

The Poverty Clinic

BY PAUL TOUGH

Can a stressful childhood make you a sick adult? This article chronicles the experiences of a doctor working in low-income clinic and how she came to the conclusion that regarding childhood trauma as a medical issue could help her treat certain symptoms in adults. It goes on to report on medical research that supports that conclusion.

Monisha Sullivan first visited the Bayview Child Health Center a few days before Christmas, in 2008. Sixteen years old, she was an African-American teen-age mother who had grown up in the poorest and most violent neighborhood in San Francisco, Bayview-Hunters Point, a bleak collage of warehouses and one-story public-housing projects in the city's southeastern corner. Sullivan arrived at the clinic with ailments that the staff routinely observed in patients: strep throat, asthma, scabies, and a weight problem. The clinic's medical director, Nadine Burke, examined Sullivan and prescribed the usual remedies—penicillin for her strep throat, ProAir for her asthma, and permethrin for her scabies—and at most clinics that would have been the end of the visit. But Burke, who founded the center in 2007, was having a crisis of confidence regarding her practice, and Sullivan was the kind of patient who made her feel particularly uneasy. Burke was diligently ticking off each box on the inner-city pediatrician's checklist, but Sullivan's problems appeared to transcend mere physical symptoms. She was depressed and listless, staring at the floor of the examination room and responding to Burke's questions in sullen monosyllables. She hated school, didn't like her foster mother, and seemed not to care one way or the other about her two-month-old daughter, Sarai.

Burke is charismatic and friendly, and her palpable concern for her patients disarms even the toughest cases. It helps that she is dark-skinned, like most of her patients, and young—just thirty-five. But her childhood was very different from theirs. The daughter of Jamaican professionals who moved from Kingston to Silicon Valley when Burke was four, she attended public school in Palo Alto, where the kids were mostly white and well-off, and where girls cried in the cafeteria if they didn't get the right car for their sixteenth birthday. Like many children of immigrants, Burke has learned to move fluidly between cultures. She now lives in a house in an upscale part of Potrero Hill, a San Francisco neighborhood, with a closet full of designer clothes, and she has a fiancé who is a wealthy solar-energy entrepreneur. But she seems just as comfortable among the mostly poor



Nadine Burke at her San Francisco clinic. Photograph by Alessandra Sanguinetti.

families she sees in her examination room: laughing, gossiping, hugging, and scolding, in Spanish as well as in English, in a full-throated alto that echoes down the hall.

At the clinic, Burke gently interrogated Sullivan until she opened up about her childhood: her mother was a cocaine addict who had abandoned her in the hospital only a few days after she was born, prematurely, weighing just three and a half pounds. As a child, Sullivan lived with her father and her older brother in a section of Hunters Point that is notorious for its gang violence; her father, too, began taking drugs, and at the age of ten she and her brother were removed from their home, separated, and placed in foster care. Since then, she had been in nine placements, staying with a family or in a group home until, inevitably, fights erupted over food or homework or TV and Sullivan ran away—or her caregivers gave up. She longed to be with her father, despite his shortcomings, but there was always some reason that he couldn't take her back. For a long time, she had the same dream at night: taking the No. 44 bus back to Hunters Point, walking into her father's house, and returning to her old bedroom, everything just as it used to be. Then she'd wake up and realize that none of it was true.

When I met Sullivan, last September, she had recently turned eighteen, and three days earlier she had been emancipated from foster care. She was now living alone, in a subsidized apartment off Fillmore Street. In California, emancipated foster children are given a summary of their case file, which meant that Sullivan had just been handed an official history of her rootless adolescence. “It brought up a lot of emotions,” she told me. “I read it, and I kind of wanted to cry. But I was just, like, ‘It’s over with.’” The most painful memory was of the day, in fifth grade, when she was pulled out of class by a social worker she had never met and driven to a strange new home. It was months before she was able to have contact with her father. “I still have dreams about it,” she told me. “I feel like I’m going to be damaged forever.”

I asked Sullivan to explain what that damage felt like. For a teen-ager, Sullivan is unusually articulate about her emotional state—when she feels sad or depressed, she writes poems—and she evoked her symptoms with precision. She had insomnia and nightmares, she said, and at times her body inexplicably ached. Her hands sometimes shook uncontrollably. Her hair had recently started falling out, and she was wearing a pale-green head scarf to cover up a thin patch. More than anything, she felt anxious: about school, her daughter, even earthquakes. “I think about the weirdest things,” she said. “I think about the world ending. If a plane flies over me, I think they’re going to drop a bomb. I think about my dad dying. If I lose him, I don’t know what I’m going to do.” She was even anxious about her anxiety. “When I get scared, I start shaking,” she said. “My heart starts beating. I start sweating. You know how people say, ‘I was scared to death’? I get scared that that’s really going to happen to me one day.”

Sullivan encountered Nadine Burke at a moment when Burke was just beginning to think deeply about the physical effects of anxiety. She was immersing herself in the rapidly evolving sciences of stress physiology and neuroendocrinology, staying up late reading journals like *Molecular Psychiatry* and *Nature Neuroscience*. Burke had just learned of a pioneering study, conducted in San Diego, on the long-term health effects of childhood trauma, and its conclusions had led her toward a new way of thinking—not just about her clinical practice but about the entire field of pediatric medicine.



As she listened to Sullivan, Burke found herself inching toward a diagnosis that, a year earlier, would have struck her as implausible. What if Sullivan’s anxiety wasn’t merely

an emotional side effect of her difficult life but the central issue affecting her health? According to the research Burke had been reading, the traumatic events that Sullivan experienced in childhood had likely caused significant and long-lasting chemical changes in both her brain and her body, and these changes could well be making her sick, and also increasing her chances of serious medical problems in adulthood. And Sullivan's case wasn't unusual; Burke was seeing the same patterns of trauma, stress, and symptoms every day in many of her patients.

Two years after Sullivan's first visit, Burke has transformed her practice. Her methodology remains rooted in science, but it goes beyond the typical boundaries of medicine. Burke believes that regarding childhood trauma as a medical issue helps her to treat more effectively the symptoms of patients like Sullivan. Moreover, she believes, this approach, when applied to a large population, might help alleviate the broader dysfunction that plagues poor neighborhoods. In the view of Burke and the researchers she has been following, many of the problems that we think of as social issues—and therefore the province of economists and sociologists—might better be addressed on the molecular level, among neurons and cytokines and interleukins. If these researchers are right, it could be time to reassess the relationship between poverty, child development, and health, and the Bayview clinic may turn out to be a place where a new kind of pediatric medicine is taking its tentative first steps.

“With someone like Monisha, we can help her recognize the neurochemical dysregulation that her childhood has produced in her,” Burke told me. “That will reduce her impulsivity, it will allow her to respond more calmly to provocation, it will help her make better choices. She'll have a better life.”

In 2005, when Burke completed her medical residency, at a children's hospital on the campus of Stanford University, she was an idealistic twenty-nine-year-old with a medical degree from the University of California at Davis and a master's in public health from Harvard. She was recruited by the California Pacific Medical Center, a private hospital group, to take on a vaguely defined but noble-sounding job: identifying and addressing health disparities in San Francisco, where the poverty rate for black families is five times as high as that for white families. Much of the city's African-American population lives in Bayview-Hunters Point, a largely industrial area that has a sewage-treatment facility and a sprawling Superfund site. Rates of congestive heart failure are nearly five times as high in Bayview-Hunters Point as in the Marina district, a few miles away. Before Burke's clinic

opened, there was only one pediatrician in private practice in a community with more than ten thousand children.

At Harvard, Burke had studied health disparities, and she knew what the public-health playbook recommended: improving access to health care, especially primary care, for low-income families. She persuaded her new bosses at California Pacific to let her open a clinic in Bayview-Hunters Point that would accept all patients, regardless of their ability to pay. She found some empty office space on Evans Avenue, across from a giant mail-sorting facility, and had the place remodelled and re-painted in bright colors.

When the clinic opened, in 2007, Burke focussed on health issues that particularly plagued poor children: asthma, obesity, vaccination rates. In just a few months, she made significant headway. “It turned out to be surprisingly easy to get our immunization rates way up and to get our asthma hospitalization rates way down,” she told me. And yet, she explained, “I felt like we weren’t actually addressing the roots of the disparity. I mean, as far as I know, no child in this community has died of tetanus in a very, very long time.”

Burke found herself thinking increasingly about the problems that she couldn’t immunize her patients against: homelessness, gang violence, physical abuse, and sexual abuse, as well as absent fathers, fathers beating mothers, brothers shot to death on the street, uncles sent to prison. These problems were, technically, none of her business. If you want to tackle violence and abuse and deprivation in the inner city, you don’t go to public-health school; you become a social worker or a judge or a cop. What did the field of medicine really have to offer kids like Monisha Sullivan, besides a little ProAir and permethrin?

Then, one day in the fall of 2008, Whitney Clarke, a psychologist who had recently joined the clinic’s staff, handed Burke a six-year-old medical article that he had read online. Titled “The Relationship of Adverse Childhood Experiences to Adult Health: Turning Gold Into Lead,” its author was Vincent J. Felitti, the head of the department of preventive medicine at Kaiser Permanente, the health-management organization based in California. The article described the Adverse Childhood Experience study, commonly called the ACE study, which assessed the health outcomes of patients enrolled in the Kaiser H.M.O. between 1994 and 1998. Felitti had conducted the study with Robert F. Anda, an epidemiologist at the Centers for Disease Control, in Atlanta. The study indicated to Burke that the traumatic experiences her patients faced every day were producing

not just emotional difficulties but also serious medical consequences, both present and future. Burke told me that when she finished reading about the ACE study she “could hear the angels singing. The clouds parted.” She laughed, “It was like that scene at the end of ‘The Matrix’ where Neo can see the whole universe bending and changing.” Maybe social problems were her business after all.

The ACE study was an ambitious undertaking. Beginning in 1995, Kaiser H.M.O. members in the San Diego area who came in for a comprehensive medical exam were later sent a questionnaire asking them to describe their personal history in various categories—first eight, then ten—of “adverse childhood experiences,” including parental divorce, physical abuse, emotional neglect, and sexual abuse, as well as growing up with family members who suffered from mental illness, alcoholism, or drug problems. In the course of a few years, more than seventeen thousand patients completed and returned the questionnaire—a response rate of nearly seventy per cent. As a group, the respondents represented a mainstream, middle-to-upper-middle-class demographic: sixty-nine per cent were Caucasian; seventy-four per cent had attended college; their average age was fifty-seven.

Anda and Felitti found a number of unexpected results. The first was the prevalence of adverse experiences among this generally well-off population. More than a quarter of the patients said they had grown up in a household in which there was an alcoholic or a drug user; about the same fraction had been beaten as children. The doctors used the



data to assign patients an “ACE score,” giving them one point for each category of trauma they had experienced. Two-thirds of the patients had experienced at least one category; one in six had an ACE score of 4 or higher. The second, and more significant, surprise came when Anda and Felitti compared the ACE scores with the voluminous medical histories that Kaiser had collected on each patient. The correlations between adverse childhood experiences and negative adult outcomes were so powerful that they “stunned us,” Anda later wrote. And those correlations seemed to follow a surprisingly linear “dose-response” model: the higher the ACE score, the worse the outcome, on almost every measure, from addictive behavior to chronic disease. Compared with people who had no history of ACEs, those with ACE scores of 4 or higher were twice as likely to smoke, seven times as likely to be alcoholics, and six times as likely to have had sex before the age of fifteen. They were twice as likely to have been diagnosed with cancer, twice as likely to have heart disease, and four times as likely to suffer from emphysema or chronic bronchitis. Adults with an ACE score of 4 or higher were twelve times as likely to have attempted suicide than those with an ACE score of 0. And men with an ACE score of 6 or higher were forty-six times as likely to have injected drugs than men who had no history of ACEs.

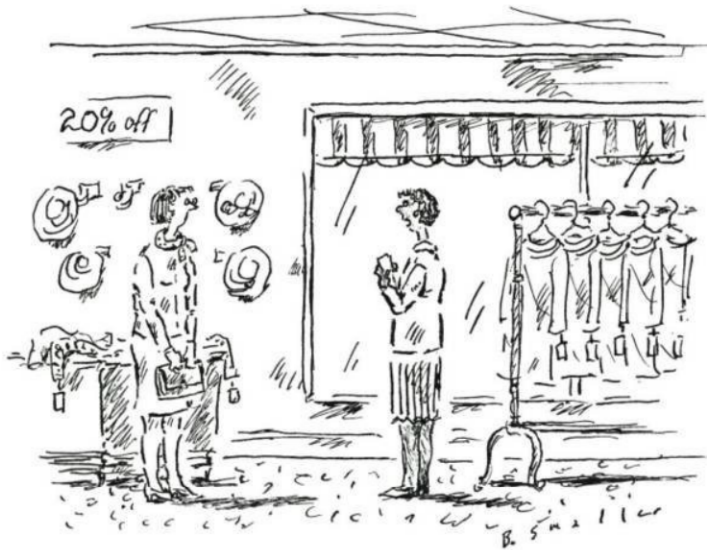
Some of the results made intuitive sense. Sigmund Freud had argued that traumatic events in childhood could produce negative feelings in adulthood, and it was reasonable to assume that those feelings could lead to addiction, depression, and even suicide. But what about cancer and heart disease? Felitti and Anda started with the assumption that ACEs led to chronic illness through behaviors like smoking, heavy drinking, and overeating, which would produce increased rates of lung cancer, liver disease, diabetes, and heart disease. The problem with this theory was that ACEs had a profound negative effect on adult health even when those behaviors *weren't* evident. The researchers looked at patients with ACE scores of 7 or higher who didn't smoke, didn't drink to excess, and weren't overweight, and found that their risk of ischemic heart disease (the most common cause of death in the United States) was three hundred and sixty per cent higher than it was for patients with a score of 0. Somehow, the traumatic experiences of their childhoods were having a deleterious effect on their later health, through a pathway that had nothing to do with bad behavior. But Felitti and Anda couldn't figure out what it was.

The medical field has not, on the whole, been quick to embrace Anda and Felitti's findings. The main critique of the ACE study is that it is retrospective, meaning that it relies on the memory and the credibility of the original respondents. Maybe some patients

misremembered or even invented their traumatic experiences; perhaps the respondents with the most wayward adult lives were the most eager to blame external forces, even imaginary ones, for their poor health. (Why do I smoke and overeat? Because my parents didn't love me.) Anda and Felitti have responded to this criticism in subsequent papers, saying that underreporting of trauma is more likely than overreporting; even in this confessional age, people are often uncomfortable acknowledging childhood sexual abuse or an alcoholic parent. In the end, though, Anda and Felitti have no way of knowing for certain how honest the respondents were.

Compounding this problem is the fact that Anda and Felitti, in their initial papers, were unable to come up with a solid explanation for why adverse childhood experiences produced serious health problems in adulthood. If you go to the main C.D.C. Web page dedicated to the ACE study, you'll see a schematic diagram that traces a path from adverse childhood experiences through "social, emotional, and cognitive impairment" and "adoption of health-risk behaviors" to disease, disability, and early death. But beside this diagram, linking the causes to the effects, are big blue arrows labelled "Scientific Gaps."

Despite this uncertainty, Felitti has written that the ACE data "have given us reason to reconsider the very structure of primary care medical practice in America." And it's true that, if the data set is accurate, it poses a significant challenge to the way that we



diagnose and treat many diseases. For example, the American medical system spends billions of dollars each year measuring and trying to lower people's cholesterol, because we know that having a cholesterol reading above two hundred and forty milligrams per decilitre doubles your chance of heart disease. But, according to the Kaiser study, so does having four or more ACES. So if we trust the data, and we want to prevent heart attacks, it makes as much sense to try to reduce ACES, or counter their effects, as it does to try to lower cholesterol.

During the past decade, other researchers have attempted to address many of the initial concerns about the ACE data. One important source of corroboration has come from researchers in Dunedin, New Zealand, who, for more than thirty years, have been following a group of a thousand people born there between April, 1972, and March, 1973. According to a recent analysis published in the *Archives of Pediatrics & Adolescent Medicine*, the incidence of early trauma among the Dunedin cohort is similar to that of the Kaiser respondents. The data in the Dunedin study, however, are prospective, not retrospective; in other words, the adverse experiences were reported by children or parents, or observed by researchers, more or less as they happened, rather than recalled by adult patients. The Dunedin researchers didn't include some of the most common adverse experiences counted by Anda and Felitti, like the alcoholism of a family member, but they still found that forty percent of the children encountered one or more adverse experiences. And they found similar correlations between early trauma and later health problems: the children who were victims of maltreatment, including maternal neglect and physical and sexual abuse, were almost three times as likely to experience major depression by their early thirties, and they were almost twice as likely to have an elevated risk of heart disease.

Although the Dunedin study buttressed some of the basic findings of the Kaiser study, it didn't fully clarify the mechanisms at work. But, in the years since the first ACE paper was published, other researchers, working with rats and primates as well as with humans, have made advances in explaining how early trauma creates lasting changes in the brain and the body. The key pathway is the intricately interconnected system that our brain deploys in reaction to stressful events. This system activates defenses on many fronts at once, some of which we can recognize as we experience them: it produces emotions like fear and anxiety, as well as physical reactions, including increased blood pressure and heart rate, clammy skin, and a dry mouth. Other bodily reactions to stress are less evident: hormones are secreted, neurotransmitters are activated, and inflammatory proteins surge through the bloodstream.

As a response to short-term threats, this system is beneficial, even essential. But researchers like Bruce McEwen, a neuroendocrinologist at Rockefeller University, and Frances Champagne, a neuroscientist at Columbia University, have shown that repeated, full-scale activation of this stress system, especially in early childhood, can lead to deep physical changes. Michael Meaney, a neurobiologist at McGill University, and his colleagues have found that early adversity actually alters the chemistry of DNA in the brain, through a process called methylation. Traumatic experiences can cause tiny chemical markers called methyl groups to affix themselves to genes that govern the production of stress-hormone receptors in the brain. This process disables these genes, preventing the brain from properly regulating its response to stress. In rat studies, Meaney has found signs that these methylation patterns can be reduced by parental nurturing. If the methylation isn't counteracted, however, its effects can last a lifetime. Researchers have observed that schoolchildren who experience early trauma find it harder to sit still and to follow directions. As teen-agers, they are more likely to be drawn to high-risk behaviors. As adults, they often show increased aggression, impulsive behavior, weakened cognition, and an inability to distinguish between real and imagined threats.

When it comes to adult health, the most important element of the stress response is the immune system, which, during moments of acute anxiety, releases a variety of



"Westminster's over, Shep—it's all about possums now."