



Mindful
Continuing Education

Substance Abuse Prevention in Early Childhood



Introduction

Substance abuse and addiction are preventable disorders that interfere with normal healthy functioning, contributing to physical and behavioral health problems, injuries, lost income and productivity, and family dysfunction. While substance use generally begins during the adolescent years, there are known biological, psychological, social, and environmental factors that contribute to the risk that begin accumulating as early as the prenatal period. This creates opportunities to intervene very early in an individual's life and thereby prevent substance use disorders—and, along with them, a range of other related behavioral problems—long before they would normally manifest themselves.



The second edition of NIDA's *Preventing Drug Abuse Among Children and Adolescents* (2003) noted that "early intervention can prevent many adolescent risks." This special supplement to that volume reflects a growing body of research that has continued to accumulate showing that providing a stable home environment, adequate nutrition, physical and cognitive stimulation, warm supportive parenting, and good classroom management in the early years of a child's life (prenatal through age 8) can lead the child to develop strong self-regulation (i.e., emotional and behavioral control) and other qualities that protect against a multitude of risks and

increase the likelihood of positive developmental outcomes. Positive effects of these interventions include delayed initiation and decreased use of drugs when the child reaches adolescence.

By adolescence, children's attitudes, behaviors, family interactions, and relationships—factors that may influence propensity to try or become addicted to drugs—are well established and not as easily changed. For young children already exhibiting serious risk factors for later drug use, delaying intervention until later childhood or adolescence may make it more difficult to overcome accumulated risk factors and achieve positive outcomes.

Our increased understanding of brain development and neuroplasticity across the first two decades of life also supports implementing early intervention. The prenatal, child, and adolescent brain is undergoing rapid and significant change, including the formation of new synapses and, after about age 5, the progressive pruning of unused synaptic connections and reinforcement of major circuits. Synaptic plasticity makes early childhood extremely sensitive to experiences and environmental influences (including family interactions and social contexts) that may act either as risk factors for later drug use and related problems or that may be protective against those risks. Thus the earlier an intervention occurs, the greater the potential to take advantage of biological, emotional, and behavioral sensitive periods to alter the course of development in a positive, healthy direction.

Research supports the value of interventions that reduce risk factors, promote protective factors, and increase access to resources (e.g., school- and community-based family support services) in the lives of young children and those closest to them. Substantial data from many long-term studies now indicate that intervening with children and families who are showing early risk factors for substance abuse is effective, and the benefits of such interventions continue into adolescence and young adulthood and even into adulthood.

Research has also found that a large number of early risk factors for substance abuse are simultaneously risk factors for other mental, emotional, and behavior problems. For example, early-onset externalizing behavior problems, such as aggressive and disruptive behaviors in the preschool years, have been found to relate to increased risk for outcomes such as conduct disorders, substance use, delinquency, and risky sexual behaviors in adolescence. Given that this is the case, it is not surprising that interventions designed to prevent substance abuse have shown many positive benefits that extend to other outcomes—including improved personal, social, and familial functioning; higher academic and career achievement; and less involvement with the juvenile justice system and mental health services.



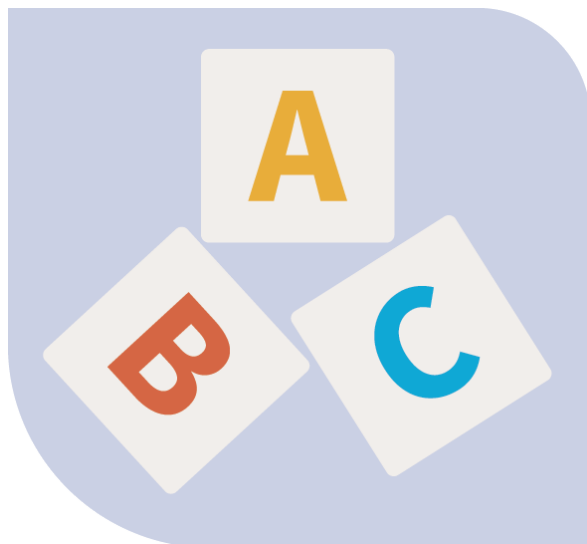


Early childhood prevention interventions can be costly to implement, but the research balancing the benefits of these programs against their costs shows they are good—occasionally very good—investments. Among interventions for which such data are available, savings range from \$2.88 for every dollar invested (the Nurse-Family Partnership, described in Research-Based Early Intervention Substance Abuse Prevention Programs) to as much as \$25.92 (the Good Behavior Game, used in the Classroom-Centered Intervention) (Aos et al., 2004). Thus, a well-conceived and well-implemented intervention for very young children can not only dramatically

improve the quality of life for the children and families involved but also benefit the community and society as a whole.

This guide, intended for parents, practitioners, and policymakers, begins with a list of 7 principles addressing the specific ways in which early interventions can have positive effects on development; these principles reflect findings on the influence of intervening early with vulnerable populations on the course of child development and on common elements of successful early childhood programs. This is followed, in “Why is Early Childhood Important to Substance Abuse Prevention?” and “Risk and Protective Factors,” with an overview of child development from the prenatal period through age 8 (the span covered by this resource) and the various factors that either place a child at risk for later substance use or offer protection against that risk.

“Intervening in Early Childhood” describes common elements of early childhood interventions that target individual, family, school, and community precursors of drug use, abuse, and addiction. “Research-Based Early Intervention Substance Abuse Prevention Programs” includes information on specific early childhood intervention programs for which the National Institute on Drug Abuse (NIDA) has provided research support, and a section on “Selected Resources” provides links to many Federal agencies, professional and academic organizations, and non-governmental agencies that engage in early-childhood-prevention-related initiatives. Two appendices for policymakers, researchers, and practitioners go into greater detail on how early childhood interventions are designed and how to select the right intervention for a community’s specific needs.



The “Selected References” include up-to-date sources that provide more in-depth coverage of all of the concepts, principles, and programs discussed.

Early childhood risks can lead to immediate and long-term problems that increase a child’s chances of substance abuse and other problems in adolescence and later in life. It is now known that intervening early is a worthwhile strategy for setting children on a healthier path that may avoid these difficulties. NIDA hopes that this guide is helpful to substance abuse prevention efforts for children at home, in schools, and in communities nationwide.



Principles of Substance Abuse Prevention for Early Childhood

Seven principles of prevention for early childhood (which is defined here as the prenatal period and infancy through the transition to elementary school around age 8) have emerged from research studies funded (in full or in part) by NIDA. The detailed rationale for these principles appears in “Why is Early Childhood Important to Substance Abuse Prevention?,” “Risk and Protective Factors,” and “Intervening in Early Childhood.”

Principle 1 (Overarching Principle): Intervening early in childhood can alter the life course trajectory in a positive direction (Kellam et al., 2008; Kitzman et al., 2010).

Substance abuse and other problem behaviors that manifest during adolescence have their roots in the developmental changes that occur earlier—as far back as the prenatal period. While prevention can be effective at any age, it can have particularly strong effects when applied early in a person’s life, when development is most easily shaped and the child’s life is most easily set on a positive course.

The following specific principles collectively provide support for Principle 1.

Principle 2: Intervening early in childhood can both increase protective factors and reduce risk factors (August et al., 2003; Catalano et al., 2003). Risk factors are qualities of children and their environments that place children at greater risk of later behavioral problems such as substance abuse; protective factors are qualities that promote successful coping and adaptation and thereby reduce those risks. All children have a mix of both. Interventions aim to shift the balance toward protective factors.

Principle 3: Intervening early in childhood can have positive long-term effects (Degarmo et al., 2009; Shaw et al., 2006). Early childhood interventions focus on settings and behaviors that may not appear relevant for adjustment later in childhood or in adolescence, but they help set the stage for positive self-regulation and other protective factors that ultimately reduce the risk of drug use.

Principle 4: Intervening in early childhood can have effects on a wide array of behaviors (Beets et al., 2009; Hawkins et al., 2008; Snyder et al., 2010), even behaviors not specifically targeted by the intervention (Hawkins et al., 1999; Kellam et al., 2014; Lonczak et al., 2002). Because behaviors (both positive and negative) are linked to each other, risk factors for substance use may simultaneously put a child at risk for other problems such as mental illness or difficulties at school. This is why intervening to prevent one undesirable outcome may have a broad effect, improving the child’s life trajectory in multiple ways.

Principle 5: Early childhood interventions can positively affect children's biological functioning (Bruce et al., 2009; Fisher et al., 2007). The benefits of intervention are not limited to behavioral or psychological outcomes—research has shown they can also affect physical health. For example, one intervention for young children in the foster care system looked at cortisol level, a biological measure of the stress response. Over time, the stress response of children receiving the intervention showed better regulation and became similar to that of children in the general population.

Principle 6: Early childhood prevention interventions should target the proximal environments of the child (Tolan et al., 2004; Webster-Stratton et al., 2008). The family environment is the most important context across all periods of early child development, and thus parents are a major target of many early childhood interventions (Dishion et al., 2008; Fisher et al., 2011). But as a child grows older, he or she typically spends more and more time out of the home, perhaps attending day care, then attending preschool followed by elementary school (Beets et al., 2009; Conduct Problems Prevention Research Group, 1999; Hawkins et al., 1999; Jalongo et al., 1999; Snyder et al., 2010). Interventions for different age groups and targeting different types of problems should focus on the most relevant context(s)—the home, school, day care, or a combination.

Principle 7: Positively affecting a child's behavior through early intervention can elicit positive behaviors in adult caregivers and in other children, improving the overall social environment (Fisher & Stoolmiller, 2008; Shaw et al., 2009). Behavioral changes in children and the adults who interact with them can be mutually self-reinforcing. Improving the child's family or school environment can, over time, cause the child's social behavior to become more positive and healthy (or pro-social); this, in turn, can elicit more positive interactions with others and improve the social environment as a result.





Chapter 1

Why Is Early Childhood Important to Substance Abuse Prevention?

Abundant research in psychology, human development, and other fields has shown that events and circumstances early in peoples' lives influence future decisions, life events, and life circumstances—or what is called the *life course trajectory*. People who use drugs typically begin doing so during adolescence or young adulthood (see “Adolescent Drug Use”), but the ground may be prepared for drug use much earlier, by circumstances and events that affect the child during the first several years of life and even before birth.

The first, overarching principle drawn from the research reviewed for this resource is that intervening early in childhood can alter the life course trajectory of children in a positive direction.

Principle 1: Intervening early in childhood can alter the life course trajectory in a positive direction.

Early childhood, considered in this book to include the prenatal period through age 8, includes the following developmental periods:

- *Prenatal Period* (conception to birth)
- *Infancy and Toddlerhood* (birth to 3 years)
- *Preschool* (ages 3 through 6 years)
- *Transition to School* (ages 6 through 8 years)[†]

Adolescent Drug Use

Collection of data from the National Survey of Drug Use and Health (NSDUH) on age at first use of illegal drugs across the U.S. begins at age 12 years, with data from 2014 indicating that 3.4 percent of 12- to 13-year-old children have used an illegal drug in the past month (including inappropriate use of prescription drugs), 2.1 percent are current alcohol users, and 1.1 percent are current tobacco users (CBHSQ, 2015). In 2015, NIDA's annual Monitoring the Future (MTF) survey of adolescent drug use and attitudes showed that, by the time they are seniors, 64 percent of high school students have tried alcohol, almost half have taken an illegal drug, 31 percent have smoked a cigarette, and 18 percent have used a prescription drug for a nonmedical purpose (Johnston et al., 2016).

[†] The transition to school period is actually part of the middle childhood and early adolescence period (6 to 13 years) but is addressed separately in this book because it is a major and significant transition in the child's development. The middle childhood period is followed by adolescence (ages 13 to 18). The age range for the interventions that form the basis for the principles of prevention described in this resource is prenatal through 8 years.

What does the life course perspective show about risk for drug abuse and how to prevent it?

The period of development covered in this guide is characterized by rapid orderly progressions of normal patterns of physical, cognitive, emotional, and social development. This development is marked by important *transitions* between developmental periods and the achievement of successive developmental *milestones* (see “Life Transitions” and “Developmental Milestones”). How successfully or unsuccessfully a child meets the demands and challenges arising from a given transition, and whether the child meets milestones on an appropriate schedule, can affect his or her future course of development, including risk for drug abuse or other mental, emotional, or behavioral problems during adolescence.

The child’s stage of life, aspects of his or her social and physical environments, and life events experienced over time all contribute to the child’s physical, psychological, emotional, and cognitive development.

A variety of factors, known as *risk factors*, can interrupt or interfere with unfolding developmental patterns in all of these periods and, especially, in the transitions between them.

Prevention interventions designed specifically for early developmental periods can address these risk factors by building on existing strengths of the child and his or her parents (or other caregivers) and by providing skills (e.g., general parenting skills and specific skills like managing aggressive behavior), problem-solving strategies, and support in areas of the child’s life that are underdeveloped or lacking.

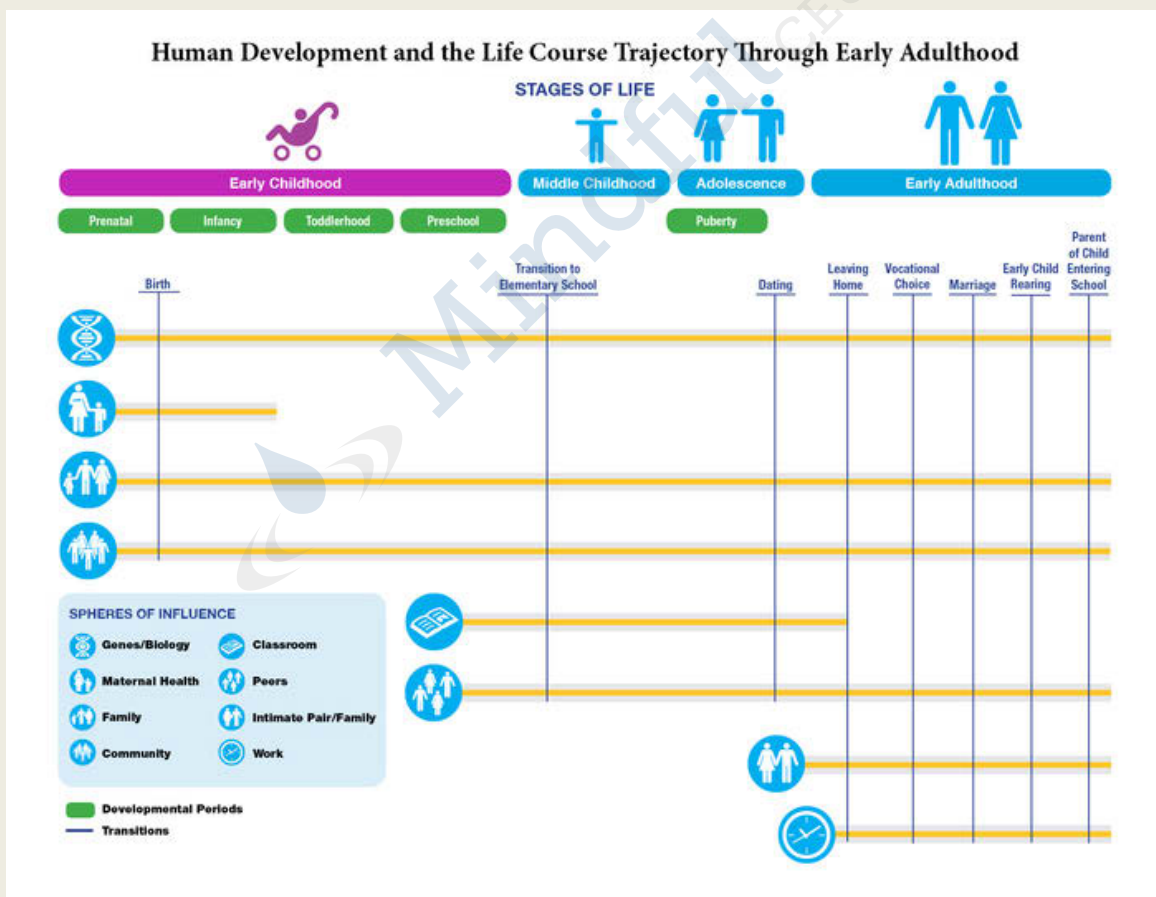
Life events or transitions represent points during which the individual is in a period of change, and they are sometimes called sensitive, critical, or vulnerable periods (Brazelton, 1992; Bornstein, 1989). Although vulnerability can occur at many points along the life course, it tends to peak at critical life transitions, which present risks for substance abuse as well as opportunities for intervention. Thus transitions such as pregnancy, birth, or entering preschool or elementary school are prime opportunities to introduce skills, knowledge, and competencies to facilitate development during those transitions. Therefore, interventions are often designed to be implemented around periods of transition.

The life transitions diagram points to life course periods, contexts, and transitions or life events that together contribute to the development of the child from the prenatal period through young adulthood. (The life course continues through to the end of life, but this resource focuses on just the early years.)

Life Transitions

Vulnerability to the risk factors for problems such as substance abuse can occur throughout the life course, but it tends to peak during critical life transitions. Transitions may be biological, such as puberty, or they may involve entering a new environmental context, such as attending school for the first time. How a child responds and adapts to these events is influenced by his or her cognitive, emotional, and social development at that point in time as well as past history, family relationships, and the surrounding world. Other transitions, such as parental divorce or military deployment of a parent, may not be predictably linked to a child's development, but these events or circumstances still require the child to adapt successfully (for instance to new people or new contexts). Because of their introduction of new potential risk factors, transitions are sometimes called sensitive, critical, or vulnerable periods, and they are prime opportunities for preventive intervention.

The figure below illustrates the development/life course trajectory from the prenatal period through young adulthood, indicating the periods of transition and life change that could represent both times of risk and periods where intervention could be of greatest benefit.



Developmental periods, life course transitions, and contexts relevant to those transitions that contribute to the development of the child from the prenatal period through young adulthood (Kellam & Rebok, 1992).

Developmental Milestones

Developmental milestones refer to particular physical, cognitive, social, or emotional capabilities that are ordinarily acquired within a certain age range. For example, most infants crawl around 9 months and walk by 12 to 15 months; most toddlers can speak one- and two-word phrases between ages 1 and 2; and so on (see www.cdc.gov/ncbddd/actearly/milestones/index.html). Over the course of development, these emerging capabilities generally trigger changes in other people's expectations and responses—for instance, upon entering elementary school, teachers will expect children to be able to sit and be attentive. Achieving milestones within the expected time frame is an important signal that development is occurring in the expected manner and timeframe, and offers protection against risk factors for substance abuse and other problems later in development. Failure to achieve important milestones may indicate the need for early intervention.

This does not mean that a child who is well below average on a milestone will not eventually achieve that milestone (or will necessarily develop later problems); milestones can be achieved later in development, albeit with greater difficulty. Part of what makes it possible to achieve a milestone at a later time is the ability of the brain to change, adapt, and reorganize. This type of brain activity is called *plasticity*, and the brain remains plastic to some degree throughout life (Kellam & Rebok, 1992; Leighton et al., 1963; Weiss, 1949). However, very young children have the greatest neurological flexibility and potential for learning new skills and behaviors; brain structure stabilizes with age and it becomes increasingly difficult to alter (see “The Developing Brain, 0 to 8 Years”).

What are the major influences on a child's early development?

The changes unfolding throughout a child's development are influenced by a complex combination of factors. One of them is the *genes* the child inherits from his or her biological parents. Genetic factors play a substantial role in an individual's development through the course of life, influencing a person's abilities, personality, physical health, and vulnerability to risk factors for behavioral problems like substance abuse. But genes are only part of the story.

Another very important factor is the environment, or the *contexts* into which the child is born and in which the child grows up. The family/home environment is the context that most directly influences the young child's early development and socialization (see “Socialization”). This includes quality of parenting and other parenting influences such

Socialization

Socialization refers to a process of acquiring and internalizing the behaviors, norms, and beliefs of the individual's society. It is a process that occurs across the course of development. During the early childhood period, both internal processes (such as learning style, attention, information processing) and the sum total of the child's social experiences in family, school, and community contexts affect socialization.

as genetic factors and family functioning. Also, siblings, if present, can influence a child's development and adjustment (e.g., internalizing and externalizing behaviors and substance use, as well as positive behaviors) (Dunn, 2005; Feinberg et al., 2013; Kramer & Conger, 2009; Pike et al., 2005). These influences may result from shared environmental experiences and interactions with parenting and other family factors (Burt et al., 2010; Neiderhiser et al., 2013). But conditions at home are also influenced by wider physical, social, economic, and historical realities—such as the family's socio-economic status and the affluence and safety (or lack thereof) of the community in which the family lives. As the child grows older and enters school, these wider environmental contexts influence him or her more directly.

What follows is an overview of the developmental influences and changes taking place during specific periods of early childhood development.

Prenatal Period

The genes, biological capacities, and innate temperament that children are born with inform the way they interact with the environment and people in it. Development is shaped by a combination of genetic and environmental factors (see “The Developing Brain, 0 to 8 Years.”).

Even before a child is born, the context or environment plays an important role in development. It has long been known, for example, that if the mother smokes, drinks alcohol, or uses other drugs during her pregnancy, these substances can enter the body of

Epigenetics

Recent research in the emerging field of *epigenetics*, or the study of environmental influences on the way genes are expressed, suggests that both the mother's and father's past history of substance use, even before conception, may influence the health of their children. Studies in experimental animals have shown that substance use may cause changes in gene expression in a father's sperm and a mother's egg cells, which could then affect the growth and brain development of offspring, influencing their response to substances of abuse (Novikova et al., 2008; Vassoler et al., 2013; Szutorisz et al., 2014). Future studies will determine if this also occurs in humans.

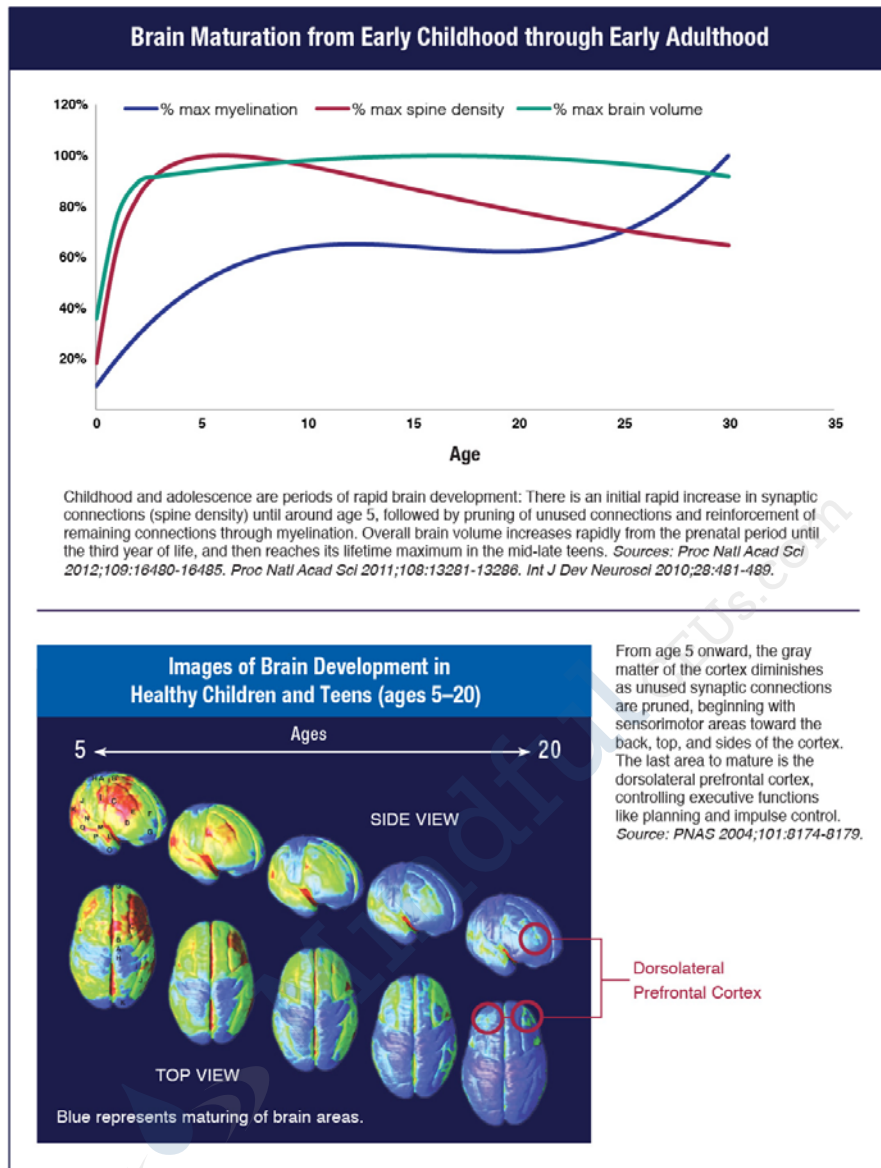
the developing fetus and have significant effects on the development of the body and brain, and these effects may become risk factors for substance use later in the child's life (see “Risk and Protective Factors” for more information). There is also emerging evidence that both parents' past histories of substance use may affect their children via changes to gene expression (see “Epigenetics”). Also, poor nutrition during the prenatal period can have adverse effects on the development of the child's brain (National Research Council and Institute of Medicine, 2000; Prado & Dewey, 2014).

The Developing Brain, 0 to 8 Years

The brain is a dense network of nerve cells (neurons) and glial cells that support the neurons in various ways. The neurons are organized in circuits that control everything people think and do—from learning and movement to language, sensing, feeling, and exerting control over emotions and behaviors. The brain's development begins soon after conception, when cells in the embryo begin to form the basic structure of the central nervous system including the brain and spinal cord. How it develops is influenced by genetics, aspects of the environment such as nutrition and social interactions, and life experiences. The relative importance of these influences shifts over the course of life, and at any point they may interact in complex ways. For example, a particular genetic factor might impede the process of a child's language development; but if the child is born into a family where parents regularly talk or read to the child, it may foster language development and act to offset those genetic influences. Brain development is not simply the growth of new nerve cells and formation of synaptic connections (connections between neurons). Early in life, there is an overproduction of synaptic connections, and over the course of childhood and adolescence a process called *pruning* reduces the number of those connections. Connections that are used frequently become strengthened; those that are not are eliminated. For example, children are born with the capacity to understand and replicate sounds of all languages; however, over the course of development these abilities become specific to the language or languages to which they are exposed. Thus the neural connections that would allow further language development diminish in the middle childhood years.

Across childhood and adolescence, the cortex (the outer layer of the brain) matures at different speeds, as measured by its overall volume, its thickness, its surface area, and other characteristics that correspond to its functioning. Generally, areas at the back and sides of the brain that process sensory information (e.g., vision, hearing, and all types of body sensations) finish developing earliest, during childhood; frontal cortical areas, which handle emotional and behavioral control and other higher order executive functions, are the last to finish developing—only reaching maturity in early adulthood. Boys' and girls' brains differ in their pattern of brain maturation, with peak changes in cortical volume and surface area typically occurring later in boys (around age 10) than in girls (around age 8) (Raznahan et al., 2011).

The proportional genetic and environmental influences on various aspects of brain development are not the same across all brain regions. Recent twin studies have shown, for example, that variations in the thickness of the frontal cortex are more attributable to genetic factors than thickness of other areas of the cortex (Schmitt et al., 2014). Also, the relative influence of environmental and genetic factors in brain development shifts across the first three decades of life: The environment exerts its greatest proportional impact in early childhood and gradually lessens, relative to genetic influences, across later childhood and adolescence. This provides an important genetic and neurobiological rationale for intervening in early childhood, when changes in the individual's environment can have the greatest long-term impact.



Infancy and Toddlerhood

Once the child is born, factors that contribute to the child’s development include the quality of the nutrition and health care provided by the mother and other caregivers, the personality fit between infant and caregivers, and the ability of the caregivers to provide warmth and support. The child also plays a more active role in shaping his or her environmental context (see “Influence is not Just a One-Way Street”).

Influence is not Just a One-Way Street

Within moments after birth, the infant’s personality and overall health can influence the parent-child relationship and physical environment in significant ways. As the child grows older, his or her unfolding personality and needs influence the family environment, school environment, and wider social contexts, which in turn exert an influence on the child and others in the same surroundings.

Over the months following birth, the child adapts to and integrates into the surrounding world as he or she makes further developmental gains, including ongoing brain development. Through practice, the child ideally becomes proficient at basic skills using limited but growing sensory, motor, cognitive, and social capacities, meeting basic milestones along the way. As the infant learns to distinguish self from others, he or she instinctively focuses attention on the primary caregiver(s), usually parents.

For optimal positive development to occur, the primary caregiver(s) must consistently meet the child's needs, be nurturing, provide a predictable schedule, and provide developmentally appropriate stimulation. The closeness of the parent-child relationship during this early period provides a context for the child's development and his or her expectations about the world as well as for secure attachment to his or her caregiver(s). Secure attachment is one of the most crucial factors leading to healthy socialization and self-regulation, which are major protective factors against drug use and other behavioral problems.

Preschool

Throughout early childhood, even when the child enters preschool or attends day care, the family remains the most important context for development. Parents play a number of roles in the development of a young child's social, emotional, and cognitive competence, including establishing the structure and routines for parent-child interactions; maintaining a sensitive, warm, and responsive relationship style; and providing instructional practices and experiences that help the child acquire necessary developmental skills. Development of motor abilities and language skills are important in the preschool period, influencing the child's growing independence.

Throughout early childhood, even when the child enters preschool or attends day care, the family remains the most important context for development.

When a nurturing, responsive relationship does not exist, elevated levels of stress hormones can impede a child's healthy brain development (Debellis & Zisk, 2014; Thompson, 2014). Moreover, when a caregiver cannot provide attention and nurturing because of a history of trauma, chronic stress, and/or mental health problems, the child is more likely to develop behavioral, social, emotional, or cognitive problems (Madigan et al., 2012; Delker et al., 2014). Likewise, impaired judgment related to substance use can reduce a parent's ability to create a warm, supportive environment for the child (Barnard & McKeganey, 2004; Lam et al., 2007). Child abuse and neglect, social isolation due to illness or disability, and lack of constancy in the primary caregiver (as in the case of a child in institutionalized care) are also linked to growth (including brain growth and neuronal connectivity), cognitive, motor, social, and emotional problems (see for example, Behen et al., 2009; Martins et al., 2013; McCall, 2013; Koss et al., 2014). Many of the prevention interventions discussed in this guide are aimed at facilitating constant, nurturing, responsive caregiving to reduce risk and prevent child behavior problems.

Transition to School

As the child grows older, new transitions and associated challenges occur. A major transition for young children is beginning elementary school. Even children who attended preschool or had been in day care can find the rules for behavior and academic requirements associated with elementary school difficult to adapt to and achieve.

Readiness for school is something that occurs over time with experience and practice. Early intervention can help parents and schools assist children through this transition. Once in elementary school, teachers can help children to adjust by providing positive classroom management.





Research over the past three decades has identified many factors that can help differentiate individuals who are more likely to abuse drugs from those who are less likely to do so (Catalano et al., 2011; Hawkins et al., 1992). *Risk factors* are qualities of a child or his or her environment that can adversely affect the child's developmental trajectory and put the child at risk for later substance abuse or other behavioral problems. *Protective factors* are qualities of children and their environments that promote successful coping and adaptation to life situations and change. Protective factors are not simply the absence of risk factors;

Principle 2: Intervening early in childhood can both increase protective factors and reduce risk factors.

rather, they may reduce or lessen the negative impact of risk factors (Cowen & Work, 1988; Garmezy, 1985; Hawkins et al., 1992; Rutter, 1985; Werner, 1989).

All children will have some mix of risk and protective factors. An important goal of prevention is to change the balance between these so that the effects of protective factors outweigh those of risk factors.

Both risk and protective factors may be *internal* to the child (such as genetic or personality traits or specific behaviors) or *external* (that is, arising from the child's environment or context), or they may come from the interaction between internal and external influences.

What are some important early childhood risk factors for later drug use?

Some factors that powerfully influence a child's risk for later substance abuse and other problems have their strongest effects during specific periods of development. Important examples include:

Prenatal Period

Maternal smoking and drinking can affect a developing fetus and may result in altered growth and physical development and cognitive impairments in the child (See "Pregnancy Matters: Use of Substances and Their Effects During Pregnancy").

Pregnancy Matters: Use of Substances and Their Effects During Pregnancy

Exposure to alcohol, tobacco, and other drugs of abuse during the prenatal period can affect children throughout their lifetime. Substances taken during pregnancy can cross the placenta, exposing the developing brain of the fetus to their effects. Examples of the effects of substance use during pregnancy include the following:

- **Smoking during pregnancy** has been linked to increased risk for slowed fetal growth and low birth weight, stillbirth, pre-term birth, infant mortality, Sudden Infant Death Syndrome, and respiratory problems.
- **Using alcohol during pregnancy** can cause miscarriage, stillbirth, and a range of lifelong disorders for the child known as Fetal Alcohol Spectrum Disorders (FASDs). FASDs can lead to physical, cognitive, and behavioral problems—for example, facial abnormalities; attention problems and hyperactive behavior; learning disabilities; poor reasoning and judgment skills; and problems with the heart, kidney, or bones.
- **The use of illicit drugs, such as cocaine, heroin, and marijuana, during pregnancy** can have a variety of adverse effects on children ranging from low birth weight to developmental problems related to behavior and cognition, such as impaired attention, problems with language development and learning, and behavior problems.
- **The use of some types of prescription drugs during pregnancy** may also have an impact on the child. Babies of mothers who chronically take opioid medications prescribed for pain or who are abusing those medications may be born with a physical dependency, causing withdrawal—a condition called Neonatal Abstinence Syndrome (NAS), which can require prolonged hospitalization of the infant and medication to treat.

The full extent of the consequences of substance use in pregnancy are not known because many confounding individual, family, and environmental factors such as nutritional status, extent of prenatal care, and socio-economic conditions make it difficult to determine the direct impact of prenatal substance use on the child. Therefore, abstinence is the best prevention.

Infancy and Toddlerhood

Having a difficult temperament in infancy may set the stage for the child having trouble with self-regulation later, as well as create challenges for the parent-child relationship (see “A Child’s Temperament”).

Insecure attachment during the child’s first year of life can cause a child to be aggressive or withdrawn, fail to master school readiness skills, and have difficulty interacting with adults or other children (see “Attachment”).

Uncontrolled aggression when a child is a toddler (2 to 3 years) can lead to problems when he or she enters preschool, such as being rejected by peers, being punished by teachers, and failing academically.

Preschool

Lack of school readiness skills such as failure to have learned colors, numbers, and counting will put a child at a disadvantage in a classroom environment, setting the stage for poor academic achievement.

Transition to School

Poor self-regulation can lead to frustration and constant negative attention on the child by peers and teachers at school.

Lack of classroom structure in the school environment can lead to additional social and behavioral problems in children who have trouble switching from one activity to another.

A Child’s Temperament

All children are born with a unique temperament, or personality characteristics (Goldsmith et al., 1987) that make them easier or harder to care for. For example, babies who are easy to manage, adapt well to routines, and are responsive to parent care tend to elicit positive parenting behaviors, which will strengthen a growing, mutually satisfying parent-child relationship. On the other hand, some babies respond to their environment with arousal and distress; they may cry a lot, fuss when being changed and fed, and are not soothed by holding and rocking. These highly *reactive* infants are more likely to elicit parental frustration, impatience, and avoidance or neglect, which can potentially escalate into a pattern of negative family dynamics (Kochanska & Kim, 2013; Lee & Bates, 1985). These natural behavioral tendencies are the focus of early interventions for parents. Such interventions nurture appropriate expectations of infants by parents, strengthen positive parenting practices, and help parents to cope with frustrating situations.

Attachment

Attachment is the natural bond that develops between parent and child (Ainsworth et al., 1978; Bowlby, 1969; Bowlby, 1982). Usually this bond is positive and secure, but when children fail to develop secure attachments to their parents, they may perceive that the world is unsafe and eventually mistrust other people and distrust their own abilities to master the environment.

Attachment may be insecure due to particular experiences that get in the way of forming a secure bond, to specific personality characteristics of the parent and/or child, or to poor “fit” between characteristics of the parent and child. For example, an easy-going infant may react more calmly to a first-time parent’s clumsy attempts at feeding, changing, and bathing him, whereas a more sensitive child might react with crying and other behaviors that could cause the parent to feel insecure about his or her capacity to parent. This in turn could affect interactions that promote attachment security (e.g., sensitive, contingent-responsive parenting). However, this is not deterministic. Good quality parenting is possible even when parent/child characteristics and experiences do not match up.

Early problems with attachment can lead to problems like acting out in school, poor academic achievement, and social isolation during the transition to elementary school (Fearon et al., 2010; Kochanska & Kim, 2012). Later on, during puberty, the transition to middle school, and adolescence, children with insecure attachment may associate with peers who exhibit problem behaviors and experiment with behaviors such as delinquency, substance use, and sexuality (Schindler & Bröning, 2015).

Any Developmental Period

Other risk factors can affect a child in any developmental period. Some important ones are:

Stress (Institute of Medicine and National Research Council, 2012; Masten, 1989; McEwen, 2010). All children experience stress at some point, and in fact a certain amount of stress helps young children develop skills for meeting challenges and coping with setbacks that inevitably occur in life. But chronic stressors like **family poverty** and stress that is intense or prolonged—such as **a parent’s mental health problems** or a lingering **illness**—can diminish a child’s ability to cope. These types of stress can even interfere with proper development, including brain development, and aspects of physical health like proper functioning of the immune system (Brown et al., 2009). This is particularly true of children who have experienced the extreme stress of **maltreatment**, such as abuse or neglect, by parents or caregivers (see “The Special Case of Abuse and Neglect”). Some children who experience a lot of stress early in life, even during the prenatal period, are more susceptible to the effects of later stressful life circumstances than other people (Raposa et al., 2014; Shonkoff et al., 2012; Turner & Lloyd, 2003).

The Special Case of Child Abuse and Neglect

Children who have experienced abuse or neglect by parents or caregivers are at greater risk for substance abuse and other mental, emotional, and behavioral problems than other children. Moreover, child maltreatment is associated with family-level risk factors, such as poor parenting skills, parental substance abuse and mental illness, and context-specific risks such as poverty (National Research Council and Institute of Medicine, 2009). The most straightforward way to eliminate the negative effects of child abuse and neglect is to prevent its occurrence. One exemplary preventive intervention that takes this proactive approach is the Nurse Family Partnership (NFP) program, described in Research-Based Early Intervention Drug Abuse Prevention Programs. Other interventions are designed to address issues in children who may have already been subject to abuse; one example is the Multidimensional Treatment Foster Care Program for Preschoolers (MTFC-P; also discussed in Research-Based Early Intervention Drug Abuse Prevention Programs), which addresses developmental issues among maltreated foster preschoolers.

Parental substance use: Parental substance use—including smoking, drinking, illicit drug use, and prescription drug abuse—can affect children both directly and indirectly. Substances used by a mother during pregnancy can cross the placenta and directly expose the fetus to drugs (see “Pregnancy Matters: Use of Substances and Their Effects During Pregnancy”), and substances can pass to a nursing infant through breast milk. When parents smoke in the home, it can also expose children to secondhand smoke, putting them at risk for health and behavioral problems (see “Secondhand Smoke”), as well as increasing children’s likelihood of smoking when they grow older (Leonardi-Bee et al., 2011).

Parental substance use can also impact the family environment by giving rise to family conflict and poor parenting, which could increase risk for child abuse and neglect and involvement with the child welfare system (National Research Council and Institute of Medicine, 2009). Poor family functioning can increase the risk for multiple problem behaviors in children and adolescents, including risk for substance use and abuse

Secondhand Smoke

According to the surgeon general, there is no safe level of exposure to secondhand smoke (HHS, 2006). When children are exposed to it, they can develop the same kinds of health problems seen in smokers themselves. Secondhand smoke exposure in childhood is associated with upper and lower respiratory tract illnesses and asthma, as well as infection and tooth decay; it is the leading preventable cause of ear infection; and it is recognized as the most common preventable cause of Sudden Infant Death Syndrome (SIDS) (Zhou et al., 2014). Also, some components in secondhand smoke, such as carbon monoxide, are neurotoxic. Because children’s brains are still developing, exposure to these chemicals can alter developmental trajectories and have long-lasting effects. Secondhand smoke exposure in children is linked to impaired executive brain function, which manifests most clearly as behavioral problems and an increased risk of ADHD (Pagani, 2014; Padrón et al, 2015).

(Aarons et al, 2008). Children with a family history of drug abuse also may have increased genetic risk for substance use (Kendler et al., 2003; Young et al., 2006), often manifested in combination with family or other environmental risk factors (Enoch, 2012). Children can learn about substance use from a very young age, especially if exposed to parental substance use and abuse (Noll et al, 1990). However, children are less likely to smoke, drink alcohol, or use other drugs when parents are clear that they do not want their children to do so, even if they use substances themselves (Jackson & Dickinson, 2006).

Emergent mental illness. Many mental illnesses have symptoms that can emerge during childhood and can increase risk for later drug abuse and related problems. For example, anxiety disorders and impulse-control disorders (such as ADHD) begin their onset prior to 11 years of age, on average (Kessler et al., 2005), but frequently symptoms may appear in early childhood. Symptoms associated with impulse-control disorders, such as aggressive disruptive behavior, as well as those associated with affective and psychotic disorders all increase the risk of substance use disorders and related problems in adolescence (Maslowsky et al, 2014; Gregg et al., 2007). (See “Drug Abuse and Mental Illness.”) If not successfully addressed when they initially present themselves, early risk factors and associated negative behaviors can lead to greater risks later in childhood and in adolescence, such as academic failure and social and emotional difficulties, all of which put an individual at increased risk for substance abuse.

Substance Abuse and Mental Illness

The relationship between substance abuse and other psychiatric disorders can be complex. Although the causal relationships are not fully understood, it is likely that shared genetic or biological risk factors give rise to both substance use disorders and mental illness and that symptoms of one may influence the development of the other, partly because they may affect the same or related brain circuitry and processes—for example, memory and neuroplasticity (Pittenger, 2013). Thus, just as early manifestations of mental illness increase the risk of later substance use, many childhood risk factors for substance use also may increase risk for later appearance of other psychiatric and behavioral problems, including conduct disorder, depression, and delinquency. And substance use during adolescence may also precipitate or affect the course of mental illness—for instance, adolescent use of marijuana may trigger psychosis in individuals with a genetic vulnerability for schizophrenia (Di Forti et al., 2012).

What if a child has multiple risk factors?

Research has shown that the more risk factors a child has or is exposed to, the more likely it is that he or she will experience problems (see “Accumulated Risk”) Unfortunately, many risk factors are related and tend to cluster together. For example, child maltreatment is associated with other family-level risk factors, such as poor parenting skills and parental substance abuse and mental illness (National Research Council and Institute of Medicine, 2009); ongoing maltreatment also results in developmental delays, which can compound a child’s risk for later behavioral and emotional problems.

Another example is poverty, which reduces a family's material resources for providing good food, medical care, and child care and thus is often linked with other risk factors such as premature birth and poor nutrition (Gershoff et al., 2003). Poverty may also be linked to problems with attachment, because it reduces the time and energy parents can devote to interacting with their child. As a result, children from impoverished families may encounter multiple risk factors in a variety of developmental contexts.

Parents and educators should keep in mind that most individuals, even those with risk factors for drug abuse, do not actually develop substance abuse or other mental, emotional, or behavioral problems.

However, individuals differ widely in how vulnerable they are to being affected by specific risk factors. Parents and educators should keep in mind that most young people, even those with risk factors for substance abuse, do not actually develop drug problems or other mental, emotional, or behavioral problems. *Resilient* children may even have a large number of risk factors but still not experience difficulties (see "Resilience").

Accumulated Risk

It is possible that children whose personal characteristics and family and school environments are highly protective can still succumb to the effects of accumulated risk if they live in areas with high levels of risk, such as the accumulated stress associated with living in a violent environment. There is as yet no direct evidence supporting this principle in the age group considered in this guide, but evidence from a study on risk and protective factors among a sample of 6th- through 12th-grade students in a five-state survey pointed to the existence of a threshold over which the ability to tolerate risk diminishes. Youth with highest levels of risk factors exhibited increased prevalence rates of problem behaviors, even when they had high levels of protective factors (Pollard et al., 1999).

Resilience

A major conclusion from research on risk and protective factors among children is that there are some children who, despite having a significant number of risk factors, do not develop problem behaviors. Intervention developers and researchers use findings from protective factor and resiliency research to inform their decisions about what child, parent, and other resources and skills should be addressed through early childhood prevention interventions (Masten, 2011; Masten 2012).

What are some important protective factors that can offset risk factors?

As with risk factors, certain protective factors are important during particular developmental periods:

- *Prenatal Period:* **Good maternal nutrition** is important for the developing fetus, as it can reduce the chances for nutrient-related birth defects (such as spina bifida) and can increase the likelihood that the child will have **normal birth weight**.
- *Infancy and Toddlerhood:* Parents who are **highly responsive** to their infant set the stage for strong parent-child attachment.
- *Preschool:* Increasing **behavioral control** in the preschool years improves social competence across the transition to elementary school.
- *Transition to School:* **School readiness** supports mastery of basic concepts (colors, numbers, letters, pre-reading) during kindergarten, setting the stage for academic success throughout the school years.

Protective factors, like risk factors, may be either internal to the individual child or may be qualities of their contexts, including family, school, and community. Internal factors that offer protection across all ages include **intelligence** and **easy temperament** (i.e., adapting well to eating and sleeping schedules and to other new experiences, as well as a generally positive mood) (Masten, 2004; Masten, 2001). Children with an easy temperament are able to make positive adaptations to a variety of situations and may thereby relax parents who are stressed. They may be less susceptible to the impact of parents who have other risk factors, such as being highly disorganized, being overly organized and scheduled, or having a negative mood. (The mix of temperaments among family members and how well they “fit” or match onto one another can greatly influence family climate and functioning.)

External factors important in building a context for healthy development across childhood (Masten, 2004; Masten, 2001) include parenting that includes **warmth, consistency, age-appropriate expectations, praise for accomplishments** (e.g., using the toilet), and **consistent routines and rules**. When providing such an environment does not come naturally to parents, prevention interventions can help them to build the knowledge and skills important for healthy development and the prevention of subsequent problem behaviors such as drug abuse.

Throughout childhood, both at home and at school, it is also important that children be provided both **opportunities for social interaction with peers**—as playing with other children promotes healthy socialization—and **opportunities for physical exercise**. Physical activity promotes not only physical health but also cognitive and brain development, including the development of executive control (Hillman et al., 2014; Chaddock-Heyman et al., 2014).

Similar to risk factors, protective factors tend to cluster. For example, sensitive, responsive parenting tends to occur along with other environments that promote good social interactions with peers, school readiness, and behavioral control. Generally, an accumulation of protective factors predicts positive outcomes. But just as having many risk factors does not make substance abuse inevitable, having many protective factors does not ensure an absence of problems.



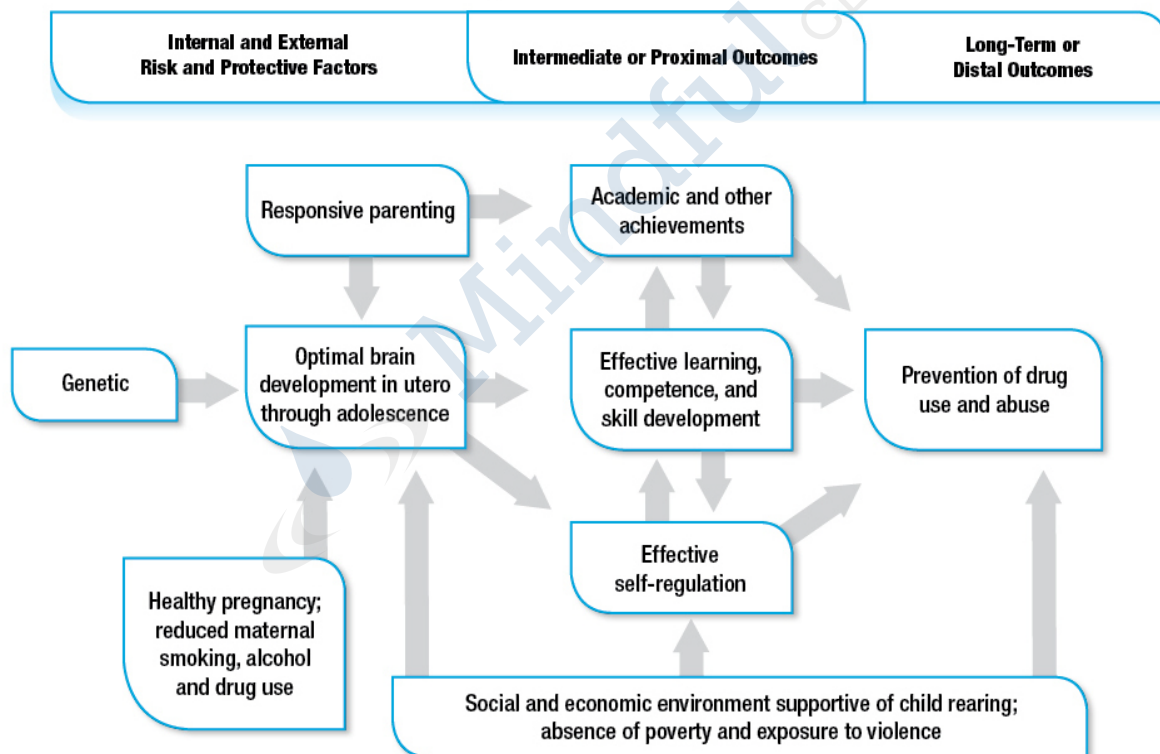


Chapter 3

Intervening in Early Childhood

The theoretical rationale for intervening in early childhood is that modifying internal and external risk and protective factors such as those discussed in the previous chapter can influence intermediate or proximal outcomes such as academic and other achievements; effective learning, competence, and skill development; and effective self-regulation. This in turn may reduce the exposure to drugs and the desire to use them during adolescence (see “Logic Model for Intervening in Early Childhood to Prevent Drug Abuse,”).

Logic Model for Intervening in Early Childhood to Prevent Drug Abuse



Principle 3: Intervening early in childhood can have positive long-term effects.

Principle 4: Intervening in early childhood can have effects on a wide array of behaviors, even behaviors not specifically targeted by the intervention.

Principle 5: Early childhood interventions can positively affect children's biological functioning.

Following this rationale (or logic model), prevention researchers have developed a large number of early childhood intervention programs, and ample evidence shows that they work. Some studies that followed participants as far as late adolescence or young adulthood have shown positive, long-term effects (including reduced substance use) from interventions that targeted poor parenting skills and other external or internal risk factors during childhood (for an example, see “Intervening to Reduce Risk for Families and Children”).

Some of these early interventions have also been found to prevent a wide range of other negative behaviors and promote a wide range of positive behaviors not specifically targeted by the intervention. (See “Intervening Early Can Have Long-Term Effects on a Wide Array of Behaviors.”) In some cases, studies

have shown that early childhood intervention even affected children’s biological functioning, such as their sensitivity to stress.

Intervening to Reduce Risk for Families and Children

Prevention interventions have been shown to alter risk factors for families and children. For example, first-time, low-income mothers who received an intervention including home visits during pregnancy and the first two years of life (the Nurse Family Partnership, described in Research-Based Early Intervention Substance Abuse Programs) had fewer child maltreatment reports involving them or their children 15 years after birth than mothers who did not receive home visits (Eckenrode et al., 2000). In another study, this home visiting intervention significantly reduced role impairment of mothers due to alcohol or substance use (i.e., impaired functioning with family members, with coworkers, and with friends) (Olds et al., 2010). For biological risk, a substance abuse prevention intervention for adolescent African American rural youth and their families (Strong African American Families), designed to strengthen family interactions, was found to be protective for children with genetic risk for initiating high-risk behaviors (Brody et al., 2009).

Intervening early can have long-term effects on a wide array of behaviors

| Intrapersonal | | |
|--------------------------------|--|--|
| Increased | Child health | Olds et al., 1986; Olds et al., 1994 |
| | Normalization of cortisol levels | Fisher et al., 2007 |
| | Language development and cognitive function | Olds et al., 2002a; Olds et al., 1994; Lunkenheimer et al., 2008 |
| | Self-regulation (emotional and behavioral control) | Hawkins et al., 2005; Conduct Problem Prevention Research Group, 2002; Lunkenheimer et al., 2008; Reid et al., 1999; Reid et al., 2007 |
| | Pro-social behavior | Catalano et al., 2003; Washburn et al., 2011 |
| | Social competence | Conduct Problem Prevention Research Group, 2002; Webster-Stratton et al., 2008; August et al., 2002; Tolan et al., 2004 |
| | Age at first sexual experience | Lonczak et al., 2002 |
| Decreased | Irritability as baby | Olds et al., 1986 |
| | Attention deficit hyperactivity disorder (ADHD) | Tolan et al., 2004 |
| | Internalizing behaviors and disorders (depression, anxiety) | Hawkins et al., 2005; Shaw et al., 2009; Conduct Problem Prevention Research Group, 2002; Izzo et al., 2005; Dolan et al., 1993; Barrera et al., 2002 |
| | Early aggressive behavior | Stoolmiller et al., 2000; Tolan et al., 2004; Tolan et al., 2009; August et al., 2001; August et al., 2003; Dolan et al., 1993; Kellam et al., 1994; Reid et al., 1999 |
| | Externalizing behaviors and disorders (aggression, anti-social behavior, and conduct problems) | Catalano et al., 2003; Reid et al., 2007; Webster-Stratton et al., 2008; Reid et al., 1999; Kellam et al., 2008; Shaw et al., 2009; Kellam et al., 1994; Petras et al., 2008; Barrera et al., 2002; Dishion et al., 2014 |
| | Delinquent, violent, and criminal behaviors | Hawkins et al., 1999; Beets et al., 2009 |
| | Driving under the influence of alcohol | Haggerty et al., 2006 |
| | Likelihood of selling drugs | Hawkins et al., 2005 |
| | Teen pregnancy | Lonczak et al., 2002 |
| | Lifetime sexual partners | Hawkins et al., 1999; Olds et al., 1998; Beets et al., 2009 |
| | Sexually transmitted infection (STI) | Lonczak et al., 2002 |
| | Initiation of tobacco, alcohol and/or other drug use/abuse | Beets et al., 2009; Degarmo et al., 2009; Storr et al., 2002; Wang et al., 2009; Hawkins et al., 1999; Furr-Holden et al., 2004 |
| | Alcohol, tobacco, and other drug use | Brown et al., 2005; Kellam et al., 2008; Furr-Holden et al., 2004; Izzo et al., 2005; Beets et al., 2009; Hawkins et al., 1999 |
| | Substance abuse disorders | Kellam et al., 2008 |
| Suicidal ideation and attempts | Hawkins et al., 2005; Wilcox et al., 2008 | |
| Any psychiatric diagnosis | Kellam et al., 2008 | |

| Family | | |
|-----------|--|---|
| Increased | Maternal prenatal and perinatal care | Olds et al., 1986; Olds et al., 1994 |
| | Maternal concern, support, nurturing, and monitoring for the child | Olds et al., 1986; Lunkenheimer et al., 2008; Reid et al., 1999; Tolan et al., 2004 |
| | Family problem-solving | Degarmo et al., 2009 |
| | Proactive family management | August et al., 2003 |
| | Parent involvement | Reid et al., 1999 |
| | Maternal graduation rates | Olds et al., 1988 |
| | Maternal work history | Olds et al., 1988 |
| Decreased | Prenatal smoking | Olds et al., 1986 |
| | Subsequent pregnancies | Olds et al., 1988; Olds et al., 1997 |
| | Child accidents and poisonings | Olds et al., 1986; Olds et al., 1994 |
| | Child abuse and neglect | Olds et al., 1986; Olds et al., 1994; Olds et al., 1997; Eckenrode et al., 2000 |
| | Domestic violence | Olds et al., 2004 |
| | Parental/caregiver stress | August et al., 2003; Fisher & Stoolmiller, 2008 |
| | Maternal depression | Shaw et al., 2009 |
| | Maternal role impairment due to substance use | Olds et al., 1997; Olds et al., 2010 |

| School/Work | | |
|-------------|--|--|
| Increased | Emphasis on social-emotional teaching | Webster-Stratton et al., 2008 |
| | Teacher reported increase in social skills | Reid et al., 1999 |
| | Academic achievement (reading and math) | Snyder et al., 2010; Catalano et al., 2003; Tolan et al., 2004; Tolan et al., 2009; Gunn et al., 2005; August et al., 2001; Dolan et al., 1993; Hawkins et al., 2005 |
| | Cooperative, team learning style | O'Donnell et al., 1995 |
| | School competence, socialization to school context | August et al., 2001; August et al., 2003 |
| | Commitment to school, school bonding | Catalano et al., 2003; Hawkins et al., 1999 |
| | High school completion | Kellam et al., 2008; Hawkins et al., 2005 |
| | College attendance | Hawkins et al., 2005 |
| | Employment | Hawkins et al., 2005 |
| | Time at present job | Hawkins et al., 2005 |
| Decreased | Criticism from teachers | Webster-Stratton et al., 2008 |
| | Disruptive behavior | August et al., 2003 |
| | School absenteeism | Snyder et al., 2010 |

| Service Use | | |
|-------------|---|---|
| Increased | Awareness of community services | Olds et al., 1986 |
| Decreased | Social service use (Temporary Assistance to Needy Families; Aid to Families with Dependent Children; other) | Olds et al., 1988; Olds et al., 1997; Olds et al., 2010; Poduska et al., 2008 |
| | Special education | Poduska et al., 2008 |
| | Child Protective Services | Eckenrode et al., 2000 |
| | Mental health and drug abuse services | Izzo et al., 2005; Poduska et al., 2008 |
| | Criminal justice involvement | Olds et al., 1998; Eddy et al., 2003; Poduska et al., 2008 |

What contexts do early childhood interventions target?

Prevention interventions not only support children’s development directly but also support the development of skills and resources of those who care for children in their most important primary contexts—or what is sometimes called their *proximal environments*.

Principle 6: Early childhood prevention interventions should target the proximal environments of the child.

The proximal environment during very early development is the family, so prevention interventions for the prenatal through infancy and toddlerhood periods often focus on the parents. When providing an environment that

supports healthy early development does not come naturally to new parents, prevention interventions can help them to build the necessary knowledge and skills. Family interventions may be delivered in the home, but that is not universally the case; some may be delivered in social service, community health, or educational settings.

The family remains the most important proximal environment for children, but as a child grows and develops, other contexts outside the family become increasingly important as well. The classroom is an important environment during the preschool and elementary school years, and interventions may focus on things like improving school climate, resources, and policies as well as enhancing teachers’ skills and parent-teacher communication. Changing classroom environments from those that react to problem behavior to those that encourage pro-social behavior can be achieved through supporting teacher training in constructive classroom management strategies (see “School Interventions”).

Some interventions address multiple contexts such as family and school, with emphasis on communication and collaboration between the two environments, thereby making a

Principle 7: Positively affecting a child's behavior through early intervention can elicit positive behaviors in other people, improving the overall social environment.

consistent prevention effort across contexts to affect the target population(s) of the intervention. In fact, this is a primary strategy of interventions for children 3 years of age and older.

Even when children are progressing along the normal course of physical, cognitive, social, and emotional development and achieving age-appropriate milestones, improvements in their proximal environments can further their development.

School Interventions

Programs targeting children making the transition to elementary school focus on building a repertoire of positive competencies including academic, self-regulation, and social skills. For example, tutoring, especially in reading, is one important focus of prevention programs because reading difficulties during the early elementary years is a strong risk factor for school failure and later drug use. Prevention intervention programs also target social skills that affect the children's relationships with peers and adults outside the family. For example, some approaches used in programs that address social skills development include positive behavior teams, group practice, playground and free play monitoring, and rewarding good behaviors. Incorporating skills development into the natural environment of children allows them to practice these skills with peers. Another frequently used strategy for these interventions is training teachers in classroom management strategies. This approach provides teachers with both the skills for managing children's behaviors and activities for teaching children to manage their own behaviors and emotions, thereby helping children develop self-regulation. Also, approaches that draw on mindfulness-based strategies (e.g., meditation, yoga, martial arts) are being developed and tested for their potential to enhance self-regulation.

Do early childhood interventions target all children or just those at highest risk?

It depends on the type of intervention. *Universal* interventions are delivered to everyone in the population regardless of risk—for example, all children in a preschool or first-grade classroom or all children in a community. *Selective* interventions are delivered to groups of children who are at risk due to some factor they have in common—for example, children entering elementary school with a low level of self-regulation or ability to pay attention, children living in a high poverty or crime area, or children in the foster care system.‡

‡ An additional category, *indicated* interventions, has been defined by the Institute of Medicine (Institute of Medicine (1994). *Reducing Risks for Mental Disorders*. Washington, DC: National Academy Press) but is not relevant to early childhood. In the context of substance abuse prevention, indicated interventions are for individuals who already exhibit drug use but do not meet criteria for drug abuse or addiction.

Some interventions target more than one level of risk. For example, within a universal intervention, screening can be provided to determine who has more severe problems and risks, and then additional services can be provided to those most in need based on that screening. Such programs are called *tiered*, because some people progress from one level of intervention to another.[§] (Research-Based Early Intervention Substance Abuse Prevention Programs reviews universal, selective, and tiered programs.)

What are some characteristic features of early childhood interventions?

Specific characteristics of early childhood intervention programs are generally related to the developmental period of the child, the specific risk to be addressed, and the people with whom the child interacts in his or her proximal environments. Interventions are generally timed to coincide with the transitions between life course periods, because changes occurring within and around the child during these transitions present particular risk factors, as well as opportunities for enhancing protective factors. (See “Risks Addressed Through Specific Age-Appropriate Strategies.”)

Risks Addressed Through Specific Age-Appropriate Strategies

| | Risk | Intervention Strategy |
|--------------------------------|--|--|
| Prenatal | Maternal substance use before and during pregnancy | Counseling through primary care and referral to treatment |
| | Inadequate prenatal care | In-home nurse visits |
| Infancy and Toddlerhood | Inappropriate expectations for children | Parenting class on child development |
| | Harsh discipline | Parenting class on managing child behavior |
| | Insecure attachment | Parent class on developing a warm, supportive relationship |
| Preschool | Aggressive behavior | Parent and teacher classes on setting limits and boundaries |
| | Poor emotional control | Preschools that teach social-emotional learning |
| | Delayed school readiness | Preschool programs that highlight basic math and language concepts |
| Elementary School | Behavioral problems in the classroom | Training teachers on classroom management |
| | Academic problems | Academic tutoring |
| | Child acting out at school | Developing collaborative relationships between school and home |
| | Poor social skills | Peer social groups |

[§] Universal interventions do not group high-risk participants, avoiding an environment in which those at elevated risk are set apart or stigmatized by their status. Moreover, many selective and tiered interventions more directly address the problems that a population is likely to encounter, however these interventions carefully consider such issues as stigma and the risks (e.g., modeling of negative behaviors) and benefits of grouping individuals from a subpopulation.

Prenatal Period, Infancy, and Toddlerhood

Prevention interventions for the prenatal period and infancy usually focus on very young mothers and families who are at risk due to poverty. The goal is to foster a healthy pregnancy, healthy development of mothers and their children, and a healthy parent-child relationship. Specific programs differ, but they commonly screen mothers for drug use, instruct them in good health care practices, and teach them how to connect to appropriate community services. Programs typically focus on mother-child bonding, using consistent discipline, setting an example of pro-social behavior, and getting the child ready for preschool. Involvement of the father is often encouraged as well.

Some programs access mothers at home during the prenatal period. For example, in order to support mothers, nurse visitors may provide extensive one-on-one instruction during visits (Olds, 2002b). Other programs access mothers and their children through services for low-income families. This strategy supports finding mothers and children in need, assessing their needs, and referring them to available services and programs that meet those specific needs (Shaw et al., 2006).

Preschool

Similar to programs for younger age groups, programs during the preschool period address the well-being of both caregivers and children and the quality of their relationship, primarily through teaching pro-social parenting practices. Early disruptive behaviors of children are addressed in order to prevent escalation of these behaviors, promote better parent-child bonding (Webster-Stratton et al., 2008), and help the child learn positive ways of relating to others. Preschool programs can incorporate much of the same content as programs for younger age groups (for example, encouragement of pro-social child behavior and consistent contingent-responsiveness and non-abusive limit setting) but within very different contexts (such as school) and with children who have a wide variety of risk factors.

Core elements of a school-based early childhood intervention include training teachers to establish clear rules and rewards for compliance, teach interactively, and promote cooperative learning in small groups.

Preschool is a point in time when many children are at risk for or entering child protective placements (Child Welfare Information Gateway, 2013), and these children are at increased risk for multiple problems early and later in life. Thus some interventions specifically target foster parents and children. For example, in the Multidimensional Treatment Foster Care Program for Preschoolers (MTFC-P), maltreated foster children receive individualized services in the home, a preschool setting, and a therapeutic child play group; and foster parents are given training to ensure that they are properly equipped to care for children who may come to them with symptoms of severe stress and unusually difficult behavior challenges.

Transition to School

A significant target of programs aimed at the transition to elementary school is creating strong collaborative ties between families and schools. Evidence indicates that such links facilitate children's adjustment to school, academic achievement, pro-social peer friendships, and self-regulation. A notable characteristic of programs targeting this period of development is the use of interactive techniques such as role-playing, guided play sessions, and small-group practice; research has demonstrated that interactive techniques are more successful than lecture and information only (Tobler, 2000).

A number of programs focus on improving communications between parents and teachers and on providing parents with information and strategies for helping their child cope with the structure and behavioral expectations of the classroom and how to facilitate positive peer interactions.

Research shows that parents can help their children develop skills, competencies, and knowledge specific to the school transition and thereby promote a child's school success.

The elementary school is also a focus of interventions to develop children's school competencies. At the heart of these programs are activities that build a repertoire of positive academic, self-regulation, and social skills. Programs may include tutoring—especially in reading, as reading difficulties in early elementary school is a risk factor for ongoing academic problems and later school failure and drug use. Even if they target similar outcomes, programs may use different strategies: For example, social skills development can be approached through positive behavior teams (seating children with social or behavioral problems with more competent children) (Ialongo et al., 1999), group practice, playground and free-play monitoring, or rewarding of good behaviors.

Teachers are also a focus of interventions for this developmental stage. In such programs, teachers are frequently trained in classroom management strategies. Core elements of a school-based early childhood intervention include training teachers to establish clear rules and rewards for compliance, teach interactively, and promote cooperative learning in small groups. Such an approach is designed to provide teachers with both the skills for managing child behavior and activities for teaching children to manage their own emotions and behaviors, thereby helping children develop self-regulation.

How does changing the behavior of parents and teachers help children?

In programs that target multiple actors (such as parents and teachers, or parents and children), the program activities for one actor often reinforce those of another. For example, parents who are taught to respond with consistency and a matter-of-fact, warm tone when their child breaks a rule are likely to elicit a positive change in child behavior. Thus, a program to reduce aggressive behavior in children entering school could include activities and training in classroom management for teachers and instruction in supportive, consistent, contingent-responsive parenting strategies for parents and other caregivers, as well as child-oriented program components aimed at increasing the child's attention and self-regulation within the classroom environment.

Behavioral changes in children and the adults who interact with them can be mutually reinforcing. By positively influencing the child's family or school environment, child behavior can, over time, become more pro-social; this, in turn, can elicit more positive interactions with caregivers and peers, and thereby improve the social environment.

Who benefits the most from early childhood interventions?

While most children and families benefit from interventions, children at increased risk for later substance abuse due to factors such as early aggressive behavior, poor emotional control, or extreme poverty, generally benefit the most from early childhood interventions.

In addition to children, there is evidence that mothers benefit from the parenting interventions. For example, several studies have shown positive effects on maternal depression, substance use, education, and career attainment.





Chapter 4

Research-Based Early Intervention Substance Abuse Prevention Programs

NIDA-supported research over the past 3 decades has resulted in the development of a range of early intervention substance abuse prevention programs that span the prenatal period, infancy and toddlerhood (0 to 3 years), preschool (3 to 6), and the transition to elementary school (6 to 8). The programs described in this chapter are arranged by developmental period. Within each age range, programs are presented according to level of prevention—universal, selective, and tiered. (Not all prevention levels exist within each age range.) Contact information is provided for each of the programs listed. Research findings regarding the specific programs can be found following each program description. (See “NIDA-Funded Early Interventions.”)

NIDA-Funded Early Interventions

Prenatal/Infancy and Toddlerhood

| Universal Programs | Target Population | Context | Reference |
|------------------------|---------------------------------------|---------|---------------------|
| Durham Connects | Mother, Father (when possible), Child | Family | Dodge et al., 2013a |

| Selective Programs | Target Population | Context | Reference |
|-------------------------------------|------------------------------------|---------|----------------------|
| Early Steps, Family Check Up | Mother, Child | Family | Shaw et al., 2006 |
| Family Spirit | Mother, Child | Family | Mullany et al., 2012 |
| Nurse Family Partnership | Mother, Father (if present), Child | Family | Olds, 2002b |

Preschool

| Selective Programs | Target Population | Context | Reference |
|--|----------------------|----------------|----------------------------|
| Multidimensional Treatment Foster Care for Preschoolers | Foster family, Child | Family, School | Fisher & Chamberlain, 2000 |

Transition to Elementary School

| Universal Programs | Target Population | Context | Reference |
|---|--------------------------------|----------------|-------------------------|
| Caring School Community Program | School, Teacher, Family, Child | School, Family | Battistich et al., 1997 |
| Classroom-Centered Intervention | Classroom, Child | School | Kellam & Rebok, 1992 |
| Linking the Interests of Families and Teachers | Classroom, Child, Family | School, Family | Reid et al. 1999 |
| Raising Health Children | Family, Child, Classroom | School, Family | Catalano et al., 2003 |
| SAFEChildren | Family, Child | School, Family | Tolan et al., 2004 |
| Seattle Social Development Project | School, Parent/Family, Child | School, Family | Hawkins et al., 1999 |

| Selective Programs | Target Population | Context | Reference |
|--|-------------------|----------------|---------------------|
| Early Risers "Skills for Success" Risk Prevention Program | Parent, Child | School, Family | August et al., 2001 |
| Kids in Transition to School | Child | School | Pears et al., 2007 |

| Tiered Programs | Target Population | Context | Reference |
|---|------------------------------|---------------------------|--|
| Fast Track Prevention Trial for Conduct Problems | Family, School, Class, Child | School, Family, Community | Conduct Problems Prevention Research Group, 2000 |
| Incredible Years | Family, Child, Classroom | School, Family | Webster-Stratton et al., 2008 |
| Positive Action | Family, School, Class, Child | School | Flay et al., 2001 |
| Schools and Homes in Partnership | Parent, Child | School, Family | Barrera et al., 2002 |

Prenatal/Infancy and Toddlerhood (Ages 0 to 3 Years)

Universal Programs

Durham Connects. Durham Connects is a brief, universal postnatal nurse home-visiting program designed to assess family needs and connect parents with community resources to improve infant health and well-being. Important aims are to alleviate parent substance use and other problems and to prevent child abuse. Designed for population-level implementation, it engages every family but rapidly triages and concentrates resources on families with assessed higher needs. The highly structured program consists of four to seven scripted intervention contacts, beginning with consent during a birthing hospital visit when a staff member communicates the importance of community support for parenting, one to three nurse home visits when the infant is between 3 and 12 weeks old, one to two nurse contacts with a community service provider, and a telephone or home follow-up 1 month later.

Findings: In a population-level randomized controlled trial with almost 5,000 families, families assigned to Durham Connects had 50 percent less emergency medical care use across the first 12 months of life than the control group. This population-level program yields similar benefits to other, more intensive nurse visiting programs that have found reductions in service usage in infancy (Dodge et al., 2013b).

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Selective Programs

Early Steps, Family Check-Up (Early Steps FCU). Early Steps FCU is a brief selective intervention designed to support families with young children (ages 2 through 5) who may experience stress due to income or other family circumstances. It is a brief (three-session) family intervention that consists of an initial parent interview followed by family assessment and a feedback session; there is an option for additional follow-up sessions on parent management support using an empirically validated curriculum (Everyday Parenting). Early Steps FCU aims to improve parenting practices, increase the involvement of caregivers with children, and link parents to support services with the goal of preventing the development of childhood problem behaviors. A benefit of this intervention is that it

works with individual families to identify specific needs and strengths, thus tailoring the intervention to each family's needs.

Findings: To test the Early Steps FCU, participants were identified through a national family nutrition and health program for young families referred to as the Women, Infants, and Children Nutrition Program (WIC). Early Steps FCU resulted in reduced problem behaviors, especially among the highest risk children. This effect on child behavior was accounted for by improvements in positive parenting. The Early Steps FCU was also found to be associated with attenuated internalizing behavior, increased self-regulation, and improved language skills among children and reduced depressive symptoms in mothers. This highlights that prevention interventions can improve parenting practices and reduce problem behaviors in children, and improve parental functioning (Dishion et al., 2008).

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Family Spirit. Family Spirit is a pregnancy and early childhood selective prevention intervention for American Indian teen mothers and their children, delivered by Native paraprofessionals (local workers trained and supervised by professionals to deliver the program) in home visits. Sessions target parenting skills across early childhood (0 to 3 years), maternal substance abuse prevention and life skills, and positive child psychosocial development. The program consists of 43 highly structured lessons, occurring weekly through pregnancy, biweekly in the first 3 months after childbirth, monthly between 4 and 12 months, and bimonthly between 12 and 36 months.



Findings: Recent findings for the Family Spirit intervention showed that, at 12 months postpartum, intervention mothers had greater parenting knowledge, parenting self-efficacy, and home safety attitudes with fewer externalizing behaviors (opposition/defiance, rule breaking, and social problems) than the control group. Their children also had fewer externalizing problems. In a subsample of mothers with any lifetime substance use at baseline, children of substance users in the intervention versus control group were found to have fewer externalizing and dysregulation problems, and fewer scored in the clinically "at risk" range for externalizing and internalizing problems (Barlow et al., 2006; Barlow et al., 2012).

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Nurse Family Partnership. Nurse Family Partnership is a selective prenatal and infancy home visitation program for young first-time mothers from low socio-economic backgrounds and their children through age 2. The program's primary goals are to improve the outcomes of pregnancy by helping pregnant women improve their health, for instance through diet and discontinuing cigarette, alcohol, or other drug use; to improve children's subsequent health and development by promoting competent parental caregiving; and to improve parents' economic self-sufficiency by helping them develop a vision for the future of their families and to make appropriate decisions about completing their educations, finding work, and planning the timing of subsequent pregnancies. The program consists of 64 structured visits beginning as early in pregnancy as possible and continuing through the first 2 years of the child's life. Nurses adapt the content and frequency of visits to meet families' needs and aspirations.

Findings: Findings on this program have confirmed that the Nurse Family Partnership (NFP) intervention produces a broad array of positive effects on immediate and intermediate outcomes, including improved maternal, infant, and child health and reduced injuries, neglect, and maltreatment of children. There are also long-term effects on child outcomes. For example, children in the NFP intervention group had lower rates of substance use, delinquency, and involvement in the juvenile justice system at age 12 than control group children. This intervention is effective with diverse populations (e.g., rural and urban) but not as effective when implemented by trained paraprofessionals; hence, nurse participation is a key aspect of this intervention (Kitzman et al., 2010; Olds et al., 2010).

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Preschool (Ages 3 to 6 Years)**Selective Programs**

Multidimensional Treatment Foster Care for Preschoolers (MTFC-P) (Formerly Early Intervention Foster Care [EIFC]). MTFC-P is a selective intervention for 3- to 6-year-old children in foster care. It attempts to create optimal foster care conditions (including providing responsive and consistent caregiving and predictable daily routines) to facilitate developmental progress and address difficulties related to delayed maturation and behavioral and emotional problems. Children are referred from the child welfare system by their caseworkers. The intervention is delivered by family therapists and licensed psychologists who provide parenting training and access to resources for foster parents above and beyond those offered in regular foster care. Prior to bringing a new foster child into their home, foster parents receive 12 hours of training during which they learn how to concretely encourage pro-social behavior, consistently and non-abusively set limits to address disruptive behavior, and give children close supervision. Foster parents attend weekly support group meetings and have frequent telephone contact with intervention staff, including access to a 24-hour crisis hotline. The children receive weekly individualized skills training services from a child therapist and attend a weekly therapeutic playgroup. In addition, family therapists work with families to facilitate the transition out of foster care and into a permanent home.

Findings: Children in this early intervention foster care program showed more secure behaviors, improved response to feedback, and improved sleep. They also showed reduced stress, measured by the level of the hormone cortisol. Over the course of MTFC-P placement, children's cortisol levels normalized and became similar to those of a control group of non-maltreated children living with their biological parents. Another measure of child function among children in foster care is disrupted placement, with children who function better staying in a placement rather than being moved to another foster home. Successful transitions into permanent homes were significantly higher for children in the early intervention foster care program compared to children in regular foster care (Fisher et al., 2007; Fisher et al., 2009).

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Transition to School (Ages 6 to 8 Years)

Universal Programs



Caring School Community Program (Formerly Child Development Project). This is a universal family and school intervention to reduce risk factors and bolster protective factors among children making the transition to elementary school. The program focuses on strengthening students' "sense of community," or connection to school, which research has shown to be pivotal in reducing drug use, violence, and mental health problems and promoting academic motivation and achievement. The program consists of a set of classroom, school, and family involvement approaches that reinforce the development of skills by children across

contexts. These promote positive peer, teacher-student, and home-school relationships and the development of social, emotional, and character-related skills. The program provides detailed instructional, implementation, and staff development materials.

Findings: Research results showed a significant reduction in students' drug use and involvement in other problem behaviors in schools where the Caring School Community Program was widely implemented by teachers over a period of 3 years, compared to schools not implementing the program (Battistich et al., 2000).

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Classroom-Centered (CC) Intervention. The CC Intervention is a multi-component, universal first-grade preventive intervention targeting early aggressive or disruptive behavior and poor academic achievement, with the long-term goal of reducing adolescent and adult antisocial behavior and substance abuse. The CC Intervention enhances teachers' behavior management and instructional skills through the use of an effective classroom behavior management program called the "Good Behavior Game" and an enhanced reading and mathematics curricula.

Findings: Results from an ongoing follow-up study indicate that the CC Intervention decreased the level of conduct problems in middle and high school, delayed the onset of smoking tobacco in both males and females, and was associated with an increased likelihood of high school graduation and a lower likelihood of special education use. While broad benefits of this intervention have been found, the effects of the CC Intervention are strongest for males who exhibit a relatively high level of aggressive-disruptive behavior in the early elementary school years, indicating that this universal intervention can have a targeted impact on a high-risk group of children. In a study of the Good Behavior Game, males in the intervention group who were more aggressive in 1st grade had higher rates of high school graduation, lower rates of alcohol and drug abuse and dependence, and lower rates of antisocial personality disorder at ages 19 to 21 than males in the control condition (Bradshaw et al., 2009; Wang et al., 2012).

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Linking the Interests of Families and Teachers (LIFT). LIFT is a universal preventive intervention that was developed for elementary schools in communities with high levels of juvenile delinquency. Created for students in the 1st and 5th grades, LIFT is a multi-component intervention that is designed to improve school and family environments while also reinforcing stronger links between the two. Two school components are designed to decrease the likelihood of both aggressive child behavior and rejection of aggressive children by their peers: A classroom component improves upon social and problem solving skills during 20 1-hour-long sessions, and a playground component based on the Good Behavior Game (see the CC Intervention) reinforces positive social behaviors during free (unstructured) play. There is also a parent management training component emphasizing good discipline, supervision, and problem-solving during a group meeting, once a week for 6 weeks, as well as parent support between sessions. In addition, a school-parent communication component supports connections between the families and teachers through phone, email, and Internet, as well as a weekly newsletter sent to parents describing the LIFT activities of the week and suggesting complementary home activities.

Findings: Within the context of a randomized controlled trial of 12 schools, LIFT resulted in improvements in parenting behaviors and child social skills as well as reduced child physical aggression on the playground. During their middle and high school years, children in schools assigned to the LIFT intervention had lower rates of police arrest and substance use compared to children in control schools (DeGarmo et al., 2009; Eddy et al., 2000).

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Raising Healthy Children (RHC). RHC is a school- and home-based intervention targeting children in grades 1 through 12. It engages classroom teachers, parents, and students with the goal of increasing pro-social behavior and reducing substance use and other problem behavior by addressing developmentally salient risk and protective factors. Teachers attend workshops to improve instruction and classroom management practices and have access to one-on-one classroom-based coaching to help them implement the techniques they have learned. Parents participate in parenting workshops and brief, individual, in-home sessions as students approach critical transitions in adolescence. Children learn social, emotional, and cognitive skills through classroom, after-school, and parent-youth sessions. In addition, families have access to school-home coordinators (SHCs) who check in with families several times a year and help solve problems that arise.

Findings: Students who participated in the RHC intervention showed higher academic performance, a stronger commitment to school, and increased social competency. They also showed lower levels of antisocial behavior and less frequent alcohol and marijuana use, and were less likely to drive under the influence of alcohol or ride with someone who had been drinking alcohol. Reductions in driving under the influence and riding with another driver under the influence were sustained through age 20. As such, the RHC intervention has been shown to promote healthy behaviors and academic achievement, reduce substance use and antisocial behaviors, and reduce drunk driving (Brown et al., 2005; Haggerty et al., 2006).



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SAFEChildren. SAFEChildren is a universal intervention with school and family components developed specifically for 1st graders from urban, disadvantaged, or low-income neighborhoods. This program is designed to help families protect their children from the risks of growing up in communities with high levels of poverty and crime and few social and economic resources. SAFEChildren also specifically focuses on helping inner-city parents manage a child's transition to school with the goal of promoting academic achievement and overall child well-being. The family component brings multiple families together in a group setting once a week for 22 weeks. During these meetings, families receive information about parenting skills, family relationships, and understanding and managing developmental and situational challenges. In addition, there are opportunities to practice skills and solve problems as a group. These multiple-family groups increase support among parents and help families become more engaged with the school and more engaged in managing issues such as problems in the neighborhood. The school component consists of a tutoring program that takes place twice weekly for 22 weeks and emphasizes phonetics as well as a step-by-step advancement in academic skills.

Findings: The SAFEChildren intervention has been shown to improve reading level overall. Among higher-risk families, characterized by poorer family relationships and parenting practices, the SAFEChildren intervention led to improved parental monitoring and reduced child aggression. Furthermore, higher-risk children, characterized by greater aggression and hyperactivity as well as poorer concentration, showed greater reduction in aggression and hyperactivity as well as improved leadership skills. Also, SAFEChildren had an effect on ADHD symptoms from first grade to fourth grade, with intervention children less likely to be rated as high on impulsivity and hyperactivity, over this time frame (Fowler et al., 2014). An additional version of SAFEChildren was developed for 4th grade to deliver booster sessions. Those assigned to the booster showed lower rates of aggression than those with only 1st-grade intervention (Tolan et al., 2009).

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Seattle Social Development Project (SSDP). SSDP is a universal intervention for elementary school children with a school component and voluntary family component, developed to increase pro-social bonds, strengthen attachments to school, and decrease delinquency. The family component consists of parenting classes that cover family management (1st and 2nd grade), engagement in a child's education (2nd and 3rd grade), and the drug abuse prevention program Preparing for the Drug Free Years (PDFY) (5th and 6th grade). In the school component, teachers are trained to establish clear rules and reward compliance, teach interactively, and promote cooperative learning in small groups. The goal is to increase the students' academic performance as well as social skills and increase contact with pro-social peers. In addition, children are taught interpersonal problem-solving skills to improve communication, decision-making, negotiation, and conflict resolution. SSDP is the original intervention that serves as the basis for the Raising Healthy Children (RHC) intervention.

Findings: The SSDP intervention was associated with reduced aggressive behavior in males and reduced self-destructive behavior in females. It has also been shown to reduce delinquency and alcohol use for both males and females. Females were also less likely to have smoked cigarettes and somewhat less likely to have tried marijuana. Further, there is evidence that SSDP increases attachment to school, cooperative learning, and academic achievement. Intervention effects were strongest among children from lower income households. Long-term effects of the SSDP intervention found that those children who received the intervention had less risky sexual behavior (fewer partners, sexually transmitted infections, and pregnancies, and more condom use), were more likely to graduate high school, were more likely to become gainfully employed, and have less involvement with the criminal justice system (Hawkins et al., 2008).

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Selective Programs

Early Risers “Skills for Success” Risk Prevention Program. Early Risers is an intervention for children at higher risk for the development of serious conduct problems, including the use and misuse of drugs. Elementary school-aged children ages 6 to 10 are selected for the program based on the presence of risk factors including exposure to stressful life experiences and/or early aggressive and disruptive behavior. The program is designed to deflect children from the “early starter” developmental pathway toward normal development by improving their academic competence and behavioral self-regulation and encouraging positive peer affiliations. The program also teaches parenting practices that include discipline, nurturance, and involvement. The Early Risers intervention model includes two child-focused components and two parent- or family-focused components delivered over a 2- to 3-year period. The program includes standard skills curricula as well as strategies tailored to address the individual needs and goals of children and their parents.



Findings: In efficacy and effectiveness trials of Early Risers, program participants have demonstrated greater gains in social skills, peer reputation, pro-social friendship selection, academic achievement, and parent discipline than did controls. The program has been replicated with African-American children. Findings from a 6-year follow-up indicated that the gains in social skills and parent discipline observed early on accounted, in part, for fewer oppositional defiant disorder symptoms among program

participants compared with controls in middle school. Recently, in a going-to-scale trial, Early Risers was implemented with high fidelity across 28 school sites, and children made positive gains on outcomes similar to those found in the efficacy trial (August et al., 2003).

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Kids in Transition to School (KITS). KITS is a selective prevention intervention designed to enhance psychosocial and academic readiness in children in the foster care system as they enter school by promoting pre-literacy skills and increasing their attention, effortful control, and social skills in classroom settings. The program gives caregivers skills for facilitating their children's successful transition to kindergarten and becoming involved in their children's schooling. The KITS intervention targets specific school-related skills during the summer before and the first weeks of kindergarten via a therapeutic playgroup; caregiver psycho-educational support groups; and behavioral consultation in the home, school, and community settings.

Findings: Recent findings from a randomized controlled trial of KITS showed positive effects on outcomes in childhood that are linked to later risk for drug use. Children who received the KITS intervention had lower levels of oppositional and aggressive behaviors in the classroom. Also, there were positive intervention effects on early literacy and self-regulatory skills (Pears et al., 2013; Pears et al., 2012).

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Tiered Programs

Fast Track Prevention Trial for Conduct Problems. Fast Track is a tiered comprehensive preventive intervention delivered in grades 1 through 10 to children at high risk for long-term antisocial behavior. Based on a developmental model, the intervention includes a universal classroom program (adapted from the Promoting Alternative Thinking Strategies [PATHS] curriculum) delivered in elementary school. This classroom intervention builds skills in emotional understanding and communication, friendship, self-control, and social problem-solving. In addition, the program includes selective interventions for high-risk children displaying elevated aggression at home and school, as assessed in kindergarten. These high-risk children receive social skills training and academic tutoring, and their parents receive group parent training and individual home visits. Child-focused skill training targets academic and social competencies as well as self-control skills. Parent training builds parents' self-control and targets skills to support the child's school adjustment, improve the child's behavior, promote appropriate expectations for the child's behavior, and improve parent-child interaction.

Findings: By the end of 12th grade, the Fast Track intervention was found to reduce adolescent delinquency as indicated by youth self-reports and official arrest records and, for the youths at highest risk, to reduce lifetime prevalence for conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder, and any externalizing disorder. At the end of elementary school, children in Fast Track were found to have significantly reduced home and community problems, which included past-year involvement in substance use behaviors. There was no significant effect of the intervention on the onset of delinquent acts that included selling controlled substances. By the end of 12th grade, children in Fast Track had significantly fewer visits to general health providers, pediatric providers, and emergency departments for emotional, behavioral, academic, drug, or alcohol problems. At age 25 years, assignment to intervention significantly decreased the probability of alcohol abuse, marginally decreased binge drinking, did not affect heavy marijuana use, and significantly decreased serious substance use (Conduct Problems Prevention Research Group, 2011; Conduct Problems Prevention Research Group, 2015).

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Incredible Years® Parents, Teachers, and Children's Training Series. The Incredible Years series is a tiered, multi-component prevention and treatment intervention implemented in day care, preschool (2 to 5 years), and early primary grades (6 to 8 years). The prevention version of the program can be offered in high-risk schools or day care centers to all parents, teachers, and children; or parents and teachers may identify children at moderate or higher risk based on elevated behavior problem ratings. The treatment version is used for children identified as having behavioral or conduct problems. The comprehensive intervention consists of a parent training component as well as school-based teacher training and child training components.

The Incredible Years parenting program

instructs parents in child-directed play, academic and persistence coaching, social and emotional coaching, use of praise and tangible incentives, and positive discipline methods that promote positive relationships and strengthen children's language development, social and emotional competence, school readiness skills, problem-solving, and anger management. Different parent curricula are available for different child developmental stages and teach parents how to partner with day care providers and teachers to develop individualized behavior plans. The program consists of weekly, 2-hour parent group meetings with a group leader and/or counselor for a total of 14 to 18 sessions or more. The number of sessions varies according to the child's age, the parent's needs, and whether the prevention or treatment version of the program is being used.



The Incredible Years child program, also called the Dina Dinosaur Social Skills Program for young children (Dinosaur School), teaches children school rules, strategies for success in school, feelings literacy, empathy training and emotional regulation, problem-solving skills, and friendship skills. The prevention version of this program can be delivered by classroom teachers throughout the school year two to three times per week, with structured circle time lesson plans and hands-on small group activities. The program uses developmentally appropriate lesson plans for children in preschool through 2nd grade (3 to 8 years old).

The **Incredible Years teacher classroom management program** trains teachers in effective classroom management strategies as well as ways to collaborate with parents to promote consistency of learning from school to home. This program can be delivered to all teachers in a school or to selected teachers who have particularly challenging children in their classrooms. The training is group-based and delivered in six day-long sessions once a month throughout the year, accompanied by individual coaching within the schools.

Findings: Each of the Incredible Years programs has been researched in their prevention and treatment versions. Parent programs consistently result in higher rates of positive parenting behaviors and fewer child behavior problems at home. The child program results in improved social interactions and problem-solving with peers, increased in-school readiness behaviors, and decreased aggression and negative behavior with peers. The teacher program results in increased use of positive classroom management strategies, less negative or critical teaching, more focus on providing children with social emotional curriculum, and increased home-school collaboration (Webster-Stratton & Reid, 2010; Webster-Stratton et al., 2004).

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Positive Action (PA). The PA intervention is a tiered, multi-component, school-based, social-emotional and character development program designed to improve academics and pro-social behaviors as well as decrease problem behaviors. Components of this intervention target the classroom and the overall school climate as well as families and the community. The classroom component consists of grade-specific curricula, which can be implemented beginning as early as Pre-K and extending through grade 12. The lessons cover six broad categories: self-concept, physical and intellectual actions, social/emotional actions for managing oneself responsibly, getting along with others, being honest with oneself and others, and continuous self-improvement. The overall school climate supports the classroom curriculum through ongoing reinforcement of positive behaviors, posters, assemblies, newsletters, and other means. In addition, school counselors work with selected higher-risk students and families to develop PA skills. The family component provides caregivers with resources that parallel the classroom curricula to further reinforce the messages children are receiving at school. The PA intervention also helps establish media messages and civic engagement activities for the larger community in which the children live.

Findings: Children who participated in the PA program had improved academic achievement and lower rates of substance use, violence, sexual activity, and absenteeism. Furthermore, the effects of PA on child outcomes increase with multiple years of exposure to the program (Beets et al., 2009; Flay & Allred, 2010; Snyder et al., 2010).

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School and Homes in Partnership (SHIP). The SHIP intervention is a tiered intervention for children in kindergarten through 3rd grade who have aggressive behavior problems or reading difficulties. It is implemented over the course of 2 academic years and includes parent training, a social behavior intervention, and reading instruction. The parent training component is administered in either Spanish or English and consists of the Incredible Years parenting program delivered over 12 to 16 sessions. There are two components to the social behavior intervention. The first component, Contingencies for Learning Academic and Social Skills (CLASS), involves the child working directly with a trained consultant, then the teacher, and lastly the teacher and parents to reduce acting out and improve appropriate classroom behavior. The second component is the Dina Dinosaur Social Skills Program (see Incredible Years), a 2-hour after-school program using puppets and video tapes to model appropriate behavior to children. The reading instruction component consists of daily small-group instruction in phonemic awareness, sound-letter correspondence, and blending. Additional instruction is provided for those students who are still non-readers in the 3rd and 4th grades.

Findings: SHIP has been evaluated among both European-American and Hispanic children. It was found to reduce aggressive or anti-social behavior, particularly for those children with early aggressive behavior problems. SHIP has also been found to improve reading abilities (Gunn et al., 2005; Smolkowski et al., 2005).

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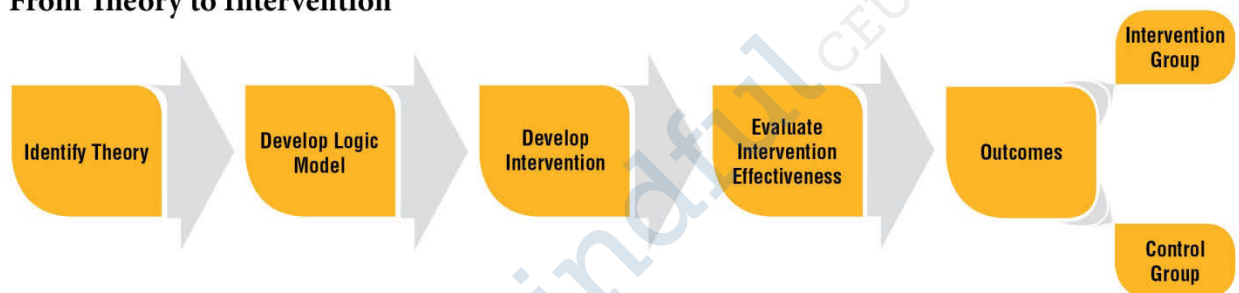


Appendix 1

From Theory To Outcomes—Designing Evidence-Based Interventions

Through theory, observation, and behavioral study, scientists have determined that select facets of human behavior can be changed over time. Specifically, the effects of malleable risk factors can be reduced, protective factors can be enhanced or developed, and resources can be accessed. An important avenue for accomplishing this is through prevention interventions that develop knowledge, skills, and competencies in the targeted individual(s). This provides the basic rationale for the conception and design of prevention intervention programs.

From Theory to Intervention



Design of science-based interventions begins at the theoretical level, with:

- *Developmental theories* that explain human growth and maturation; the normal course of physical, psychological, emotional, and cognitive changes; and what motivates humans to behave in particular ways
- *Ecological theories* that specify the contexts within which individuals develop and function and strive to explain the factors within contexts that influence changes in behavior
- *Cognitive theories* that focus on internal states such as motivation, problem-solving, decision-making, and attention
- *Behavior analytic theories* that focus on how behaviors and habits are acquired and can be changed

These theories help researchers think about how patterns of behaviors develop, what motivates individuals to behave in specific ways, and what risk and protective factors should be examined. The influence of theory can be traced throughout the processes of conceptualizing, developing, and testing an intervention. Theory informs thinking about what internal and contextual factors and processes may be modifiable; this information is then used in the development of the *logic model*.

Logic models graphically explain how changes in malleable risk and protective factors and behaviors will take place over time to produce positive outcomes. From the logic model described in “Intervening in Early Childhood” (see “Logic Model for Intervening in Early Childhood to Prevent Drug Abuse”), an intervention is developed, including the specification of knowledge and activities designed to strengthen the resources and capacities identified as crucial to providing protection against and reducing risk factors and associated problem behaviors.

Intervention Timing, Context, and Components

As discussed in “Why is Early Childhood Important to Substance Abuse Prevention?,” life course transitions in childhood often signal new or evolving physical, cognitive, social, and emotional development and represent peak times of vulnerability to various risk factors. Prevention interventions are designed and tested for specific stages of development, with a focus on fostering optimal development as the child encounters new internal and external capacities, social relationships, and contexts. For instance, the expectations for performance associated with new phases of life can trigger anxiety and self-doubt among many children. Providing experiences with and practice in negotiating new situations during these transitions can foster confidence and competence, thereby maximizing the potential for optimal development.

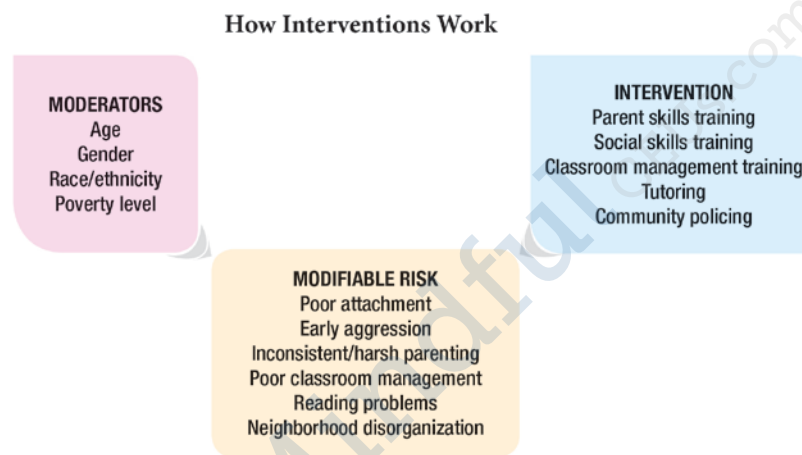
As was described in “Intervening in Early Childhood,” interventions are generally targeted to the context that is most central to the target population—the proximal context. The most important context of very early development is the family, and thus this is the focus of prevention interventions for the prenatal through infancy and toddlerhood periods. Interventions may be delivered in the home or in other contexts with which families interact.** Other contexts, like school, become increasingly important for children at older ages.

Intervention components specify what knowledge, skills, and competencies are addressed in an intervention to achieve the target outcome. Components are specific to target populations and, within an intervention, multiple actors may be defined as target populations. For example, family-based programs often include parent and child behavioral outcomes and classroom interventions often include both teacher and child outcomes. Moreover, interventions that combine contexts—such as family and school—could target the child, the caregivers, and the teachers. Thus, the targeted knowledge, skills, and competencies would be specific to those intervention populations and can be very precisely defined.

** This is the case with two examples of the NIDA-supported interventions for children under the age of 3. The Nurse Family Partnership intervention (www.nursefamilypartnership.org) sends nurses to the home to train young mothers and can take advantage of the public health system for implementation. The Early Steps intervention screens for mothers in need of services through an existing program for at-risk families called Women, Infants, and Children (WIC), who are then visited, usually in the home, by a trained clinician. Together they decide what resources and services would be most helpful for the child and family.

The diagram “How Interventions Work” illustrates several key features that help in understanding how interventions work. *Moderators* are aspects of the people who are targeted by the intervention and influence the intervention’s design and outcomes but cannot be changed—such as age, sex, race, and socio-economic factors such as poverty. *Modifiable risk factors* are the knowledge, behaviors, attitudes, intentions, skills, and competencies that the intervention attempts to change. The intervention often includes:

- activities designed to promote skill development in specific areas such as parenting
- environmental change strategies, such as modifying classroom management style to reduce the aggressive behaviors of some children
- provision of services to help in the development of specific competencies such as academic skills through tutoring
- community-level change strategies such as changing minors’ access to alcohol or tobacco through policy enforcement



Program Evaluation and Assessment of Benefit-Cost

Prevention interventions developed using scientific methods go through these stages of theory and logic model conceptualization. In addition, they are subjected to testing, usually in a randomized controlled trial (RCT) or other rigorous research design. An RCT randomly assigns participants to intervention and control conditions. The advantage of this method and other rigorous research designs is that they make it possible to draw conclusions about the effectiveness of an intervention without being concerned that the outcomes are related to some other population or contextual factor that was not taken into account.

Through the evaluation and comparison of measures of current status among intervention and control group participants at multiple time points before, during, and after the intervention, changes in behaviors, attitudes, intentions, skills, and knowledge can be assessed to determine if the expected positive results were achieved.

Continued assessment of intervention-group children and families and comparison with control-group families into adolescence—and in some cases, into early adulthood and

beyond—allows researchers to draw conclusions about the impact of intervening in early childhood on outcomes across the course of development, including effects on the initiation or reduction of drug use and related problems. Long-term follow-up of study participants informs understanding of program effects and provides information that can be used to determine the benefits of early interventions relative to their costs. Some of the existing research has not yet been able to follow participants to the point at which drug use, abuse, and addiction occur; for such programs, the assessment of benefit-cost must be estimated. Participants in other programs have been followed into adolescence and young adulthood, and researchers have been able to directly measure outcomes such as drug involvement, educational attainment, criminality, mental health problems, and health-risking sexual behaviors. When this is the case, a direct comparison of those who received an intervention versus those who did not receive it can determine the benefit-cost of the program in preventing negative and promoting positive outcomes (see “Benefit–Cost Examples for Early Childhood Programs”).

Benefit–Cost Examples for Early Childhood Programs

Research on the benefits relative to costs of early childhood prevention interventions has shown positive results. Some examples of benefit-cost data of interventions with long-term follow-up data are:

- Durham Connects—\$3.02 saved for each dollar invested (Dodge et al., 2013b)
- Nurse Family Partnership—\$2.88 saved for each dollar invested (Aos et al., 2004)
- Seattle Social Development Project—\$3.14 saved for each dollar invested (Aos et al., 2004)
- Good Behavior Game (used in the Classroom-Centered Intervention)—\$25.92 saved for each dollar invested (Aos et al., 2004)

Other programs with long-term follow-up data have not shown benefits this dramatic. However, the listed examples point out the extent to which a well-conceptualized and implemented intervention for very young children can benefit society tangibly, not to mention the improved quality of life for children and families that comes from preventing substance abuse and other problems. The tables below indicate which of the early interventions included in this review have economic analysis information (e.g., cost, benefit-cost, or cost effectiveness analysis).

Infancy and Toddlerhood

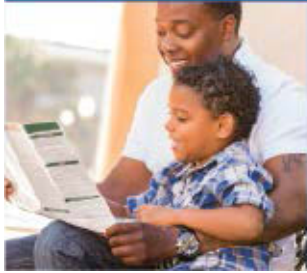
| Program | Economic Analysis Information |
|-------------------------------------|--|
| Durham Connects | Cost of the intervention; benefit-cost analysis; Emergency health care service savings (Dodge et al., 2013b) |
| Early Steps, Family Check Up | N/A |
| Family Spirit | N/A |
| Nurse Family Partnership | Savings in government spending (Olds et al., 2010) Benefit-cost analysis (Karolyv et al., 2005; Aos et al., 2004) |

Preschool

| Program | Economic Analysis Information |
|---|-------------------------------|
| Incredible Years-Spirit | N/A |
| Multidimensional Treatment Foster Care for Preschoolers | N/A |

Transition to Elementary School

| Program | Economic Analysis Information Available? |
|---|--|
| Caring School Community Program | N/A |
| Classroom-Centered Intervention (Good Behavior Game) | Benefit-cost analysis (Aos et al., 2004; Miller & Hendrie, 2008) |
| Linking the Interests of Families and Teachers | N/A |
| Raising Healthy Children | N/A |
| SAFEChildren | Cost of program(National Registry: SAFEChildren, 2014) |
| Seattle Social Development Program | Benefit-cost analysis(Aos et al., 2004; Miller & Hendrie, 2008) |
| Early Risers "Skills for Success" Risk Prevention Program | Cost of program(National Registry: Early Risers, 2014) |
| Kids in Transition to School | N/A |
| Fast Track Trial for Conduct Problems | Cost of conduct problems (Foster & Jones, 2005) Cost effectiveness analysis (Foster et al., 2006) |
| Incredible Years | Cost effectiveness analysis (Foster et al., 2007) |
| Positive Action | Cost of program(National Registry: Positive Action, 2014) |
| Schools and Homes in Partnership | N/A |



Appendix 2

Selecting and Implementing an Intervention

Determining Community Risk and Protective Factors

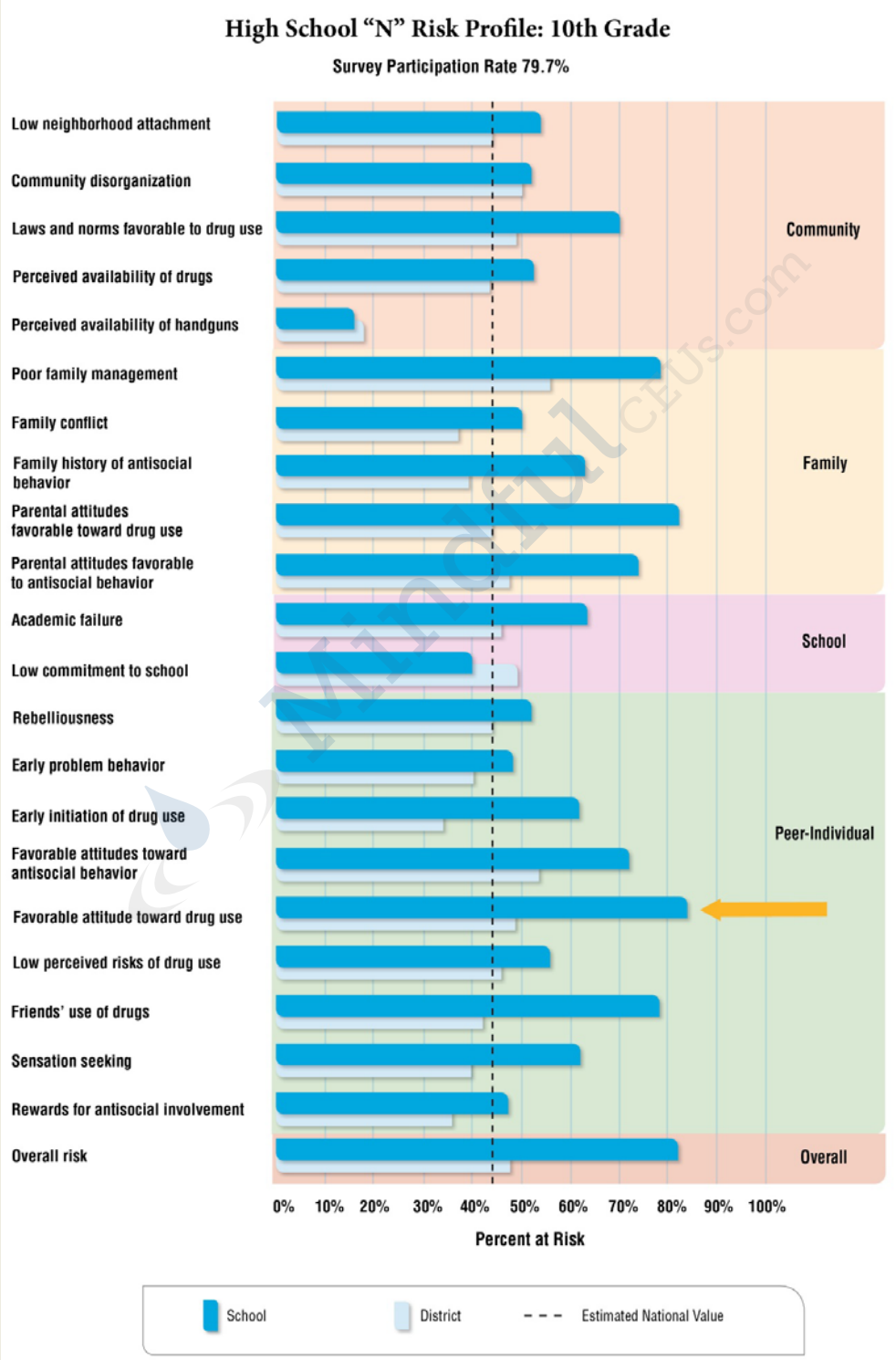
Before selecting a prevention program or developing a comprehensive plan, it is important for communities to determine what risk factors may be contributing to problem behaviors and what resources the community has available to address the problem(s). Assessment of risk and protective factors is used to identify the problem(s) of interest through archival searches for information available in existing community databases (e.g., poverty level; access to nutritious food and health care; child accidents and maltreatment; abandoned/substandard housing; access to alcohol, tobacco, drugs, and firearms; toxic exposure) and through surveys of community members to assess family, school, and community functioning. Assessing these factors can help identify the most pressing problems facing a community. Community prevention leaders can then select the targeted problem to intervene upon (see “Examples of Community Risk Assessment”).

Examples of Community Risk Assessment

Below are two examples of risk and protective factor assessments at the school and community levels. The first example shows the results of surveying students within a high school about specific risk and protective factors. The resulting bar charts provide information on factors that can then be matched to specific evidence-based interventions.

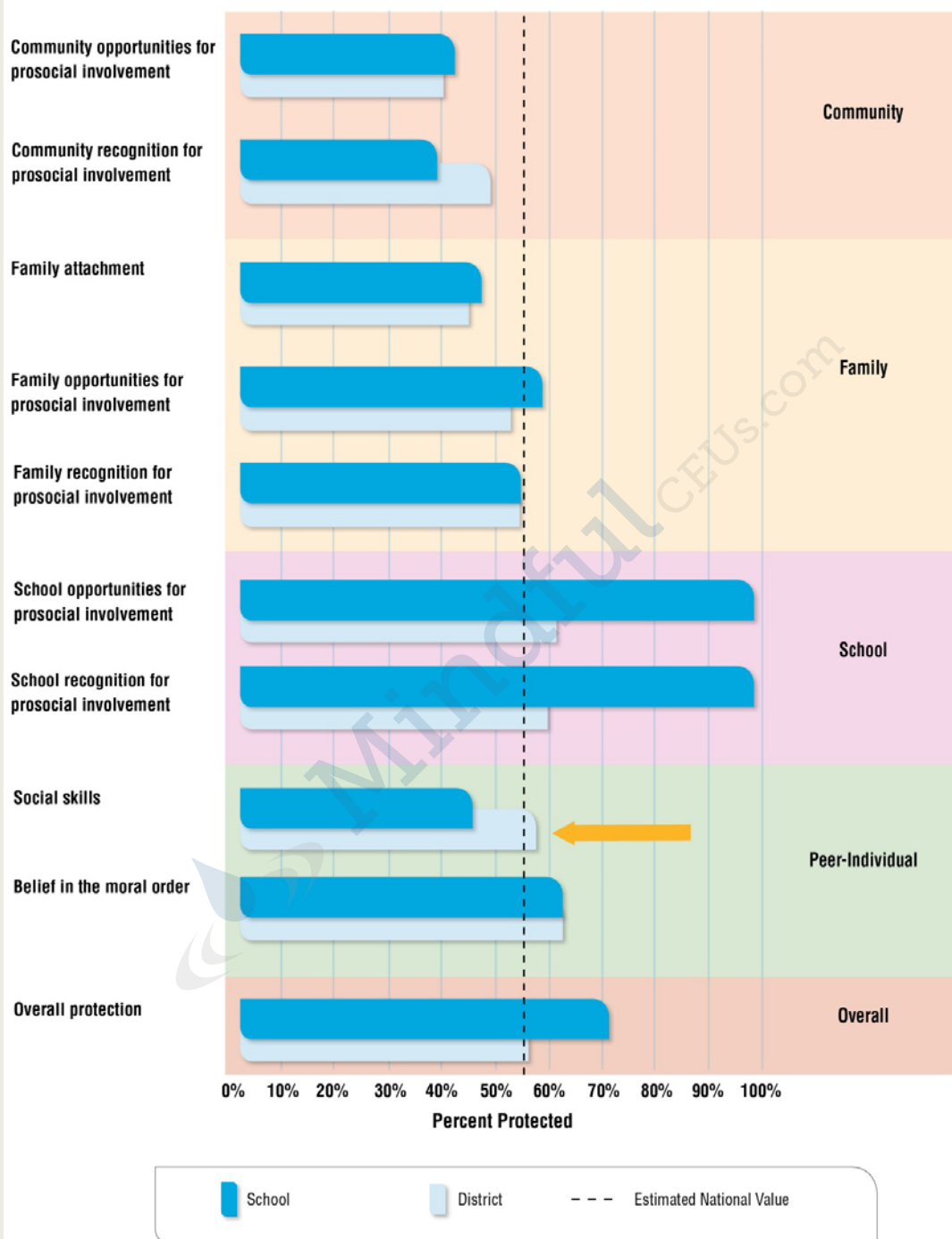
In this particular example, community coalitions identified specific factors that needed to be reduced (risk factors; top graph) or increased (protective factors; bottom graph) and selected evidence-based prevention interventions to address them. The graphs illustrate how communities compare with the average for all schools within the school district and the national average on measures of protective factors at the community, family, school, and peer-individual levels. As shown in the top graph, for High School ‘N,’ ratings for several risk factors are significantly higher than those for other schools in the school district and the national average; the community selected one of these, “Favorable attitude toward drug use,” as the risk factor they wanted to work on decreasing for this school (yellow arrow). As shown in the bottom graph, the value for the protective factor “Social skills” in High School ‘N’ was found to be a significantly lower compared to ratings for other schools in the school district and the national average, and the community selected this as the protective factor they wanted to work on increasing for that school (yellow arrow).

This framework could be adapted for use with early interventions. For example, data could include archival measures of public health data on prenatal visits by mothers, birth weights, social service records on child abuse and neglect, and access to local and county support services. Risk and protective factors could be determined through national data sets that provide information at the community level as well as by parent reports of child and family behaviors.



High School "N" Protective Profile: 10th Grade

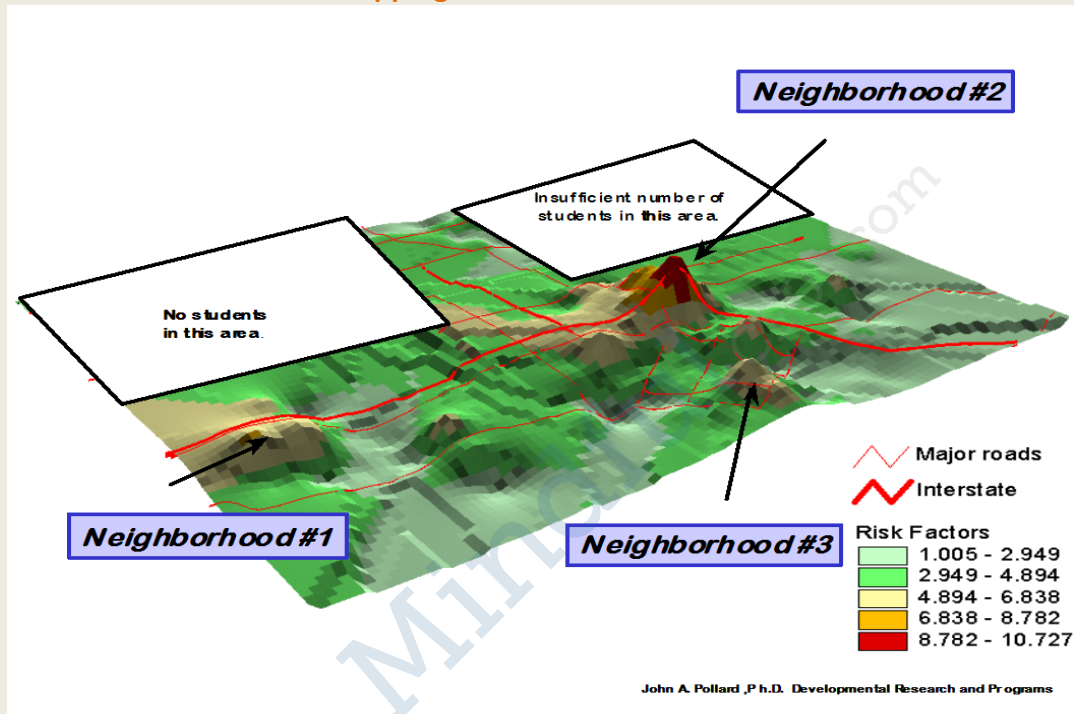
Survey Participation Rate 79.7%



Source: Hawkins, JD. Preventing Teen Smoking, Drinking and Violence Community Wide: Results from the Randomized Trial of Communities That Care. Division of Epidemiology, Services and Prevention Research (DESPR) Seminar, National Institute on Drug Abuse, Rockville, MD; 2011.

The second example provides a representation of substance abuse risk and protective factors within a geographic community area. Based on youth surveys and community records, 23 risk factors and 10 protective factors were examined in three neighborhoods of a California community. The peaks within the three neighborhoods in the figure below indicate elevated risk, with neighborhood #2 showing the highest elevation of risk factors. Communities can use this information to decide where to implement evidence-based substance abuse prevention interventions in order to address specific risk and protective factors.

Geomapping Based on Risk Assessment



Source: Hawkins JE, Catalano RF, Arthur MW. Promoting science-based prevention in communities. Addictive Behaviors. 2002;27(6):951-976. Copyright ©2002, Elsevier Science Ltd. Reprinted with permission.

Identifying the Target Population

Identifying the subpopulation most impacted by the problems isolated through the community assessment of risk and protective factors will help determine the population to be targeted for intervention. The target population is defined based on characteristics of the individuals or group to be addressed by the intervention. For interventions addressing childhood problems, age or developmental period is usually the most important defining characteristic. Other characteristics to consider in defining the target populations include: gender, race/ethnicity, health status, and socio-economic status. Another significant defining characteristic of target populations is level of risk. Risk assessments help in defining individuals and subpopulations at elevated risk due to internal, behavioral, familial, and environmental factors.

Adapting Programs

One question that is sometimes asked is whether childhood prevention interventions need to be modified for implementation with populations or contexts that differ from the original research. Unfortunately, this question has not been adequately addressed through research. Minor changes to original program materials to make the people, contexts, and examples more relevant to a specific group have been found to have little effect on intervention outcomes. Generally speaking, significant changes to the intervention structure and content are not recommended, as there is limited evidence on how these types of changes will affect outcomes. When a target population or context differs markedly from those targeted in available science-based interventions, a new intervention tailored to meet that population's specific needs (e.g., cultural or contextual needs) may need to be designed. An example of one such program, Family Spirit (described in "Research-Based Early Intervention Substance Abuse Prevention Programs") intervenes with very young poor mothers on American Indian reservations (Barlow et al., 2006).

Another adaptation that may need to be made is providing program support services to participants to make an intervention more accessible to them. Services may include transportation, care for other children in the family, snacks or meals, and compressed programming (e.g., offering fewer but longer sessions). Accommodations can lessen the burden associated with attending a program, help to build social support among members of the intervention group, and help keep participants coming to the program.

Collecting Data

Collecting data before, during, and after the evidence-based intervention is implemented at the local level is important as it allows the implementer to assess whether the intervention is producing effects similar to those in the original research and, if not, to help in determining why. It helps community prevention leaders as they decide on next steps in maintaining the focus on the most important risk factors to address for developing a comprehensive prevention plan.



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“This document was developed from the public domain document: Principles of Substance Abuse Prevention for Early Childhood: A Research Based Guide - National Institute on Drug Abuse; National Institutes of Health; U.S. Department of Health and Human Services (2016).”