A REPORTER AT LARGE

THE POVERTY CLINIC

Can a stressful childhood make you a sick adult?

BY PAUL TOUGH

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

MAGNUM PHOTOS

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 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 liv-

ing 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 repainted 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 in-

creasingly 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.

"This is Lawrence—he does something with right-wing smearing."

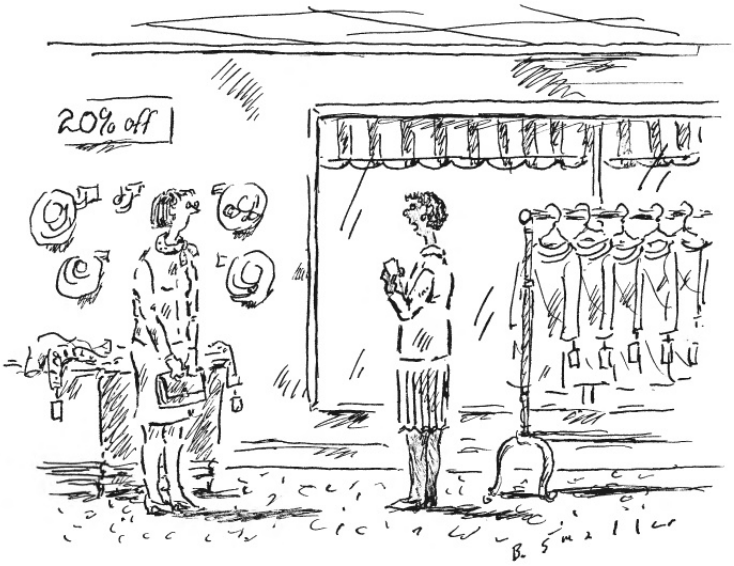
Some of the results made intuitive sense. Sigmund Freud had argued that traumatic events in childhood could produce negative feelings in adulthood, and it was reasonable to assume that those feelings could lead to addiction, depression, and even suicide. But what about cancer and heart disease? Felitti 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.



"Are you looking to accentuate or camouflage?"

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 per cent 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

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

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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 proteins and other chemical signals into the bloodstream. In the short term, this process promotes resistance to infection and prepares the body to repair tissues that might be damaged. After the short-term threat disappears, this inflammation subsides, unless the system gets overloaded, in which case these chemicals can build up, with toxic effects on the heart and other organs. The Dunedin researchers found that adults in their thirties who had been mistreated as children were nearly twice as likely to have elevated levels of an inflammatory protein in their blood—high-sensitivity C-reactive protein—as adults who had not been mistreated. Many studies have shown high-sensitivity C-reactive protein to be a leading marker for cardiovascular disease.

Such research provided Nadine Burke with a new way to evaluate what she was seeing in her clinic, and in Bayview-Hunters Point as a whole. "In many cases, what looks like a social situation is actually a neurochemical situation," Burke explained one afternoon at the clinic. "You can trace the pathology as it moves from the molecular level to the social level. You have a girl who grows up in a household where there's domestic violence, or some kind of horrible arguing between her parents. That triggers her fight-or-flight response, which affects the way the hormone receptors in her brain develop, and as she grows up her stress-regulation system goes off track. Maybe she overreacts to confrontation, or maybe it's the opposite—that she doesn't recognize risky situations, and feels comfortable only around a lot of drama. So she ends up with a partner who's abusive. Then the pathology moves from the individual level to the household level, because that partner beats their kids, and then their son goes to a school where ten out of thirty kids are experiencing the same thing. Those kids create in the classroom a culture of hitting, of fighting—not just for the ten kids but for all thirty. Then those kids get a little older, and they're teen-agers, and they behave violently, and then they beat *their* kids. And it's just accepted. It becomes a cultural norm. It goes from the individual fight-or-flight adrenaline response to a social culture where it's, like, 'Oh, black people beat our kids. That's what we do.'"

In the nineteen-sixties, federal policymakers were influenced by scientific research that established direct connections between childhood disadvantage and diminished educational outcomes. Researchers of that period demonstrated that disparities in early-childhood experience produced disparities in cognitive skill—most significant, in literacy—that could be observed on the first day of kindergarten and well into adulthood. Out of that science came a wave of early-childhood programs designed to address those gaps, from Head Start to "Sesame Street." Fifty years later, another generation of scientific advocates has begun to make the case for a broader approach,

one that aims at protecting children from both the mental and the physical consequences of early adversity.

Jack P. Shonkoff, a professor of pediatrics at Harvard Medical School, has emerged as a leader of this campaign. He headed a group that produced, in 2000, "From Neurons to Neighborhoods," a groundbreaking study from the National Research Council that recommended early intervention for disadvantaged children. He is now the director of the Center on the Developing Child, an interdisciplinary group at Harvard that works with scientists and legislators to translate research into policy. Shonkoff cites the ACE study in his center's reports, and he respects Anda and Felitti's work, but he calls the research of McEwen, Meaney, and others a "revolution in biology." As he said to me recently, "It's not like we need a strategy for learning and a strategy for health and a strategy for character. The beauty of the science is that it's showing us how all of these have common roots. We now know that adversity early in life can not only disrupt brain circuits that lead to problems with literacy; it can also affect the development of the cardiovascular system and the immune system and metabolic regulatory systems, and lead to not only more problems learning in school but also greater risk for diabetes and hypertension and heart disease and cancer and depression and substance abuse. This is a very exciting opportunity to bring biology into early-childhood policy."

Shonkoff and Burke are still struggling to figure out how to put this new theory into clinical practice. The science does provide powerful evidence that intervening early can improve later outcomes in an individual's health—as well as in his education and his behavior. And researchers working with rats say they have found indications that the physiological effects of stress can be reversed well into adolescence, or even adulthood. But there's not yet a lot of good data to tell us which kinds of interventions are most effective.

One approach that scientists have examined is psychopharmacology: fighting chemicals with chemicals, by directly targeting the mechanisms in the brain that get overloaded by early stress. Researchers in Meaney's lab found that they were able to counteract stress-related methylation in rat brains with doses of certain psychoactive drugs. Though scientists call these findings promising, they also express caution. This kind of pharmacological assault on methylation in the brain has never been tested in humans, and such a drug regimen would likely have many side effects. In the Meaney experiment, furthermore, the drugs were injected directly into the rats' brains.

Other researchers have produced evidence that they can mend children's overtaxed stress-response systems by changing the behavior of their parents or caregivers. A study in Oregon drew this conclusion after assessing a program that encouraged foster parents to be more responsive to the emotional cues of the children in their care. Another study, in Delaware, tracked a program that promoted secure emotional attachment between children and their foster parents. In each study, researchers measured, at various points in the day, the children's levels of cortisol, the main stress hormone, and then compared these cortisol patterns with those of a control group of foster kids whose parents weren't in the program. In both studies, the children whose foster parents received the intervention subsequently showed cortisol patterns that echoed those of children brought up in stable homes.

In terms of helping older children and adolescents who have experienced early trauma, the research is less solid. There is evidence that certain psychological regimens, especially cognitive-behavioral therapy, can reduce anxiety and depression in patients who are suffering from the stress of early trauma. But, beyond that, little is known, which means that, for now, Nadine Burke is trying to figure things out on her own.

Every Monday afternoon at one o'clock, the staff of the Bayview clinic—doctors, therapists, social workers—meet in the therapy room for what Burke has named "multidisciplinary rounds." The meeting is modelled on the kind of dialogues between specialists that almost never occur in primary-care facilities but that do take place in the best cancer centers, where a patient's oncologist coördinates care with surgeons and other specialists.

Burke and her colleagues discuss various patients' ACE scores the way that other doctors might talk about blood-pressure readings; the ACE score is, for them, a basic measure of health and an essential tool in planning treatment. In early 2009, Burke made a modified version of the Felitti-Anda ACE questionnaire a standard part of the annual physical exam for patients. She has now analyzed data on more than seven hundred patients, which has allowed her to draw some preliminary conclusions about the effect of ACEs on the local population.

It is difficult to directly compare ACE scores among Burke's patients with those in the original Kaiser sample. The Kaiser patients were looking back from adulthood on their entire childhood; the median age of Burke's patients is a little more than seven, and in many cases their ACE scores are just starting to add up, and will continue to rise through adolescence. Their current scores may also often be artificially reduced by the fact that parents generally provide the responses for young children, and they are unlikely to volunteer that their children are the victims of, say, emotional neglect. Even so, Burke's data reveal some interesting patterns.

Sixty-seven per cent of her patients have had one or more ACEs, and twelve per cent have had four or more. Although it is too early for Burke to study chronic maladies, such as obstructive pulmonary disease, in her patients, she has been able to demonstrate a strong correlation between ACE scores and problems in school. In a paper that Burke and several co-authors will soon publish in *Child Abuse & Neglect*, they report that just three per cent of her patients with an ACE score of 0 display learning or behavioral problems. Among patients with an ACE score of 4 or higher, the figure is fifty-one per cent.

At the Bayview clinic, having the patients' ACE data, and a theoretical framework for discussing the effects of trauma, has inspired Burke and her colleagues to be more vigilant about abuse and neglect. It also makes them more likely to help children get the social services they need, and better prepared to talk to parents early about the importance of secure attachment.

For some children, Burke prescribes one or more psychological therapies. Whitney Clarke, the psychologist who

introduced Burke to the ACE study, has an office at the clinic, and regularly sees about a dozen of Burke's patients. To treat younger children growing up in high-risk homes, Burke is collaborating with Alicia Lieberman, a leading San Francisco psychologist who is a pioneer of child-parent psychotherapy, which enables therapists to work simultaneously with children under five and their parents. Perhaps not surprisingly for a resident of San Francisco, Burke embraces alternative therapies as well. She refers a few patients each month to a biofeedback clinic at a hospital in Presidio Heights, where the children practice self-calming exercises while watching schematic representations of their vital signs on a computer screen. She has steered some teen-age patients toward meditation, yoga, and a relaxation technique called Mind Body Awareness.

The next step, according to Burke, is to combine these interventions. She has begun creating a network of resourceful and like-minded San Franciscans who want to expand the ambitions of her clinic. In 2006, Burke met a young local philanthropist named Daniel Lurie, an heir to the Levi-Strauss fortune; his foundation, Tipping Point Community, began contributing to the clinic before it had even opened. In the spring of 2008, Burke met Kamala Harris, then the San Francisco district attorney (and now the attorney general of California); Burke told her about the ACE research, and Harris said that she wanted to help. Harris then introduced Burke to Victor G. Carrion—the director of a research program on early life stress at the Lucile Packard Children's Hospital, a Stanford facility—and Katie Albright, the daughter of Madeleine Albright, the former Secretary of State, and the executive director of the San Francisco Child Abuse Prevention Center. Now Burke, Lurie, Harris, Carrion, and Albright are working to open a new center for child services in Bayview-Hunters Point that would include a medical clinic, family-support services, a child-abuse-response program, and an expanded staff of social workers and psychotherapists, as well as space for biofeedback and other stress-reduction therapies. Soon after meeting Burke, Harris helped direct two million dollars in city funds toward the new center. Last May, Tipping Point Community raised four million dollars for the center in a single evening. Lurie and Burke say that the new center is on track to open next year.

Burke's goal is a treatment protocol, like the one doctors use when they're dealing with cancer or diabetes. "For cancer patients, someone comes in, they have stage-four breast cancer, they're BRCA-negative, they have these different types of comorbid factors," she explained one day last fall. "As a doctor, you can look up that combination of indicators, and you know what to do. I would love to see a treatment protocol that says, you know, this child comes in, she's six years old. She has a history of intrauterine drug exposure and domestic violence." Burke ticked her way down an imaginary medical chart. "She is here today following removal from the home and foster-care placement after six years of physical and emotional abuse by dad and neglect by mom. And she's manifesting A, B, and C symptoms. And you could say, 'O.K., let's start with twelve weeks of biofeedback, overlaid with a one-year course of insight-oriented therapy, and go from there.' " One patient might need to be removed from an abusive home; another might benefit from a course of antidepressants or a better diet. Burke acknowledges that it will take a lot of work to get her field to the level of practical coherence where, say, oncology is today. But she also contends that the only way to even approach that goal is to begin testing different combinations of therapies in a clinical setting.

For many of Burke's patients, especially the older ones, it's going to be very difficult to reverse the effects of years of adversity. In many ways, Monisha Sullivan has flourished under the care of the Bayview clinic. Her asthma is under control, and she has finally had a full set of immunizations. In 2009, she was assigned to yet another foster home, in Oakland, and she and her new foster mother, a grandmotherly type named Ethel Holmes, found a way to coexist without door-slamming fights. Sullivan started therapy with Whitney Clarke, and had so much to tell him each week that she asked if they could schedule sessions lasting ninety minutes, instead of the usual fifty. She worked hard to develop a stable relationship with her father, and her connection with her daughter grew tighter. "When I first had Sarai, I didn't hate her, but I didn't love her," she told me last September. "But I really love her now." Last spring, she graduated from high school, and she started college in the fall, taking classes in theatre and video production at a San Francisco art school.

Yet, last fall, as I visited Sullivan every month or so, it seemed that each time we spoke there was a new setback. School was a challenge. There was never enough money. She was assaulted, she said, by an ex-boyfriend she had invited over one night, to stave off loneliness. Then the city told her that she had to move out of her sunny apartment off Fillmore Street to a small, dark place back in Hunters Point.

When Sullivan started school, Holmes offered to keep Sarai with her in Oakland during the week, so that Sullivan could focus on her studies. Sullivan was grateful, but it made her feel guilty and inadequate, and she wondered if she would ever be ready to take care of Sarai on her own. "I'm trying to be everything my parents weren't," she told me. "And it's not working." She was determined to improve her life—her cell-phone ringtone is the Miley Cyrus song "The Climb," an inspirational ballad about overcoming obstacles—but her anxiety had not diminished. "Sometimes the stress is just too much for me to bear," she said one day. "I don't see how people deal with it."

Burke is realistic about the challenges that Sullivan and other patients face, and there are plenty of days, she says, when their problems feel overwhelming, even for her. Nevertheless, she is convinced that her new methodology will give patients a better chance at good health and a good future. "Look, it's not the answer for a hundred per cent of everyone's social problems," she told me. "It's not that if we poured all of our money into treating ACEs the jails would empty out and we would no longer have any kids in special ed. But this is a huge, huge issue, and as a society I don't think we've even come close to grasping its significance." ♦