

Brain Development, Sudden Infant Death Syndrome, and Abusive Head Trauma: Shaken Baby Syndrome*

Hi, my name is Eva. In this course, we are going to focus on three very important topics for those who care for infants and toddlers: early childhood brain development, Sudden Infant Death Syndrome, also known as SIDS, and Abusive Head Trauma: Shaken Baby Syndrome. The early years of a child's life serve as the foundation for lifelong development. From conception to around 5 years of age, development occurs at a pace that exceeds that of any other stage of life. During this time, children's brains undergo tremendous growth as they acquire the ability to speak, think, learn, and reason. According to the National Scientific Council on the Developing Child, children's early experiences literally influence the physical construction of the brain. This is why it is imperative that infant and toddler caregivers provide a safe and developmentally appropriate environment for children. The information presented in this course is designed to help you establish such an environment for the infants and toddlers in your care.

[Learning Objectives]

Before we begin, let's take a few minutes to review the learning objectives for this course. After completing this course, you should be able to:

- Describe how the brain develops,
- Design activities for children to help facilitate connections in the brain,
- Define SIDS and describe what you can do to reduce the risk to children in your care, and
- Define SBS and describe how to prevent it.

[Brain Development]

Did you know that when an infant is born, his brain is the most underdeveloped organ in his body? The parts of the brain that handle thinking and remembering, as well as emotional and social behavior, are only a fraction of the size they will be later in life. In order for an infant's brain to develop to its fullest potential, a child must interact with the world around her. In fact, research confirms that the way adults interact with infants and toddlers has a major impact on all aspects of development. These interactions not only influence children's short-term development, but also what happens to children during their adult years.

At birth, the brain contains approximately 100 billion cells. While the basic connections between major areas of the brain have been formed before birth, the fine tuning of the complex network in the brain has yet to occur.

The brain's main job during the first three years is to create and maintain connections between neurons, or brain cells. Connections between neurons are created when one or more of an infant's senses – seeing, hearing, smelling, touching, or tasting – receive a stimulus from something or someone. When an infant's senses are stimulated, a signal is sent to the brain. These signals, in the form of electrical impulses, travel through the infant's nervous system and are passed to each neuron via synapses.

Why is this important to know when caring for infants? Because by providing an environment rich in age-appropriate activities and warm, nurturing relationships, you are positively affecting the way a very young child's brain grows. The brain development that occurs while in your care will be part of the child throughout his life.

[Critical Periods]

For certain areas of the brain, development takes place very rapidly during specific time frames. These specific time periods in a very young child's life are often referred to as "sensitive" or "critical" periods. If a child's brain does not receive proper stimulation during these periods, the child might experience skill deficits for the rest of his life in the affected areas.

It is important to note that children are capable of learning and growth in areas affected by critical periods, even after the end of the critical period. Providing engaging, individualized experiences for infants and toddlers allows for optimal brain development.

[Pruning]

The adult brain has fewer connections than the brain of a 3-year-old child. Over time, connections that are not being used regularly are cut off, or pruned. Connections that are used frequently are retained and strengthened, and make up the network that will be used for all the child's future learning and relationships. Pruning occurs throughout early childhood and adolescence. It may sound harsh, but without pruning, our brains would be unable to efficiently perform the functions necessary for basic actions like seeing or walking.

Because brain connections that are not used will likely go away, it is important that you are helping infants and toddlers form the "good" connections in their brains. This can include healthy touch, empathy, problem solving and how to cope with new situations and environments. In the next several minutes, we will discuss some practical ways that you can do this.

[Meaningful Experiences]

Meaningful experiences are experiences that provide stimulation to the senses to facilitate the creation of connections in the brain. For example, Jacob's mother gently touches his leg. His

brain receives information about how her touch feels, and connections are formed or maintained in the area of his brain responsible for the sense of touch. Many stimuli can occur during a single experience, causing a multitude of connections to be created simultaneously. For instance, Mariana holds a rattle in her hand and shakes it. All at once, her brain receives information about the feel of the rattle in her hand and the sound the rattle makes. Connections are formed or maintained in the areas of her brain which are responsible for the senses of touch and hearing.

The brain absorbs the outside world through sight, smell, hearing, touch and taste. These multisensory experiences stimulate cognitive, physical, language, social and emotional development in infants and toddlers. In order to create experiences that are crucial for a very young child's development, we must incorporate activities and interactions that use different senses. High-contrast images, like black-and-white drawings, are great stimulation for an infant's sense of sight. A colorful, fuzzy toy presented to two infants during "tummy time" can not only help strengthen their senses of sight and touch, but the toy can also provide an opportunity for the two children to interact and plant seeds for social interaction.

The chart on your screen shows some ways you can create meaningful experiences for the infants and toddlers in your care. This chart is only a starting point for the endless amount of infant and toddler activities you can create. Ask parents what activities they do at home and see if you can replicate these in your center. Each child in your care is unique – some infants may love the noise that a rattle makes, while others may find the sound too loud. Experiment with many different sensory activities and find out what works best for the children in your care. Fortunately, many activities that promote meaningful experiences are easy and inexpensive to create. Sing songs, use cups to collect and dump water, enjoy fresh air on nice days, make faces to show different expressions and feelings, listen to and label the instruments played on various radio stations – be as creative and consistent as possible.

[Importance of Warm, Responsive Care]

The care infants receive in the earliest stages of brain development affects their social and emotional development in subsequent years. Exposure to trauma, abuse, and neglect can interfere with brain development. On the other hand, infants thrive when they receive warm, responsive care. Warm, responsive care means the infant's caregivers show affection and love and respond quickly and appropriately to the infant's signals of distress, such as crying. This kind of sensitive care can mitigate the effects of stressful situations, as the infant learns techniques to regulate her own emotions. It can also promote strong social skills by strengthening the connections in an infant's brain which allow him to engage in positive relationships throughout life.

[The Importance of Play]

Many times, connections in the brain are formed or maintained through an infant or toddler's meaningful experiences in play. You may not think of infants as "playing," especially when compared to older children. However, infants do have time during the day when they are not eating or sleeping. The experiences infants have during this time are the earliest forms of play. It is important that infant caregivers design this time to be filled with positive meaningful

experiences. One of the best ways to ensure that infants' meaningful experiences will be primarily positive is to develop a strong, caring relationship with each infant in your care. As you incorporate meaningful activities, like those listed on the chart, into an infant's play, be mindful of your interactions with her. Are you smiling, maintaining eye contact, and using soft touches? Without these relationship-building techniques, activities like reading and singing will not be as beneficial.

Your role as an infant or toddler caregiver cannot be overestimated. An activity like squeezing a noisy toy strengthens an infant's cognitive development. Responding to his cries of hunger develops a sense of trust. Using words to describe a snack sets the pattern for language development, and spending time reading a favorite book helps develop self-esteem. By choosing to make each and every interaction a positive and meaningful one, you are helping an infant's or toddler's brain develop to its full potential.

[What is SIDS?]

Another issue affecting the care of infants and toddlers is Sudden Infant Death Syndrome, or SIDS. Each year in the U.S., more than 4,500 infants die suddenly of no obvious causes. Approximately 2,200 of these deaths are due to SIDS. Sudden Infant Death Syndrome is the leading cause of death in babies between the ages of 1 month and 1 year. Most deaths from SIDS occur in babies between the ages of 2 to 4 months.

Sudden Infant Death Syndrome is most commonly defined as, "The sudden death of an infant under 1 year of age, which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history." Victims of SIDS usually appear healthy, often playing normally days, hours, even minutes before death.

[What Causes SIDS?]

SIDS affects sleeping infants, and it is sometimes referred to as crib death. However, SIDS can affect an infant anywhere he or she might be sleeping. Researchers are still not sure what causes SIDS. However, research has identified a number of risk factors which contribute to the incidence of SIDS.

Infants who are premature, who are born with low birth weight, who are born to mothers who are younger than 20 years old, or who receive late or no prenatal care are at a higher risk of SIDS-related death. Infants born to mothers who use drugs or alcohol during pregnancy are also at greater risk. Of particular note, research has indicated that mothers who smoke during and after pregnancy triple their babies' risk of becoming victims of SIDS. SIDS affects all races, religions, and income levels, and it occurs all over the world. Male infants tend to be at a slightly higher risk than female infants.

Research has also provided information about what SIDS is not. SIDS is not a hereditary condition. It is not the result of child abuse, choking, vomiting, apnea, or suffocation. SIDS is not

contagious. Immunizations, or shots, do not cause or increase the risk of SIDS. Even though the number of shots that children receive has increased over the last decade, the SIDS rate has actually decreased.

[Safe Sleep]

Sudden Infant Death Syndrome cannot be completely prevented, but there are some things caregivers can do to reduce the risk of SIDS- related death for children in care. This information is important for child care providers, because two-thirds of infants in the United States are cared for by someone other than their parents.

In 1994, the U.S. Public Health Service and the American Academy of Pediatrics began a campaign to promote placing infants on their backs for sleeping called "Back to Sleep." Since "Back to Sleep" was launched, SIDS cases have decreased by over 50 percent. In Texas, the Department of State Health Services and the Department of Family and Protective Services created the "Safe Sleep" campaign that sets guidelines for parents and child care workers to follow.

The Safe Sleep recommendations are:

- Always place the baby on his or her back to sleep – even for short naps.
- Place infants on a firm sleep surface, such as a safety approved crib mattress covered by a fitted sheet. Never place a baby to sleep on pillows, quilts, comforters, sheepskin, or other soft surfaces.
- Loose bedding such as sheets and blankets should not be used, instead dress your infant in light sleep clothing, such as a one-piece sleeper or wearable sleep sack.
- Keep soft or loose items such as blankets, stuffed toys, crib bumpers, and other soft items out of a baby's sleep area.
- Do not use wedges or infant positioners, there is no proof that use of these reduces the risk of SIDS and they may increase the risk of suffocation. Do not use home monitors as a strategy to reduce the risk of SIDS.
- Do not smoke or allow smoking around an infant.
- For the first six months of life, put the infant's sleep surface, whether it is a crib, pack and play or bassinet, in the same room as the parents. This has been shown to be protective against SIDS.
- Breastfeed your baby. Breastfed infants are less likely to die of SIDS than formula fed infants.
- Talk to others about the safest way to put a baby to sleep. This includes parents you work with. Encourage parents to talk with babysitters, friends and family that may care for the baby during sleep.

A study in September 2000 found that one in five of all SIDS cases occurred in a child care setting. The study indicated that child care providers were not aware of the "Back to Sleep" recommendations for placing children on their back while they sleep. Many of these infants were used to sleeping on their backs outside of child care. Infants who are used to regularly sleeping

on their backs and are then placed in another position to sleep are at a much higher risk of becoming victims of SIDS.

Occasionally, an infant may have a medical condition which requires her to be put to sleep in a way that conflict with current requirements. In these instances, child care programs should have a written policy about obtaining written orders from the child's licensed healthcare provider stating the medical reason the child cannot be placed to sleep according to the Licensing requirements, clear instructions for caregivers on what is required instead and how long the instructions are to be followed. The program will then need to submit a waiver request and a copy of the health care professional's orders for the child to Licensing. The waiver must be approved by Licensing before it may be implemented.

The following video clip shows a safe crib setup and the proper way to place a child to sleep to reduce the risk of SIDS death.

[Other Measures to Reduce the Risk of SIDS]

Overheating is associated with a higher incidence of SIDS. Infants should be dressed in light clothing for sleep, and blankets are not necessary. Avoid bundling an infant in layers of clothing and blankets. The temperature in the room should be comfortable to a lightly clothed adult, and infants should not feel warm to the touch.

If parents approve, caregivers can consider offering pacifiers to infants at nap times. Pacifier use can reduce a child's risk of SIDS. However, pacifiers should only be used when placing the infant in his crib to sleep, and should not be reinserted once the infant is asleep. Pacifiers must not be attached by a string or cord to the child's clothing. Pacifiers should be cleaned regularly, replaced often, and should never be coated in sweet solutions. In order to ensure that breastfeeding is firmly established, wait until breastfed infants are at least 1 month of age before offering a pacifier.

Infants who have recently experienced a respiratory infection are at a higher risk of SIDS. Breastfed infants are less likely to contract respiratory infections. Supporting breastfeeding mothers is an important way to reduce the risk of SIDS for children in your care. Caregivers can support breastfeeding mothers by letting mothers know that breastfeeding is good for them and their infants, storing expressed breast milk in a refrigerator at the child care facility, feeding the infant the mother's expressed breast milk when the mother is not available, and providing a nursing area, if possible, where breastfeeding mothers can feed their infants.

[Tummy Time]

Child care providers may worry that placing a baby on his back to sleep will delay his upper body development or cause permanent flat spots on his head. "Tummy time," or time during which an infant is awake and is placed on his tummy to play, encourages the development of neck and shoulder muscles, and helps avoid flat spots on the infant's head.

During tummy time, a caregiver can encourage an infant to interact by lying on her own tummy facing the infant and making faces, singing, or talking to the infant. These strategies encourage the infant to try lifting his head and looking around for the source of the sights and sounds.

Other ways to avoid the creation of flat spots on infants' heads include reducing the amount of time spent in car seats, carriers, or bouncers, and rotating the position of the infants' heads during sleep.

[Developing and Implementing a Safe Sleep Policy]

Before we conclude this section of the course, let's take a few minutes to discuss the benefits of developing a written safe sleep policy for your child care center or family child care home. Having a written safe sleep policy is beneficial for the following reasons:

- It could potentially save an infant's life,
- It demonstrates to parents that their infant's health is of utmost importance to you,
- It educates current and future staff by making sure that all staff members are following the same policy,
- It provides an opportunity for you to discuss safe sleep practices with parents,
- It helps you and other staff members to remain up-to-date on the latest best sleep practices,
- It empowers you to make the best decisions possible regarding a baby's care, and
- If followed, it can reduce your risk of liability.

What elements should be included in a written safe sleep policy? "A Child Care Provider's Guide to Safe Sleep," developed by the American Academy of Pediatrics, lists several elements that should be included. A written safe sleep policy should include the following regulations:

- Babies will always be put to sleep on their backs,
- An approved waiver from Licensing is required before a child may be put to sleep in a way that conflicts with current minimum standard requirements. A physician's order is required that explains the medical reason why the baby must be placed to sleep differently, instructions how the child must be placed to sleep, and a time frame that the instructions are to be followed,
- Use safety-approved cribs and firm mattresses,
- Bibs and hoods will be removed before the child is placed in the crib.
- Pacifiers will not be attached by a string or clip to the child's clothing.
- Keep cribs free of toys, stuffed animals, and extra bedding,
- Sleep only one baby per crib,
- Keep the room at a temperature that is comfortable for a lightly clothed adult,
- Do not use wedges or infant positioners,
- Never allow smoking in a room where infants sleep,
- Have supervised "tummy time" for infants who are awake, and
- Teach all staff, substitutes, and volunteers about safe sleep policies and practices, and be sure that they are reviewed often.

The handout called “Safe Sleep Policy” is an example of a safe sleep policy which would be appropriate for use in a child care program. It is important that parents receive and sign a copy of your program’s written safe sleep policy. The best time to do this is usually when parents enroll their children in the program. Take this opportunity to visit with parents about your policies, learn how their babies typically sleep at home and provide education about SIDS prevention.

[Abusive Head Trauma: Shaken Baby Syndrome]

Let's move on to our final topic affecting the care of infants and toddlers. Abusive Head Trauma: Shaken Baby Syndrome is the term used to describe the constellation of signs and symptoms resulting from the shaking and possibly impacting of the head of an infant or small child. These signs and symptoms are the result of shaking the infant or child by the arms, legs, or shoulders with or without impact of the head, direct blows to the head, or dropping or throwing a child. They can appear after an infant or child is shaken with relatively little force, for as little as two to three seconds.

Abusive Head Trauma: Shaken Baby Syndrome usually affects children under 3 years of age, most commonly under 18 months. While the true incidence of Shaken Baby Syndrome is difficult to determine, an estimated 1,200-1,400 U.S. children are treated for injuries due to shaking. Twenty-five percent of these children die as a result of their injuries. Abusive Head Trauma: Shaken Baby Syndrome is the most common cause of death due to child abuse in infants and very young children.

[What Happens when a Baby is Shaken?]

Infants’ and toddlers’ neck muscles are not fully developed. This means that when a very young child is shaken, she has a difficult time bracing her head against the back and forth motion. When an infant or child is shaken, the brain bounces back and forth inside the skull cavity, causing bruising of brain tissues. In severe cases, the brain can be ripped from the inside wall of the skull, causing bleeding and swelling. Blood pools within the skull, and swelling places pressure on the brain stem, which controls vital functions such as heartbeat and breathing. Babies who are shaken might also experience retinal bleeding.

[What are the Symptoms of Shaken Baby Syndrome?]

When a baby has been shaken, symptoms can range from seemingly mild and hard to detect to very severe and quite obvious. Some immediate or short-term effects include:

- Vomiting with lethargy or tiredness,
- Irritability,
- Sucking or swallowing difficulties,
- Decreased appetite,
- Difficulty breathing,
- Seizures,
- Changes in consciousness,

- Limp arms & legs,
- Excessive drooling,
- Heart failure, or even
- Death

Children who survive shaking may suffer from visual disabilities, speech difficulties, hearing loss, developmental delays, learning disabilities, cerebral palsy, or seizure disorders. In severe cases, the infant child may live in a permanent vegetative state.

[Why Does Abusive Head Trauma: Shaken Baby Syndrome Happen?]

Parents and caregivers are the most common perpetrators of Shaken Baby Syndrome. Perpetrators report experiencing extreme frustration before the incident, often due to an infant's seemingly uncontrollable crying. Many infants spend more than three hours crying each day. Trying to comfort a crying infant for long periods of time can stir up intense emotions, such as anger and exasperation. Some parents and caregivers also report feelings of inadequacy, meaning they feel the infant's continued crying is a reflection of their inability to care for the child properly. Sometimes, overwhelmed by these negative emotions, a parent or caregiver momentarily "snaps," and turns to shaking as a potential means of quieting the crying child. Parents and caregivers might be unaware of the dangers of shaking, or of how little force is actually required to cause serious injuries. In other cases, parents and caregivers report feeling intense frustration in situations other than trying to comfort a crying infant. Problems encountered during toilet training and problems with feeding are other common triggers.

[What Can Be Done to Prevent Abusive Head Trauma: Shaken Baby Syndrome?]

Shaken Baby Syndrome is 100 percent preventable. One of the best ways to prevent Shaken Baby Syndrome is to do what you are doing right now. Become educated about Shaken Baby Syndrome and its long-lasting effects. Share your knowledge with parents, siblings, teachers, co-workers, and anyone else who spends time around very young children.

Keep lines of communication between parents and caregivers open at all times. Caregivers need to be aware of illnesses or changes in routine which might cause an infant to fuss more than usual.

It is also important to know your own stress level. If you feel yourself becoming angry or frustrated, use calming techniques such as deep breathing, tensing and releasing all your muscles at once, stretching, or closing your eyes and picturing yourself in a calm and peaceful place. One effective stress reduction technique is to take a break, take a deep breath, and count to ten slowly.

Another way to prevent Shaken Baby Syndrome is to learn a variety of strategies for consoling infants. There are a number of ways to soothe a crying baby, including changing his diaper, walking or rocking him, rubbing his back or tummy, feeding him, giving him a pacifier or teether, playing soft music, turning on a fan or small motor, singing to him, wrapping him in a warm blanket, or briefly putting him in a swing. If a normally calm infant begins crying for long

periods, check her for signs of illness. Remember that infants are sensitive to tension around them. If you can reduce your own stress, the infant will probably sense less tension, and may be more easily comforted.

If you feel you have tried everything and your stress level is not improving, it may be time to remove yourself from the situation. If possible, ask another qualified caregiver to take over while you take a short break.

Many centers have policies in place for handling excessive crying. Talk to parents about what you as a caregiver do to soothe a crying baby. The Texas Department of State Health Services recommends that parents develop a plan in case they are in a situation where their baby will not stop crying. In order to help parents plan for such occasions, DSHS has developed four fill-in-the-blank statements that they encourage parents to complete. This tool, adapted slightly for non-parental caregivers, can also be very helpful to you. We encourage you to take a few minutes to complete the following sentences:

When a baby in my care won't stop crying:

A safe place I can leave the baby for five minutes is _____.

A calm and understanding person I can all to talk to is _____.

One thing I can do to calm myself down is _____.

If I need help caring for the baby I will _____.

By planning for these stressful situations at home and at the child care center, you can help prevent Abusive Head Trauma: Shaken Baby Syndrome.

Most importantly, remember to *never shake a baby*.

[Bringing it All Together]

Throughout this course, we have discussed some of the key issues in providing safe and appropriate environments for infants and toddlers. The care children receive in the first five years of life affects their skills and abilities for the rest of their lives.

Here are the major messages we would like you to “take home.”

- Providing a variety of positive meaningful experiences in the context of warm, responsive care allows children’s brains to develop to their full potential, setting the stage for all future learning, thinking, and relationships.
- Sudden Infant Death Syndrome, or SIDS, is the death of a child 1 year of age or younger, which cannot be explained after a thorough investigation.
- To reduce the risk of SIDS death, infants should always sleep on their backs on a firm sleeping surface free of soft objects such as quilts or stuffed toys. The Safe Sleep c” campaign gives an extensive list of suggestions for reducing the risk of SIDS death.

- Abusive Head Trauma: Shaken Baby Syndrome is the group of symptoms resulting when an infant or small child is shaken, usually at the hands of a parent or caregiver experiencing extreme frustration, and is fatal in about one-fourth of all reported cases.
- Abusive Head Trauma: Shaken Baby Syndrome can be prevented by practicing stress reduction techniques, learning a variety of strategies to soothe crying infants, and asking for help if necessary. Never shake a baby.

Thank you for your participation in this course, and for your concern for the health and well-being of our youngest children.

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*** This course was developed and produced by the Texas A&M AgriLife Extension Service of the Texas A&M University System in cooperation with the Texas Department of Family and Protective Services, Child Care Licensing Division, and using funds provided under the American Recovery and Reinvestment Act of 2009.**

