

## Our Bodies, Our Nerves

Recently, I read a story about a young pediatrician who opened a clinic in San Francisco's poorest and most violent neighborhood. Children and adolescents in her practice came to her with many physical symptoms. The doctor could treat these problems – asthma, skin rashes, sore throats, aches and pains – so long as families could buy and use the medications and other treatments she prescribed. Trouble was, the kids often returned with recurring or new medical concerns. The clinic had the best success treating problems for which there were effective immunizations to prevent respiratory and other infectious diseases. They could not, however, immunize patients against the deeper problems that plagued them and contributed to their physical, behavioral and emotional disorders - problems like homelessness, gang violence, physical, emotional and sexual abuse, an absent parent, domestic violence, or family members in prison. Traditional medicine had few answers for treating these conditions or for keeping up with the health problems these stressful circumstances created.

Just when the doctor began to despair over the challenges her young patients faced in trying to grow up healthy, secure and ready to thrive in school and beyond, she came across a few research papers that began to explain why and how her patients' toxic levels of social stress invaded their bodies, reducing their chances for physical health, emotional peace and academic success. From a study of adult members of Kaiser Permanente's HMO in California, she learned that the more adverse events people experienced during childhood, the more likely they were to suffer health problems as adults – everything from addictive behavior to chronic disease. Those who had endured multiple stressful childhood events were much more likely to smoke and drink heavily, to have engaged in sex before the age of fifteen, to have attempted suicide and to develop cancer, heart disease or emphysema. Another long-term study, this one from New Zealand and starting in childhood, has found similar connections between early trauma and later health problems. Childhood victims of maltreatment were 2-3 times as likely to experience major depression and heart disease as young adults.

Meanwhile, some truly groundbreaking laboratory research is beginning to elucidate the chemical pathways by which sustained early stress creates lasting changes in the brain and the body. Newly developed techniques enable scientists to mark and trace the basic structure and function of nerve centers in the brain. Using such methods, researchers have learned that when seriously adverse events are repeated and accumulate, especially during early childhood, chemicals attach to genes that then disrupt the brain's normal activation of stress hormone receptors. This then causes persistent flooding of fight-or-flight steroids and inflammatory proteins that in turn raise heart rate, blood pressure and inflammation in blood vessels and vital organs. In other words, when children experience multiple stressful events over time without the buffering of caring relationships from adults in their lives, the trauma can transform their DNA, putting the affected children at greater risk for learning and lifelong health problems. When toxic stress occurs to women during pregnancy, the developing fetus along with his or her brain, lungs, kidneys and pancreas can fail to fully develop, predestining the unborn child to potential complications, including obesity, diabetes, high blood pressure, heart and lung disease.

I was moved to learn how one extraordinarily caring and observant young pediatrician fused her own insights into her patients' social and emotional stress with new scientific explanations for how experience becomes embedded into our biology early in life. As the article I was reading wound to its conclusion, however, the story took a U-turn, neglecting the exciting possibility of conceiving social policies and neighborhood-level interventions to vaccinate children from the toxic stressors that currently limit the growth, health, learning and well-being of whole populations. In the end, the good physician put too much faith in the power of early therapeutic interventions to positively alter the health trajectories of children. Retreating down the old medical road, our heroine is now searching for drugs and other therapies to offer individual kids before their fate can be sealed by time and more adversity. She is mustering an expensive partnership of philanthropists to organize clinical responses customized to every child's unique combination of chemical and behavioral indicators. Imagine: next patient is 6 year old Sally who presents with physical abuse by father during infancy, emotional neglect by mother as a toddler, now in foster care and underperforming in school, moody with elevated levels of blood cortisol and C-reactive protein. Let's try 12 weeks of biofeedback, then a year of cognitive behavioral therapy and a medication trial with a selective serotonin re-uptake inhibitor. I could feel my optimism deflating.

The broader implication is even more disappointing – the belief that prevention is a matter of treating problems when they first begin to appear. The new science teaches that by then it may already be too late to reverse the biologic toll of disproportionately stressful life circumstances. Healthcare can do little to prevent the medical consequences of economic, social, educational and environmental inequities that penetrate and transform the genetic protein of infants and very young children. That is why, no matter how high the quality or how universal the access, healthcare can only contribute about 10-20% of the total influence on our health. In the final analysis, health is determined more by the quality of our lives than by the quality of our healthcare.

Let us only hope that the good doctor, her wealthy funders, the wisdom of science and the foresight of policymakers will see the light and walk us toward a new system of care, one that acts on the inevitable truth that while we believe that all people are created equal, their lifespan health, learning, achievement and fulfillment require equal access to the protections and promotions of a just society.