

Transcript of Healthy Brains, Healthy Families

Tiedra M.: Good morning. I am Tiedra Marshall, your family support technical assistance coordinator with the Pennsylvania Family Support team based at the center for schools and communities. I will be your moderator for today. It's my pleasure to welcome you to today's webinar session 'Healthy Brains, Healthy Families'. Our presenters today are Heidi Wettlaufer and Mike Brink. Michael and Heidi are consultants with the Early Intervention Technical Assistance, part of the Pennsylvania training and technical assistance network. They provide training and assistance to local infant/toddler and preschool Early Intervention Agencies that provide supports and services to children birth to school age with developmental disabilities and their families.

As early childhood professionals, they have worked as teachers, home visitors, administrators, trainers and always as learners. Both are board certified behavior analyst. Mike is a certified brain injury specialist. Heidi has multiple credentials related to teaching children with autism. They have visually started this conversation by showing us ways that they build their own brains as you see in the photos that are present. Please welcome Michael Brink and Heidi Wettlaufer. The microphone is now yours.

Heidi W.: Thank you for your patience. Welcome everybody. I am Heidi Wettlaufer. I'm gonna start the presentation on healthy brains and healthy families. I'm gonna go pretty quickly because we have a lot to share with you, and I hope that you all downloaded your handouts. We have a very resource rich handout that gives you a lot of links to the things that we're gonna be talking about. Even though we talk fast, we're giving you links that you can go and dig deeper in the information that we're sharing.

What we really wanna go over today is to ... Hold on one second I just high ... is to go over really how young kids' brain develop, the impact on child development, and what can we do in our jobs to support healthy brain development. Mike's gonna talk about the impact of trauma on brain development and we're both gonna be talking about building parent knowledge and capacity to support children's healthy brains. If you have questions or you wanna chat, we welcome you to do that in an ongoing way. We're not gonna save an extra space at the end for that. There is a chat box and I believe you can put your questions in there and we'll try to address them as best as we can.

The first thing is, we have a polling question, what are the ages of the kids that you serve? Select all that apply. While you're doing that, I'm just gonna keep talking and really start with this idea about the brain as a building and that we are in part the architects along with the genes that make up our code for who we are. Just to start, after you've done your polling, I want you to do something for me. I want you to lean over on one side of your chair if you're sitting. If you're standing then lean on to the right side, and then I want you to close your eyes, and then I want you to raise your left hand way high, and then I want you to stick your

tongue out and do that all at the same time. Now wave your hand that's up in the air and you can release that.

Before I talk about why I asked you to do that, I see we have ... oh, good we've got a really nice broad representation of people here serving a lot of kids. Oh, good and we're gonna be talking about prenatal brain development in very young kids. This is wonderful. Welcome everybody. I think I'm gonna skip that polling question because I wanna go to talking again about the brain architecture and this idea of the brain as being a building. When you think about that exercise that I just gave you, you heard information. I'm assuming some of you followed the instructions. I can't see you so I wouldn't know. You heard something and then that information you have to make meaning of it somehow to then lean over to one side.

From there, I asked you to do two other things and at one point stick your tongue out. Some of you might have thought, "Well, I'm eating my breakfast. I'm not doing this." Or somebody might be by a window or your door is open and you don't want people to see you doing that as you go by. You're thinking about the information that you have and whether somebody else will actually perceive you, and if they do perceive you, what will they think of you. You have this thing called theory of mind that's able to have a theory about what somebody else is thinking about you. These are all very complex processes. I think that I wanted us to think about just a very simple thing that some of you probably said, "I'm not doing this. People are gonna think I'm crazy." In a very simple decision all of that was going on and the brain is what mediates those decisions. Every thought and action is controlled by the brain and it is a very complex organ. There's a lot that's not known about the brain.

I wanna just do a quick anatomy of the brain, and I think Mike you can maybe begin to queue the video, but I'm gonna just keep this slide up. Just really talk about the brain as being divided up into functional units with particular tasks that have to be done. When you think about what you see in the world, it comes in through your eyes and then it's relayed through the nerve to the thalamus and then it goes to the visual cortex, which if you put your hands on the back of your head, that's occipital lobe and that's the visual process in part of your brain.

The brain has these functional units that do something that within themselves work together, but they're also connected to other parts of the brain and other functional units. If you think about like a tea kettle whistle that blows, you can say, "Oh, my tea kettle whistle is blowing." Then what you know it's time to get the water. It's not really just the whistle that's blowing. If it weren't for the container that holds the water, the heat under the kettle, the way water create steam that then allows the whistle to blow. That's how the brain is. We've got little structures that do specific things but they don't do it in isolation. All the cells are formed, connections are formed between functional units and within functional units. Maybe with that we can move on to looking at Dan Siegal's Hand Model of the Brain, which is a video that you have a link too on your handout. It's a really nice way of explaining this idea.

Daniel Siegal:

One of the most rewarding experiences for me has been to study brain science and apply it to the experience of parenting. The hand model of the brain that I use to teach parents is very useful to understand that. If you take your thumb and put it in the middle of your palm, put your fingers over the top, this is a very useful model of the brain, when we can actually see in front of us what's going in the brain then we can change what the brain does. Let me walk you through very basically what happens in this brain and the structures in it. It goes like this, the spinal cord comes up representing the wrist, and then you have coming up into the skull the brain stem and the limbic area, which work together to help regulate arousal and your emotions and the way you have a fight flight freeze response.

These are below the cortex, the limbic and brain stem areas and the cortex is this higher part of the brain that allow us to perceive the outside world and to think and reason. This front most part of the brain right behind your forehead, the person is oriented like this, is actually the part that regulates the subcortical limbic and brainstem areas. This regulation is very important because sometimes we can have all sorts of things happen in our life. We're tired, we're exhausted, someone pushes a particular emotional button, and we can flip our lids. Rather than being tuned in and connected and balance and flexible, we can lose all that flexibility, even lose moral reasoning and act in ways that are terrifying to others including our children.

You can actually bring yourself back online and come back to the highroad and make a repair with your child, and that's explain to them. You can also use this hand model of the brain to explain to children even as young as five and six how to understand when their emotions are rising up from the brainstem and the limbic areas here, and how it's overriding the prefrontal area and making it so they may be about to flip their lids. I have kids come tell that they're about to go flip their lids and they need a break, they need a timeout and by even just naming that they can tame it. That's the power of using the hand model for ourselves and for our children to help us all make sense of what goes on in the emotional communication that we have in the course of day-to-day life.

Heidi W.:

I think right now it's a good time that I wanna share my screen because I wanna show you something that's in your handout. Mike if you can ... If you look in your handout number, there's something called 'Brain Maps' and that's where you can get the link to this. This is a nice interactive site around the brain and you can click on ... Here is the brain and can look at it from different angles. We'll look at it from a profile angle and if you click on a part of the brain ... Actually, let me backup. The brain is made ... Let's look face on from the back. Here is that occipital lobe in the back of your head where vision is processed.

If you see the brain's divided into two halves, a right half and a left half. We often think about the right half as being the more intuitive side of the brain, the left half being the more analytical side and to some extent that's true. The one small example would be that when you think about language, language is processed and the meaning is processed and the coding or symbol meaning of language is processed in the left side of the brain in one of the lobes. On the other side of the

brain, language is also processed but not actually the meaning part but the porosity of language or the tone. If I say, "I hope you're all listening!" Or if I say, "I hope you're all listening." I'm using the same language that you're processing meaning for in the left side of your brain, but the right side of your brain heard the tonal difference in my voice. The emphasis difference. There is a lot of meaning in that too. Those two sides of the brain work together.

We have the brain divided in two different parts and then there are four different lobes, the occipital lobe, parietal lobe, the frontal lobe and people often think of this as the thinking brain, the higher order thinking, and the temporal lobe. They have different functions and I'm not gonna get into brain anatomy. You can go the site and look at it yourself. The cerebellum ... I wanna give you an example of how you can use the site. If you click on the cerebellum, I wanna know more about the lower brain. I've heard of that. It tells you what is the cerebellum and if you wanna read more, it will give you more information about where it's located, what its function is, that it coordinates voluntary movement such as posture and balance, and that it's very important in getting information from the senses. I wanted to just let you see that site so that if you wanna explore brain anatomy further, you're welcome to do that and you have the link to do it.

I'm not sure what else I wanted to say about that. Here is the links to the interactive maps. The next thing I wanted to say is, we have these big regions of the brain, but they're all composed of neurons or brain cells. There are different types of brain cells, but just for general purposes, brain cell has a dendroid, which I don't know if you can see my cursor is right here. An axon from another cell comes, there's an electrical impulse ... I'm on the other side. That comes through that axon of another cell and then at the synaptic connection where those cells are in close proximity, the electrical impulse turns into a neurochemical response. Those chemicals or neurotransmitters are then sent out into the space and the synaptic connection happens when the next cell receives those neurotransmitters. That's how the cells talk to each other and that's how they build connections.

A lot of us have probably heard of the stress hormone of the cortisol and epinephrine. Cells that release those hormones or neurotransmitters would be released here and picked up by another cell. Similarly, serotonin, which modulates anxiety would also be a neurotransmitter. That's basic cell anatomy. Why do we care? Oops, I think I advanced. There we go. I think we care because it's good to know the anatomy and function of cells and how they connect to one another, because that's what's forming in prenatal development.

When do these cells develop and how do they know what to do? When children are conceived, it's probably around 25 days into conception that the nervous system really begins to develop and that's a critical time. Remember what I said earlier is that the genes that we have are in one of the architects of our brain but experience is also an assistant architect of the brain in terms of building the brain and experiences begin prenatally. When you think about ... Mike you know what? You may ... I don't know if I wanna pull the next polling question up. Maybe in a

half a minute we'll pull up the next polling question. After about maybe three months, the cells start to migrate. When we looked at how does the cell know to be in the visual cortex? How does the cell know to be in the frontal cortex, in the thinking part of the brain? That's where our genes are the architects. They give the cells that information. Mike, we can pull up the polling question next.

What you see is the child's ... This is all neutral, as the child's developing, their brain becomes more and more specialized in terms of those lobes and the sections of the brain have been established. By six months, there is almost a lifetime supply of the neurons that we need and that are produced in our lives. Sometimes these cells will migrate to the wrong area and when they do, they often die off. When they don't die off sometimes that can become what scientist think are the beginnings of an underlying disorder.

The womb provides a fetus with a stable unchanging silent dark environment in which to grow and develop. Is that true or false? While you're answering if you haven't already, I'm gonna talk a little about what happens in the womb. Those of you who've had children certainly know, when you're walking as a parent or a mother, you're talking, you're eating, you're drinking, you're listening to music, you're frightened or stressed, or you're laughing, or you're taking a bath, all of that is happening in the uterus and in the utero environment for the fetus. One of the things ... Do we have the results of the poll? Excellent. It is false because of what I just said and also because the blood brain barrier to the fetus is not a strong ... There's not like a wall up.

If the mother is for example, feeling stress, there is an increase in her stress hormones, her heart rate goes up, her blood pressure, her respiration, even digestion is affected by stress in all of us. Because the baby is also in that environment, these factors affect things like the level of oxygen and nutrition that the fetus receives. Also, stress hormones can cross the placenta and actually affect the fetus directly. There's still a lot unknown about the degree and timing and the intensity of stress that's required. Everybody has stress and it's not to say that stress is gonna damage the baby's brain. But when there's a certain level of intensity and duration of that stress, and it's chronic, that's when scientists believe that there's an effect on the developing brain of the fetus. I would say when Mama ain't happy, ain't nobody happy and the baby's brain is certainly part of what we wanna be concerned about.

Who cares? Of course, we do because there's implications for you as home visitors or people that are working with young parents. What would be important? Prenatal education is certainly important, but prenatal education about this very we're talking about today. The brain is developing in utero and that you are one of the architects of your baby's brain that early in life. I think many of you know that folic acid is important for neuro development. Actually women that may be getting pregnant should be having folic acid and during pregnancy, and doctors tell parents about how much they should have. But it's critically important and it prevents spine bifida and other disabilities.

Another thing is tobacco, alcohol, and drugs. Again the baby is gonna experience. An alcohol is a very tiny molecule so it's easily passing through the placenta to the baby. I think many of you probably heard of fetal alcohol syndrome. That's definitely a neurological disorder that affects a child's attention, their intellectual development, and the consumption of alcohol during is what causes that. It's really important as home visitors and people that counsel and work with families to help them support good nutrition, and to find or to access resources for good health and nutrition if they don't have access for that now.

Trying to help parents modulate their stress levels, and if they're living in very stressful circumstances, mediators are stressed or social support, people accepting them, having their basic needs met, having some kind of routine in their life. Those are things that help mediate stress. Again it's a tall order for some families but it's an important thing to pay attention to. Adequate is important. Sleep is what helps us solidify our memory, regular light exercise et cetera. There is a handout called 'Building Baby's Brain the Basics' and that's a nice handout to use with families. It's under number three, Prenatal Development and there is some other information on that as well.

What can you do as home visitors? You can share this information with families in lots of different ways. I just wanna give you resources for you to do that. Here is an absolutely wonderful resources on the zero to three website, which is on your brain maps. The link is on that brain maps, number seven in your handout. I'm just gonna walk you through an example of, here we are. Here is select the age. I'm in prenatal development and here is the brain. The question is, what do we know about brain development during the prenatal period? You click on that and up comes the answer about at birth about 100 billions neurons have been produced, and then it goes on to talk more about during the prenatal development how busy that development is.

Then there is a section on the site that says, "Well then, what can you do?" This gives you information about what ... appreciate how the component behaviors in your newborn, the first day of life have emerged out a developing prenatal period. When a baby is born, their brain already has some information. They've had experiences already and then you can go to let's say, newborn to two months. I'll go to hearing. This shows you where in the brain hearing is mostly processed, and then it says, "What does the newborn hear?" Here you can see it gives you an answer that they really don't discriminate a lot but there are lots of different sounds, everything is new. But they do have a genetic predisposition to oriented speech sounds and to the voice and the newborn will even turn their heads to your voice.

What can you do? This is really lovely. Talk to your baby during caregiving routines. Notice how you speak to the infant. Remember we talked about the right/left side of the brain. In very young babies, they really are more attracted to sound, pitch, and rhythm of your voice. I think that's why we do all that baby talk, because that part of their brain is really attentive to sound. That's the beginning of relationship. You can keep going through this. You can look at the language

area. What might my baby see or hear and again it gives you an answer, oops, when you click on the question and then what can you do?

I would love to spend the next hour this site. It's just such a wonderful wealth of information and it's a really nice thing that you can share with parents. I'm gonna click out of this and get back onto the webinar Mike. Again, I just wanna remind us that the brain is developing and it's through the interaction of our genetic code and our early experiences and that both of those things actually build the brain. The genes are the basic blueprint but the experiences before and after birth really influence how our genes are expressed. I just wanna remind us of the neurons again because when we look at this next ... There we go. When we look at this next slide, this gives you a picture of at birth.

This panel right here shows that ... Look at all these neurons that are there. There are lots of neurons on the baby's brain but there aren't a lot of connections made here, because connections are made through experience. By two years, look at the web of connections. These are the connections between the nerve cells. Those are the connections that allow us to talk to each other. It's almost like the whistle on the tea kettle. The hot water talks to the whistle. If there is never any heat put on the kettle, then that's never gonna happen. It's experiences that create the connections in our brains.

By the time children are six years old, you can see that some of those connections have died out. We wanna give babies a lot of rich experiences to build those connections, and then as children grow and develop, they strengthen the connections that are used. For example, the reflexes like the rooting reflex when a baby's cheek is blushed and they turn their head to one side. That's really important in infancy, because that helps them with feeding, but that dies down as children get older. What really also dies down or the lack of experience will prune neuro connections.

This slide gives you a sense of when you are ... Like in this very young age from birth to two to four, the brain's ability to change in response to experience, is much easier or the amount of effort required is much lower when babies are younger and their response to change is much higher, because they don't have stuff already built up. It's almost like the habits that we have. They're much harder to break after you've had them for many many years. That's what this graph is showing. It's really important at that young age to build baby's brain.

This graph gives you a sense of the vision and hearing critical periods, and you see that's really before age three months. Why is that important? Because when we have sensitive periods, it's much easier to build those circuits, and when those sensitive periods have ended it's harder. For example, children that are born with cataracts, the doctors really wanna remove those cataracts as the soon as the baby is able to undergo that surgery, because the brain needs to get information from the visual nerve, back to the occipital lobe, so that the occipital lobe can process visual information. If it never gets that information, that parietal brain that we touched before isn't gonna be having those experiences to build

neuro connection. It's important for babies to hear language, it's important for them to have a lot of different experience to build those connections, and to build their brains.

Speaker 5:

As we said, a baby is born with 100 billion neurons, but those quadrillion connections they're not there yet. Those connections form at a very rapid speed during the first five years of life at 700 to a 1,000 new synapses per second. Those connections are created through every interaction a child has and are important because they form the architecture of the brain. Every time you talk to and engage with a child, you are literally growing a brain, connecting the different parts of the brain, which allows for new ideas, insights, and creative thinking.

Each moment of eye contact, each new word exchanged, each time you make a child laugh, you are strengthening these connections. Since there are so many different ways to do this, we asked people around the world, send us videos of your favorite ways to engage with the children in your life. During these early years, a child's brain makes as many connections as possible and then it begins pruning the ones that aren't used and strengthening the ones that are a dynamic process that continues throughout life.

Heidi W.:

I think this is a slide that I wanna spend a little bit of time on. It's a pretty famous study by Hart and Risley. They took a lot of data watching children in their first couple of years of life in their parent's home and interactions. They noticed in their result that the children of families who had higher economic and educational levels, their children had much higher vocabularies by the time they were age three, and children in working-class, lower middle social economic and educational levels, and kids who were in families who were really struggling financially and had lower levels of education had the lowest vocabularies.

I don't really like calling this welfare parents but I didn't make this slide. One of the things that they found was the number of words per hour that these children had average 616 words an hour. The average number of words these children had in their experience was almost doubled 1,200 and these children it was doubled from here. When you think about these kids had way more words than these kids. Look at the effect. There was another part of the study that they also describe and it had to do with the amount of encouragement versus discouragement the children received from their caregivers. In these children's lives, they had a one to two ratio of encouragement to discouraging statements. They categorized the way the kids were spoken to in those two ways.

There was more discouraging statements here like, "Stop doing that," or "Watch what you're doing," comments versus, "Wow, look what you did. That's wonderful." These kids had ratio that was improved from that in terms of they had two to one encouraging to discouraging statements on average. Then when they analyzed the language samples of the children's caregivers, in this group, they had six to one statements of encouragement to discouragement. When you think about developing the child's brain, the vocabulary, which then is gonna affect

their interactions, their reading levels, what you say and how much you say to a child really does matter and it's building a baby's brain.

The implications I think are pretty clear. We wanna have responsive stimulating and language, which experiences, think about nutrition. I'm gonna go really fast. I apologize for how quickly I'm going. Screen time is an important thing to think about in this day and age. In your handout and on number two, there is a link to the American Academy Pediatric statement on screen time. Basically, then, the National Association for Education of Young Children, television and other entertainment media should be avoided for infants and children under two.

What are the implications? For you to have some conversations with families to share information with them and to problem solve for alternatives. I would say it's important to talk to them about the consequences for their baby's brain and development. I'm going to skip that slide because I think this sums it up and it's that idea of nature and nurture. It's a dance not a contest. It's really important that we provide children with experiences as architects of their brain.

Speaker 6:

The key to forming strong brain architecture is what's known as Serve and Return interaction with adults. In this developmental game, new neuro connections form in the brain as young children instinctively serve through babbling, facial expressions, and gestures and adults return the serve, responding in a very directed meaningful way. It starts very early in life when a baby coos the adult interacts and directs the baby's attention to a face or hand. This interaction forms the foundation of brain architecture upon which all future development will be built. It helps create neuro connections between all the different areas of the brain, building the emotional and cognitive skills children need in life. For example, here is how it works for literacy and language skills.

When the baby sees an object, the adult says its name. This makes connections in the baby's brain between particular sounds and their corresponding objects. Later, adults show young children that those objects and sounds can also be represented by marks on a page. With continued support from adults, children then learn how to decipher writing and eventually to write themselves. Each stage builds on what came before. Ensuring that children have adult caregivers who consistently engage in serve and return interaction beginning in infancy, builds a foundation in the brain for all the learning, behavior, and health that follow.

Heidi W.:

When we think about the different parts of the brain, the frontal cortex. If you put your hand on your forehead, that sort of the thinking part of your brain that regulates your impulse control, it helps you gather your memory together, make decisions, that earlier exercise when the people that were sitting at their desk by a window and didn't wanna do it. All that thought process that you had about, I'm not doing this. People are gonna think I'm crazy. That happens in the front part of your brain. That's impulse control, that's your decision making. This is our number one in activities to support healthy brain development and those are executive function skills. I think for all of us, for parents, for early educators,

children's ability to control their impulses, pay attention and learn is important and to grow that front part of their brain.

This gives you examples for what can you do for 6 to 18 months olds to build their executive function. This handout gives you all these wonderful activities. Hiding games, imitation, copying games and these are all developmentally appropriate for that age range. Then they move up to 18 to 36 month olds and you get the same kind of active games that you can do. These are all things parents can do with their children and caregivers can do in routines and activities throughout the day. I gonna click back on the webinar and I think just wanna leave you with, if you need, support for how do you find good quality child care. There are resources in your handout for that, and really coaching caregivers about how important early experiences are for the development of their baby's brain and that the brain is really life central, or brain is probably the most important organ in our body. Let me try to advance this. I think Mike you're on and thank you all so much for listening and for joining us.

Michael Brink: Thanks Heidi. We're gonna move in folks talking a little bit about what are some of the effects of trauma on the brain. We're gonna start with a little video clip. Mike if you could pull up this one that starts at 5:54.

Speaker 5: Since a child's brain is activated by everything it encounters, it can also be overwhelmed, which causes stress. When the brain experiences stress, the body's alarm system is activated. If the stress is relieved quickly, the system easily returns to normal. While learning to deal with stress is an important part of development, severe situations such as ongoing abuse and neglect where there is no caring adult to relieve the stress, leaves the body's alarm system activated, which can have serious life long consequences for the child. This is known as toxic stress. Toxic stress can lead to a body system set permanently on high alert. It causes the synapsis we use for learning and self control to be pruned while connections for fear and rash behavior get stronger.

Michael Brink: We're gonna talk a little bit about this concept of stress and particularly about toxic stress. What we know is that we all experience stress in our lives and children certainly do that as well. A certain amount of stress is good for us. It helps us learn how to make adaptive responses, and how to deal with adversity. I'm sure you've been around some folks in your lives who even as adults you can tell they were really maybe overprotected, never had to deal with stress and so they're the ones who any little event now turns into a major catastrophe and there's a large drama around that.

We wanna experience a little bit of stress so that we learn how to deal with those situations positively and how to develop some coping mechanisms. Then there is a level of stress that we consider to be tolerable. That's when there's an exposure to a potentially damaging event. Think about something like a serious injury or a disaster or a death, but this is buffered by a supportive and caring adult so it makes it tolerable. The level of stress that we're concerned about is toxic stress, and this is when there is strong, frequent, or prolonged activation of

the body stress response system. It's in the absence of that buffering, protective, and supportive adult. Think about situations such as child abuse, neglect, extreme poverty, internal depression with poor parent/child interactions. Those are the levels of stress that we're really concerned about with kiddos.

I'd like to share this research that was done by Pollak and his colleagues around kids who were abused and how they perceive facial expressions. This was really pretty interesting. I wanna start to by looking at the far left hand column. If you go down that column, everyone of those faces is a pretty neutral expression. The way this works is start with one of them, the one in the upper left and we move all the way across, you see that she's very suddenly changing her expression from neutral to scared. The one below her is going from neutral to sad. This is progression of emotions. The way the expression moves that they were looking at. What Pollak and his colleagues found was that anger tended to be identified much earlier in emotions by children who were abused than children who were not abused.

On this next slide, his research continued to go on to look at it wasn't just going from a neutral expression to something else, but it was when the expression changed from one emotion to another and how was that read. What he found was that, we're all pretty much experts in detecting emotions in faces, which allows to respond in social situations, but for non-abused children, they were able to distinguish emotions normally. They transitioned about halfway across this series of faces. At the top box where the green came around you seeing these faces are going from happy to fearful or happy to sad. About halfway through that transition, children who weren't abused could pick up this face is changing. This is starting to look different. For abused children, they could do that with emotions that didn't involve anger. However, when the emotion moves from anger to another emotion, the children routinely mistake that as still continuing anger. That's Shambhala Radio.

What you've got to think about is if anger was involved for children who were abused, they continue to read emotions as anger even though they were moving into something else. These faces that were starting to show fear, kids were abused still said that those were angry. These ones who were sad, they're still reading them as anger. Imagine how these children view the world of adults and faces around them if they're always or high percentage of their time, they're viewing things as anger. If you were an abused child and often read anger in the faces of those around you, that will continually trigger that stress response over and over.

This is just an actual image from the brain. Heidi talked to you about how the brain's architecture can change. At the top you can see that this is a normally developing brain and there are lots and lots of those connections made. Here is an image from a brain that was really exposed to a lot of stress and you see many few connections in that slide.

The takeaway about toxic stress is that think about the video talking about pruning. If someone has experienced a lot of stress that continue, ongoing stress that the stress responses are always heightened, it causes synapsis that we use for learning and self-control to be pruned because we're not using them and that strengthens those ones for fear and rash behavior. Not a good situation to be in. Not just toxic stress, we think about toxic stresses from a trauma in this case. But we also look at other forms of trauma when we're talking about brain injury. Think about abusive head and traumatic brain injury and we'll talk about both of those a little bit.

Abusive head trauma is now the term we use for shaken baby syndrome. It's preventable and it's a severe form of physical child abuse that results in an injury of the brain for the infant and a child. It's most common in children under age of five with children under one year of age at most risk. It's caused by the violent shaking or a blunt impact. It results in an injury that can cause bleeding around the brain or on the inside back layer of the eyes. Research shows us that abusive head trauma often happens when a parent or caregiver becomes angry or frustrated from the child's crying. We as home visitors, the message we wanna get to parents is crying including loud bouts to inconsolable crying is normal behavior in an infant. However, shaking, hitting, or hurting a baby is never unacceptable response.

What's on this slide now you can read through these are some things that you can do to help prevent abusive head trauma or shaken baby syndrome. You really can play a key role in that prevention by understanding the dangers, knowing the risk factors, and sharing that information with folks that you work with. You certainly wanna be apathetic for them in terms of letting them know that dealing with babies crying, a newborn's crying can be stressful at times, but you wanna give them some other alternatives, some other things that they can do.

There's a resource on that list Heidi referred to. This one is actually number nine on your resource list under abusive head trauma. The first link there will take you to some videos and some additional information if you would like to find out some more information about that. The second link that says, 'New York State Department of Health,' that's this resource that's on the screen now. This is a really nice handout that you can share with parents particularly you might wanna consider this for anyone that has a newborn and particularly with those you start to see a couple of the warning signs about stress happening with the family, but it's very specific. Talks about some very specific strategies that you can share with the family in terms of how they can position the baby to help console them, some things they can do to try to reduce the amount of crying.

The second thing we wanna talk about is really types of brain injury. There's a lot of terminology that gets thrown around with brain injury, so I wanted to just help you sort through some of that. We'd like to talk about acquired brain injuries as being that just means that it happened after the birth process, and then we can further break that down to both traumatic and non-traumatic injuries. Non-traumatic brain injuries are things like aneurysms, brain bleedings,

hemorrhaging, inhaling of toxic substances, stroke or brain infections. Traumatic brain injuries are the result of an external cause. There is always something involved externally for a traumatic brain injury. We can take traumatic brain injury and further break that down to open head injury and closed head injuries.

Open head injuries occur as a result of an object actually penetrating the skull. When you think about military veterans who come back with traumatic brain injuries, a lot of times those are a missile, a bullet, some form of object that actually entered the skull as an open head injury. A closed head injury happens when either the head is moving and it hits a stationary object or the head is still and some moving object came and struck the head. There's not something penetrating but there was a severe bump to the head.

I put up this slide because it shows the leading causes of traumatic brain injury in the United States, and you see that falls are the leading cause. If we look at this, for children under the age of five, falls under the number one cause of brain injury and account more than 50%. During a fall, a child's brain is at special risk because think about that relationship to the size of the brain and the weight of the head in relationship to the body. Our little guys, our males age zero to four have the highest reported rates of traumatic brain related emergency department visits in the United States.

When we think about falls with little kids, we need to think about, with infants sometimes these are falls that happen from changing tables, from cribs, from other furnitures. With toddlers and preschoolers it's getting up and moving around. These tend to be some of those more dramatic falls we hear about down, afraid of steps, off of the pouch, off of playground equipments. We wanna be careful about those things. What's interesting with symptoms for traumatic brain injuries, often those are things that a doctor asks someone to self-report. They ask, "Do you have a headache? Are you experiencing dizziness? Do you have nausea?" Think about our little kiddos who might not have those language skills yet or verbal skills to be able to report that. We've gotta be thinking in terms of what can we share with the adults who are taking care of children that suspect that there might be a brain injury, what are some of the things that they can look for?

The next slide shows you several symptoms that you wanna keep an eye on. What's important with a lot of these things is, we wanna think about was there a change after the suspected injury? How was the child doing before the fall or the bump to the head and what happened afterwards? Because a lot of these things seem to just describe our little kiddos and particularly infants, toddlers, that two/three year old but the difference is the change. Think about things like change in your sleeping habits, loss of interest in a favorite toy or activity after the suspected injury. Someone was just trying to gain some new skills like toilet learning skills and then there a bump to the head, a pretty significant bump to the head and then it seems like they just lost the skills that they were gaining. Those are thing that you'd wanna really be concerned about and be on the lookout for.

Here is a poll question that we can bring up. Mike if you would bring that one. The younger a child is when acquiring a traumatic brain injury, the better because a young brain can heal itself. Do you think that is a true statement or a false statement? You've just a few seconds to respond to that. Think about some of that information that Heidi provided to you about how the brain develops, that architecture of the brain looks like. Let's see if we have a result. Some different thoughts on this. The school of thought is a lot of people tend to think that because children are still growing and their bodies are a little more flexible, a little more resilient at that, carries over to their brains as well.

Think about how we talked of the brain develops what we consider from the bottom and it builds on previously learned skills and previous connections within the brain. This is actually a false statement. A younger brain is more vulnerable to damage, because the underdeveloped portions of the brain grow from that previous damage if there were damage. That makes it really difficult for to predict what development will look like in the future. This is a slide that I think is the takeaway for that.

What should we watch for and when do we see the doctor? This comes from mental clinic. It's a really good advice. Always see the doctor if you know your child has received a blow to the head or body that concerns you or that you see behavior changes. When in doubt check it out. Be on the safe side. Certainly that list of things we had up there to watch for, those changes, that inconsolable crying after a bump to the head, loss of skills, loss of interest, change in appetite, those type of things, if you see those symptoms then you really wanna get to the emergency room and get that checked out.

This is another resource that you have on your list. This is actually number 11. It say, it's from the early childhood education linkage system. Just a nice resource for you to have. When we're talking about traumatic brain injuries, the only cure is prevention. We wanna do everything we can to keep those from happening. It's a nice printable poster you've got under information about preventing injuries, you've got some signs and symptoms to watch out for and then some information about multiple injuries and an additional information as well. That's a nice handout to share with families.

This is really taking at on the left hand side of this slide what some of the typical results or the impact of a traumatic brain injury. The right hand side gives you some things that you could actually do to support that. For example, if there was a disruption in regulation or anxiety, we can really provide that consisted and predictable routine, which is good for all. A lot of mood irritability. We wanna make sure that the environments are really organized. That unpredictable emotional reactions making sure that there are consistent response of the adults. You can refer to that one as well.

There's another video that you have a link for, you'll be able to take a look at. What keeps coming up through what can we do to help alleviate the stress in kids? What can we do to help with injury? It always comes back to we, being very

supportive adults and providing nurturing environments as well. That ties in very nicely if you're familiar with the concept of positive behavior, interventions, and supports. They refer this as a pyramid model of behavior support as well. This is a system that builds from the bottom up, meaning you've got to do what's at the bottom first. Make sure that's in place for everyone before you move up to additional supports. What's nice about this is again showing what we've been talking about here, this bottom layer what we have to start with first is really focusing on nurturing and responsive relationships and high quality environments.

When we talk about those supportive environments and quality relationships, folks respond pretty well to this because it shows how they provide responsive care with the six Ts. Think about sharing this information with families and caregivers in terms of how they work with their own children. We wanna tune in with children and really make sure that they know we're invested in what they're doing, we're thinking about even for parents in their home, planning experiences and activities that actively, those synapses in the brain and really structures, some nice learning and developmental activities. We wanna make sure that we give time to our kids multiple times throughout the day. We wanna talk to them very attentively. We wanna make sure that we're touching to activate those parts of the brain that respond to that and certainly develop that sense of trust that I'm in a safe place, my needs are being met, and I'm not getting into that place where my stress responses are being activated.

You have a lot of responsibility as home visitors and working with folks who are sometimes stressful, and helping them to support their children. We know we've to take care of yourselves as well. This is also on your handout under number 10, the 'Early Childhood Mental Consultation.' This is a nice set of postures that you can print out. Think about this as a parallel process. We want you to take care of yourselves as home visitors, we want you to help the adults and caregivers you work with to take care of themselves as well. These are nice colorful posters that there might be someone here working with it. There is one in particular that it resonates with. There are topics such as 'Talk back to Your Unhelpful Thoughts,' just one about breathing, one about relaxation, one about listening, lots of helpful comments and suggestions that you can share with others.

Finally, we just wanted to let you know that we have a website. The organization that Heidi and I work with, Early Intervention Technical Assistants. If you go to that website, at the very top there is a section that says 'Topic of Interest' and Mike is gonna guide us through that. It's a dropdown and you can just scroll down to where it says, 'Traumatic Brain Injury.' It will take you to a page that's got a lot of resources, several of the ones we talked about. You can find links to websites, documents that provide you with a lot more information on brain injury and how to support those who have suffered a brain injury and also some professional development activities as well. The head bump's matter is a model series that will take you through a lot of information. I think that's all that we have for you today. We have a lot of resources. Please make sure you're able to look at our resource list with all the links and Tiedra I'll turn things over back to you.

Tiedra M.:

Thank you Mike. Thank you Heidi for the wealth of information about healthy brain development, for all of your information. All of the videos that were included but maybe omitted during this presentation, they will be included in our archive recording. Thank you all for joining us today. The archive sessions will be at the Pennsylvania parents as teachers website within a week. When you receive the electronic evaluation via email, please take a couple of minutes to complete it as your feedback is helpful to us as we plan and develop other professional development opportunities for you of the highest quality. Registration information for next month's webinar will be emailed soon. It will be placed on the Pennsylvania parents as teachers website at www.pa-pat.org. Thank you again for joining us and this concludes today's webinar.