

State

## How severe, ongoing stress can affect a child's brain

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ASHEVILLE, N.C.

A quiet, unsmiling little girl with big brown eyes crawls inside a carpeted cubicle, hugs a stuffed teddy bear tight, and turns her head away from the noisy classroom.

The safe spaces, quiet times and breathing exercises for her and the other preschoolers at the Verner Center for Early Learning are designed to help kids cope with intense stress so they can learn. But experts hope there's an even bigger benefit — protecting young bodies and brains from stress so persistent that it becomes toxic.

It's no secret that growing up in tough circumstances can be hard on kids and lead to behavior and learning problems. But researchers are discovering something different. Many believe that ongoing stress during early childhood — from grinding poverty, neglect, parents' substance abuse and other adversity — can smolder beneath the skin, harming kids' brains and other body systems. And research suggests that can lead to some of the major causes of death and disease in adulthood, including heart attacks and diabetes.

Mounting research on potential biological dangers of toxic stress is prompting a new public health approach to identifying and treating the effects of poverty, neglect, abuse and other adversity. While some in the medical community dispute that research, pediatricians, mental health specialists, educators and community leaders are increasingly adopting what is called "trauma-informed" care.

The approach starts with the premise that extreme stress or trauma can cause brain changes that may interfere with learning, explain troubling behavior, and endanger health. The goal is to identify affected children and families and provide services to treat or prevent continued stress. This can include parenting classes, addiction treatment for parents, school and police-based programs and psychotherapy.

Many preschoolers who mental health specialist Laura Martin works with at the Verner Center have been in and out of foster homes or they live with parents struggling to make ends meet or dealing with drug and alcohol problems, depression or domestic violence.

They come to school in "fight or flight" mode, unfocused and withdrawn or aggressive, sometimes kicking and screaming at their classmates. Instead of adding to that stress with aggressive discipline, the goal is to take stress away.

Many of these kids “never know what’s going to come next” at home. But at school, square cards taped at kids’ eye level remind them in words and pictures that lunch is followed by quiet time, then a snack, then hand-washing and a nap. Breathing exercises have kids roar like a lion or hiss like a snake to calm them. A peace table helps angry kids work out conflicts with their classmates.

The brain and disease-fighting immune system are not fully formed at birth and are potentially vulnerable to damage from childhood adversity, recent studies have shown. The first three years are thought to be the most critical, and children lacking nurturing parents or other close relatives to help them cope with adversity are most at risk.

Recent studies suggest that kind of stress changes the body’s metabolism and contributes to internal inflammation, which can raise risk for developing diabetes and heart disease. In 2015, Brown University researchers reported finding elevated levels of inflammatory markers in saliva of children who had experienced abuse or other adversity.

Toxic stress is not the same as post-traumatic stress disorder. PTSD is a distinct mental condition that can result from an extremely traumatic event, including combat, violence or sexual abuse. Experts say it can occur in adults and children who live with persistent toxic stress, including children in war-torn countries, urban kids who’ve been shot or live in violence-plagued neighborhoods, and those who have been physically or sexually abused.

The toxic stress theory has become mainstream, but there are skeptics, including Tulane University psychiatrist Dr. Michael Scheeringa, an expert in childhood PTSD. Scheeringa says studies supporting the idea are weak, based mostly on observations, without evidence of how the brain looked before the trauma.

The American Academy of Pediatrics supports the theory and in 2012 issued recommendations urging pediatricians to educate parents and the public about the long-term consequences of toxic stress and to push for new policies and treatments to prevent it or reduce its effects.

In a 2016 policy noting a link between poverty and toxic stress, the academy urged pediatricians to routinely screen families for poverty and to help those affected find food pantries, homeless shelters and other resources.

Much of the recent interest stems from landmark U.S. government-led research published in 1998 called the Adverse Childhood Experiences study. It found that adults exposed to neglect, poverty, violence, substance abuse, parents’ mental illness and other domestic dysfunction were more likely than others to have heart problems, diabetes, depression and asthma.

A follow-up 2009 study found that adults with six or more adverse childhood experiences died

nearly 20 years earlier than those with none.

Some children seem resistant to effects from toxic stress. Harvard's Nelson works with a research network based at Harvard's Center on the Developing Child that is seeking to find telltale biomarkers in kids who are affected — in saliva, blood or hair — that could perhaps be targets for drugs or other treatment to prevent or reduce stress-related damage.

That research is promising but results are likely years off, says Dr. Jack Shonkoff, the center's director.