

# Fetal Alcohol Spectrum Disorders (FASDs)

## Overview

**Prevalence** Fetal Alcohol Spectrum Disorders (FASDs) are sometimes referred to as “hidden disabilities” because the diagnosis often does not occur until a school-aged child is referred for either a learning disability or attention deficit disorder.<sup>1</sup> As a result, the frequency of occurrence of FASDs in the United States is not definitively known. Some experts estimate that the prevalence may be as high as 2 to 5 per 100 schoolchildren (or 2 percent to 5 percent of the population).<sup>2,3</sup> The National Organization on Fetal Alcohol Syndrome (NOFAS) estimates that 40,000 newborns each year are affected by Fetal Alcohol Syndrome (FAS) or have FASDs, “with damage ranging from major to subtle.”<sup>4</sup>

**Characteristics** FASDs are marked by a history of prenatal alcohol exposure and include a range of physical, educational, and behavioral problems. The range of disorders on the spectrum includes the following:

- **Fetal Alcohol Syndrome (FAS).** The most involved end of the FASD spectrum, which is defined by the following:
  - Three specific facial abnormalities: a smooth ridge between the nose and the upper lip (called the philtrum), thin separation between the lips and adjacent skin (called the vermillion border), and a small opening between the eyelids (called palpebral fissures)
  - Growth deficits (e.g., lower than average height, weight, or both) or a small head size
  - Central nervous system (CNS) abnormalities
- **Partial FAS (pFAS).** A person who does not meet the full diagnostic criteria for FAS but has some of the facial abnormalities and a growth problem or CNS abnormalities.
- **Alcohol-Related Neurodevelopmental Disorder (ARND).** A person with intellectual disabilities and problems with behavior and learning.
- **Alcohol-Related Birth Defects (ARBD).** A person with problems with the heart, kidneys, and bones and hearing or vision problems.<sup>5,6</sup>

A toddler or preschool-aged child with FASD may have one or more of the following issues:

- Extreme sensitivity or insensitivity to touch<sup>7</sup>
- Erratic sleep and/or eating habits<sup>8,9</sup>
- Lack of stranger anxiety<sup>10</sup>
- Poor habituation, or inability to adjust responses to external stimuli<sup>11</sup>
- Poor or limited abstracting ability (i.e., action/consequence connection, judgment and reasoning skills, and sequential learning)<sup>12</sup>
- Poor coordination<sup>13</sup>
- Rage<sup>14</sup>
- Speech, language, or gross motor delays<sup>15,16</sup>
- Sucking problems as an infant<sup>17</sup>

Symptoms in a school-aged child may include the following:

- Behavior issues, such as the following:
  - Blames others for problems<sup>18</sup>
  - Difficulty with attention<sup>19</sup>
  - Difficulty with social cognition (perceiving and interpreting interpersonal information); is socially isolated and emotionally disconnected<sup>20,21</sup>
  - High need for stimulation<sup>22</sup>
  - Hyperactive behavior<sup>23</sup>
  - Poor reasoning and judgment skills<sup>24</sup>
- Academic challenges, which tend to worsen as time passes, including the following:
  - Problems learning mathematical skills<sup>25</sup>
  - Difficulty taking in new information and in applying learning to new settings<sup>26</sup>
  - Intellectual disability or low IQ<sup>27</sup>
  - Learning disabilities<sup>28</sup>
  - Poor memory<sup>29</sup>
- Social difficulties, such as the following:
  - Immature for age<sup>30,31</sup>
  - Poor receptive language skills<sup>32</sup>
  - Not always connecting cause and effect (particularly if the effect is delayed)<sup>33</sup>
  - Possible fascination with knives and/or fire<sup>34</sup>
  - Vivid fantasies and perseveration (inappropriate repetition of a thought or action) problems<sup>35</sup>
  - Volatility, with impulse control problems and a tendency to demonstrate impaired reasoning<sup>36,37</sup>
  - Vulnerability to peer pressure and influence and high levels of suggestibility<sup>38</sup>

## Prevention

Numerous nationally recognized experts on prenatal health agree that the consumption of alcohol at any stage of pregnancy is considered unsafe and can lead to FASD. Organizations such as the Centers for Disease Control and Prevention, the American Academy of Pediatrics, and the March of Dimes have issued strong statements to this effect.<sup>39</sup> As a SAMSHA Treatment Improvement Protocol (TIP) brief states, “Because science has not determined a safe level of alcohol that may be consumed during pregnancy, the possibility of an FASD is created any time a woman consumes alcohol while pregnant (p. xxii).”<sup>40</sup> Doctors may prescribe nutritional supplements for women who are pregnant to help counteract any impacts from alcohol use during pregnancy.<sup>41</sup>

## Interventions for Parents, Schools, and Programs

The following tables present interventions that can improve outcomes for infants and toddlers (Table 1) and older children and youth (Tables 2 and 3) who are affected by FASD. Some of the interventions are suggested practices, which can be performed by a parent or a teacher, whereas others are specific programs, some of which may be most appropriately carried out by a therapist, a school psychologist, or another practitioner. These tables present the name of each intervention or category of interventions, a brief description of the intervention, and examples of specific actions associated with the intervention. They also include quality indicators, which describe the changes in outcomes that can be expected when the intervention is implemented successfully and sources for additional information on the intervention.

**Table 1. Interventions for Infants and Toddlers**

Intervention Name	Description	Example(s)	Quality Indicator(s)	More Information
Family Support Training	Promote positive early parent-to-child interactions and provide information to assist families with understanding and responding to the unique need of a child with FASD.	<ul style="list-style-type: none"> <li>• Provide guidance for safe and healthy infant care.</li> <li>• Target behaviors to parent needs and model behavior best practices.</li> <li>• Observe parents practicing desired behaviors and provide ongoing feedback.</li> </ul>	<ul style="list-style-type: none"> <li>• Infants and very young children have Improved bond with parents.</li> <li>• Young children have more stable and nurturing household environments.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Families Moving Forward</a></li> <li>• <a href="#">Strategies for Enhancing Early Development Success—Infants and Toddlers</a></li> <li>• National Institute on Alcohol Abuse and Alcoholism FASD Fact Sheet<sup>42</sup></li> </ul>
Language and Literacy Development Interventions	Promote the development of early language and literacy skills, which often are deficient in youth with FASD and are critical to later academic and social success.	<ul style="list-style-type: none"> <li>• Read and talk frequently with children, from the time they are very young.</li> <li>• Expose children to a word-rich environment through books and language.</li> </ul>	Language and literacy skills established in young children affected by FASD similar to peers who are not disabled.	Talking Is Teaching: Talk, Read, Sing <sup>43</sup>
Medication or Nutritional Supplements	Provide a drug- or vitamin-based intervention, often soon after birth, to protect against ethanol-induced neuroapoptosis (a neurotoxic response that causes significant long-term neurocognitive impairment) or mitigate the effects of prenatal alcohol exposure on brain development.	<ul style="list-style-type: none"> <li>• Medications: lithium or neuroprotective peptides</li> <li>• Nutrients: folate, selenium, vitamin C, zinc, and choline</li> </ul>	Infants and very young children impacted by prenatal alcohol exposure have decreased display of symptoms associated with FASD.	<ul style="list-style-type: none"> <li>• National Institute on Alcohol Abuse and Alcoholism FASD Fact Sheet<sup>44</sup></li> <li>• Early Intervention for Children With Fetal Alcohol Spectrum Disorders<sup>45</sup></li> </ul>
Peri- and Neonatal Interventions	Include practices to intervene beginning at birth, such as neonatal handling and enrichment of the postnatal environment.	<ul style="list-style-type: none"> <li>• Engage in regular skin-to-skin contact with newborns.</li> <li>• Engage regularly in hugging and sharing close moments with the child.</li> <li>• Involve infants and toddlers in regular, age-appropriate exercise and activities that stimulate complex motor training.</li> </ul>	<ul style="list-style-type: none"> <li>• Infants and toddlers demonstrate improved cognitive and motor functioning.</li> <li>• Infants and toddlers have enhanced learning and memory.</li> <li>• Infants and toddlers show reduced fearfulness.</li> </ul>	<ul style="list-style-type: none"> <li>• Behavioral Interventions for Children and Adolescents With Fetal Alcohol Spectrum Disorders<sup>46</sup></li> <li>• Talking Is Teaching: Talk, Read, Sing<sup>47</sup></li> </ul>
Treatment Programs for Substance-Addicted Mothers	Often delivered in conjunction with family support training, assist mothers with addressing alcohol and other substance abuse problems.	<ul style="list-style-type: none"> <li>• Improve the household environment by addressing alcohol-related issues.</li> <li>• Enhance relationship between parent(s) and child.</li> <li>• Connect parents with other community resources, as needed.</li> </ul>	<ul style="list-style-type: none"> <li>• Households and other settings contain few or no hazardous or dangerous factors.</li> <li>• Youth display more positive daily behaviors.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">New Choices</a></li> <li>• <a href="#">The Circle of Hope</a></li> <li>• Behavioral Interventions for Children and Adolescents With Fetal Alcohol Spectrum Disorders<sup>48</sup></li> </ul>

**Table 2. Academic Interventions for Children and Youth**

Intervention Name	Description	Example(s)	Quality Indicator(s)	More Information
Attention Process Training	Focus on attention, nonverbal reasoning, and generalization problems to help improve cognitive functioning and, subsequently, learning.	<ul style="list-style-type: none"> <li>Emphasize repetition: youth with FASD need more time and more repetition than other students to learn and retain information.</li> <li>Say the student's name and make eye contact when speaking to retain engagement.</li> </ul>	<ul style="list-style-type: none"> <li>Youth are able to engage more deeply and for longer periods in instruction.</li> <li>Deeper engagement translates to improved academic performance.</li> </ul>	<ul style="list-style-type: none"> <li>Systematic Review of Interventions for Children With Fetal Alcohol Spectrum Disorders<sup>49</sup></li> <li>Children's Mental Health Disorder Fact Sheet for the Classroom<sup>50</sup></li> </ul>
Incorporation of Various Sensory Approaches	Improve learning and memory retention by engaging with multiple senses.	<p><i>For young children:</i></p> <ul style="list-style-type: none"> <li>Incorporate songs or dress-up activities as part of instruction.</li> <li>Use manipulatives and provide opportunities for movement and touch in early instruction.</li> </ul> <p><i>For older students:</i></p> <ul style="list-style-type: none"> <li>Use visual aids and hands-on activities.</li> <li>Provide instruction both orally and in writing to engage all senses.</li> </ul>	<ul style="list-style-type: none"> <li>Youth show improved ability to learn material and retain knowledge.</li> <li>Youth apply established skills to the learning of new content.</li> </ul>	<ul style="list-style-type: none"> <li>Children's Mental Health Disorder Fact Sheet for the Classroom<sup>51</sup></li> <li>Fetal Alcohol Spectrum Disorders (FASDs): Treatments<sup>52</sup></li> </ul>
Language and Literacy Interventions	Assist with the mastery of literacy and language skills, including oral language; phonological awareness; spelling; and, later, fluency and comprehension.	<p><i>For young children:</i></p> <ul style="list-style-type: none"> <li>Regularly incorporate reading and interaction with text and language into the day.</li> <li>Use consistency and repetition, repeating the way a particular skill is taught from the first time to increase the likelihood of a lasting effect.</li> </ul> <p><i>For older students:</i></p> <ul style="list-style-type: none"> <li>Avoid asking "why" questions.</li> <li>Ask concrete who, what, where, and when questions.</li> </ul>	Youth gain skills in literacy and language consistent with their peers who are not impacted by FASD.	<ul style="list-style-type: none"> <li><a href="#">Language to Literacy Program</a></li> <li>Systematic Review of Interventions for Children With Fetal Alcohol Spectrum Disorders<sup>53</sup></li> </ul>
Mathematics Interventions	Address the diminished visual/spatial and executive function skills that youth with FASD often lack, which are needed to support mathematical comprehension.	<ul style="list-style-type: none"> <li>Implement specialized one-on-one mathematics instruction.</li> <li>Recognize that youth may become frustrated in trying to master mathematical skills.</li> <li>Ask students to explain their thinking as they work through a problem.</li> <li>Offer incentives for partially correct responses or finishing work, even in the absence of a completely correct answer.</li> </ul>	<ul style="list-style-type: none"> <li>Youth demonstrate improved skills needed to do mathematics, including spatial and executive reasoning.</li> <li>Youth are able to translate these skills into improved academic performance in mathematics.</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Math Interactive Learning Experience Program</a></li> <li>Systematic Review of Interventions for Children With Fetal Alcohol Spectrum Disorders<sup>54</sup></li> <li>Fetal Alcohol Spectrum Disorders (FASDs): Treatments<sup>55</sup></li> </ul>

**Table 3. Behavior Interventions for Children and Youth**

Intervention Name	Description	Example(s)	Quality Indicator(s)	More Information
Classroom Practice Training	Establish classroom routines and structures that can be implemented for all students while also addressing the specific needs of students with FASD.	<p><i>For younger children:</i></p> <ul style="list-style-type: none"> <li>• Post and regularly review rules and social norms, perhaps using pictures or icons.</li> <li>• Regularly reinforce classroom procedures, such as lining up or raisings hands to speak.</li> <li>• Use mnemonics, such as silly rhymes and songs, to improve recall.</li> </ul> <p><i>For older students:</i></p> <ul style="list-style-type: none"> <li>• Avoid long periods of deskwork.</li> <li>• Incorporate movement wherever possible.</li> <li>• Provide instruction that is specific yet brief.</li> <li>• Use immediate, rather than delayed, discipline measures.</li> <li>• Concentrate on a child's strengths and talents and accept the child's limitations.</li> <li>• Specifically state things, using as few extraneous words as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Classrooms include routines and procedures that are consistent, age-appropriate, and easy to understand.</li> <li>• Students understand procedures and are able to follow them with little or no teacher reinforcement.</li> </ul>	<ul style="list-style-type: none"> <li>• Fetal Alcohol Spectrum Disorders (FASDs): Treatments<sup>56</sup></li> <li>• Children's Mental Health Disorder Fact Sheet for the Classroom<sup>57</sup></li> <li>• Addressing Fetal Alcohol Spectrum Disorders (FASD): Treatment Improvement Protocol<sup>58</sup></li> </ul>
Cognitive Control Therapy	<ul style="list-style-type: none"> <li>• Increases youth awareness related to body position, movement, and awareness; also addresses attention-related activities, information processing, controlling behaviors, and categorizing skills.</li> <li>• Start with basic skills and build on those skills to further improve behavior.</li> </ul>	<ul style="list-style-type: none"> <li>• Teach youth to be conscious of their physiological responses to adverse environmental stimuli and promote positive responses.</li> <li>• Use repetition and generalization to make clear when and where specific responses are appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>• Youth cognitive controls become more efficient.</li> <li>• Child learns to observe and become aware of cognitive operations and how to demonstrate alternative, and more appropriate, responses.</li> </ul>	Systematic Review of Interventions for Children With Fetal Alcohol Spectrum Disorders <sup>59</sup>

Intervention Name	Description	Example(s)	Quality Indicator(s)	More Information
Cognitive Behavioral Therapy	<ul style="list-style-type: none"> <li>Encourage self-talk, allowing youth to understand how their thinking impacts emotions and actions.</li> <li>Help youth identify their behavioral state and develop techniques for optimizing that state to adapt to situations.</li> </ul>	<ul style="list-style-type: none"> <li>Train youth to recite one of the following: “When I get frustrated, I take a deep breath” or “When I feel out of control, I ask for help.”</li> <li>Support youth in understanding how to act out these behaviors and how they can lead to positive results.</li> <li>Create a self-calming and respite plan to address stressful situations when they arise.</li> </ul>	Youth are better prepared to handle negative or uncertain environmental stimuli.	<ul style="list-style-type: none"> <li>Neurocognitive Habilitation Therapy for Children With Fetal Alcohol Spectrum Disorders: An Adaptation of the Alert Program<sup>60</sup></li> <li>Children’s Mental Health Disorder Fact Sheet for the Classroom<sup>61</sup></li> <li><a href="#">Parents and Children Together Program</a></li> </ul>
Explicit Generalization Instruction	Addresses challenges with generalization by explicitly describing and illustrating appropriate behaviors for different situations.	<ul style="list-style-type: none"> <li>Explain how different school settings require certain behaviors.</li> <li>Explicitly note similarities and differences across settings and situations.</li> </ul>	Youth can apply guidelines for behavior taught in one setting (i.e., the classroom) to another appropriate setting (i.e., the school media center).	Fetal Alcohol Spectrum Disorders (FASDs): Treatments <sup>62</sup>
Functional Living Skills Therapy	Teach youth basic classroom and independent living skills.	<p><i>For younger children:</i></p> <ul style="list-style-type: none"> <li>Incorporate lessons regarding manners, such as opening doors or saying “thank you.”</li> <li>Focus on social skills, such as how to successfully negotiate and interact with peers.</li> </ul> <p><i>For older students:</i></p> <ul style="list-style-type: none"> <li>Teach skills for managing money.</li> <li>Focus on strategies for obtaining and keeping a job.</li> <li>Direct youth in performing housekeeping and other daily tasks.</li> </ul>	<ul style="list-style-type: none"> <li>Youth are able to carry out day-to-day living tasks for themselves.</li> <li>Youth are more likely to successfully live independently.</li> </ul>	<ul style="list-style-type: none"> <li>Fetal Alcohol Spectrum Disorders (FASDs): Treatments<sup>63</sup></li> <li><a href="#">Self-Advocates With FASD in Action Network</a></li> <li>Addressing Fetal Alcohol Spectrum Disorders (FASD): Treatment Improvement Protocol<sup>64</sup></li> </ul>
Positive Behavior Support	Support social skills, problem solving, and personal safety skills mastery.	<ul style="list-style-type: none"> <li>Engage in constant supervision of a setting that includes one or more youth with FASD.</li> <li>Emphasize positive reinforcement of appropriate behavior.</li> <li>Do not rely on the student’s ability to “recite” the rules or steps.</li> </ul>	<ul style="list-style-type: none"> <li>Youth are able to internalize and understand expectations for positive behavior.</li> <li>Youth exhibit positive behaviors.</li> </ul>	<ul style="list-style-type: none"> <li>Fetal Alcohol Spectrum Disorders (FASDs): Treatments<sup>65</sup></li> <li>Children’s Mental Health Disorder Fact Sheet for the Classroom<sup>66</sup></li> </ul>

Intervention Name	Description	Example(s)	Quality Indicator(s)	More Information
Social Skills/Child Friendship Training	Focus on skills for interacting with adults and other students.	<ul style="list-style-type: none"> <li>• Demonstrate and help youth emulate positive social behaviors.</li> <li>• Acknowledge and praise positive social behaviors and interactions.</li> <li>• Focus on social skills for both the classroom and home environments.</li> <li>• Be aware of “copycat” behavior and model respectful and patient manners at all times.</li> </ul>	<ul style="list-style-type: none"> <li>• Youth are able to witness and mimic positive social behaviors.</li> <li>• Youth with FASD forge positive relationships with peers and adults.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Project Good Buddies</a></li> <li>• Systematic Review of Interventions for Children With Fetal Alcohol Spectrum Disorders<sup>67</sup></li> </ul>
Virtual Reality Training	Use virtual settings to teach youth positive behaviors; this is specifically appropriate for the instruction of safety skills, such as fire and street safety.	<ul style="list-style-type: none"> <li>• Establish realistic scenarios that translate easily to situations the youth is likely to encounter.</li> <li>• Offer consistent practice of steps through repetition.</li> <li>• Provide guidance clearly in an on-screen format.</li> <li>• Optimize graphics, text, and narration to maintain focus and engagement.</li> </ul>	<ul style="list-style-type: none"> <li>• Youth understand appropriate behaviors to keep themselves safe.</li> <li>• Youth are able to apply these behaviors to make safe decisions in the environment.</li> </ul>	An Evolution of Virtual Reality Training Designs for Children With Autism and Fetal Alcohol Spectrum Disorders <sup>68</sup>



## Resources

[AAP Fetal Alcohol Spectrum Disorders Toolkit](#). The American Academy of Pediatrics created this toolkit to raise awareness, promote surveillance and screening, and ensure that all children affected by FASD receive appropriate and timely interventions. It offers tools and resources for primary care providers so that they are better equipped to meet the special needs of these children and families.

[Centers for Disease Control and Prevention \(CDC\): Fetal Alcohol Spectrum Disorders](#). This resource includes prevalence and symptom information, research and statistics, and training tools related to FASD. It also includes a multimedia resource library with videos and podcasts, all with the latest CDC information about FASD.

- [CDC FASD Regional Training Centers](#). The CDC funds five FASD regional training centers (RTCs). These RTCs are university-based centers that provide trainings to medical and allied health students and practitioners regarding the prevention, identification, and treatment of FASDs. This flyer includes contact information for these RTCs.
- [Great Lakes FASD Regional Training Center](#) (funded by HHS). This center is a project from the University of Wisconsin. The website offers trainings, podcasts, and other resources to assist families impacted by FASD.

[National Institute on Alcohol Abuse and Alcoholism \(NIAAA\)](#). NIAAA's mission is "to generate and disseminate fundamental knowledge about the effects of alcohol on health and well-being, and apply that knowledge to improve diagnosis, prevention, and treatment of alcohol-related problems," including FASD. It offers resources specifically about the prevention of FASD and treatment of prospective mothers who are alcohol dependent.

[Fetal Alcohol Exposure Fact Sheet](#). This sheet includes information about the prevalence and impact of FASD. It also includes a brief description of interventions and links to additional information.

[National Organization on Fetal Alcohol Syndrome \(NOFAS\)](#). The mission of NOFAS is to "raise awareness about the risk of alcohol use during pregnancy and prevent alcohol-related birth defects, and will support individuals and families living with FASD." The webpage features links to a variety of resources about the prevention and treatment of FASD.

[Substance Abuse and Mental Health Services Administration \(SAMHSA\)](#). SAMHSA is the agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the United States. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities. This website provides links to SAMHSA-sponsored information and resources.

[Fetal Alcohol Spectrum Disorders \(FASD\) Center for Excellence](#) (no longer funded). The FASD Center for Excellence developed various tools and resources that are now available from SAMHSA's webpage. These resources include a Curriculum Guide for Addiction Professionals and a Treatment Improvement Protocol (TIP) for youth affected by the disorder.



## Endnotes

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