindful of the fact that the field of psychoactive substance use prevention is relatively new. The knowledge that is accumulating from prevention researchers changes as intervention strategies and statistical methodologies become more sophisticated. In addition, the research that serves to guide prevention intervention development, that is, epidemiology and behavioral science, is also evolving, and, finally, our children's cultural worlds and influences are ever changing. What programs may be effective for adolescents today may not be as effective for their younger siblings when they enter their teen years. Such changes suggest constant attention to updating prevention messages and strategies.

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