

# The New Pandemic: SuperStress?

| By Roberta Lee, MD |

It is almost a new year and we're beginning a new decade. These benchmarks in time give us an opportunity to take stock of where we've been, what's happened to us, and where we would like to go from here. If one word could characterize this past decade, I would say that word would be *SuperStress*. The Oxford Dictionary describes *super* as "a high or unusual or excessive degree of a quality," and that description aptly characterizes the type of stress I've watched patients endure. I believe this a result of both the changing nature of our daily lives and our choices in lifestyle habits, as well as a series of unfortunate events. Extreme chronic stress is now causally linked with more diseases than obesity and has silently become a pandemic that disturbs not only how we perceive our quality of life but also our health and mortality.

A doorway to more serious diseases, extreme stress slowly erodes our resilience by negatively impacting how our genes behave and by sapping the nutritional reserves in our bodies. Suffering from, among a myriad of ailments, unprecedented amounts of uncontrollable irritability, explosive anger, depression, anxiety, chronic fatigue, insomnia, and unexplained brain fog, those afflicted with this extreme form of stress are finding it nearly impossible to fully recover. And although many people are characterizing themselves as feeling like they are on the brink of mental or physical collapse, the majority of them are doing so while in the prime of their lives. In 2008, the American Psychological Association issued a report on stress, revealing that nearly half of all Americans were experiencing stress at a significantly higher level than the previous year and rated its level as extreme.<sup>1</sup> In addition, there appears to be a rising number of adolescents and young adults asking for prescription medications. They typically

describe themselves as feeling out of control and, according to a recent study reported by [Theantidrug.com](http://Theantidrug.com), there has been a 300% increase in teenage prescription drug addicts since 1995.<sup>2</sup> Among the most common types of prescription drugs abused were painkillers, anxiolytics, steroids, and antidepressants.

Over the last 10 years, there have been significant changes in our lives that have altered our perceptions of well-being and safety. In 2000, we saw the first sign of a slowdown in our economy, with 116,000 jobs lost in the nation's private sector.<sup>3</sup> Our country also experienced a massive political upheaval during the 2000 US election process; half the nation felt that Bush's victory of the presidency was a glaring mishandling of the electoral process despite the ruling of the Supreme Court of the United States in his favor.<sup>4</sup> For Americans traveling abroad, it was a stressful and rude awakening to feel unwelcome on foreign soil, and the events of September 11, 2001, forced Americans to face their vulnerability at home. As a consequence of that day, every aspect of American life has been affected to ensure that we remain "safe" from terrorism. Codes Red and Orange have now entered the daily vocabulary as part of our travel dialogue. Life is much more of a hassle, an influence too small to call a stress but big enough to be significant nonetheless. In 2003, the United States launched a war against Iraq. For the first time since the Vietnam War, Americans experienced the loss of loved ones from a war and observed a robust US economy buckle from the strain of a war debt that still appears to have no end.<sup>5</sup> In 2006, former Vice President Al Gore launched his landmark film, *An Inconvenient Truth*, which provided evidence that our world of endless bounty, natural beauty, and resources was not as endless as we once thought.

In short, the sensation that our lives and nature are becoming choked with a new and modern lifestyle and are at odds with planetary well-being is not only palpable but is also becoming a reality. In 2007, the financial collapse of the US economy quickly spilled over into the global economy and created worldwide mass havoc. According to the U.S. Bureau of Labor Statistics, in 2006 the unemployment rate stood at 4.6%.<sup>6</sup> In June 2009, the US unemployment rate had swelled to 10%. As if this weren't enough, "expenditures in the United States on healthcare surpassed \$2.2 trillion in 2007, more than three times the \$714 billion spent in 1990, and over eight times the \$253 billion spent in 1980."<sup>7</sup> Unfortunately, hearing about each crisis once a day would be devastating enough, but with streaming news available everywhere, we update hourly.

The impact of these events over a 10-year stretch has left us with the following feelings:

- unsure of our financial stability in the future
- insecure about our job stability and potential for self-sufficiency
- unsafe from random violence
- uncomfortable with the health of our planet and challenged with how to positively change this complicated downward trend
- frightened by the potential loss of a reasonable healthcare plan for ourselves and our loved ones

In other words, we have been challenged on all fronts with significant global messages of instability and uncertainty and have been thrust into situations that stir up emotional conflict and SuperStress.

Focusing on daily life, we can see that modernization has had a significant impact. With less time required for menial

---

tasks, we now have more time for other activities. However, each improvement also seems laden with the hidden potential for contributing to stress. For example, during the industrial age, advances in technology increased productivity and the pace of life during the 19th century. The shift from an agrarian economy to an industrial one encouraged specialization and a high premium on enterprise.<sup>8</sup> It could be argued that the emergence of a heavy emphasis on enterprise and production formed the basis for the excessive workaholicism so prevalent today.

The introduction of artificial light in the late 1800s led to an increase in the number of hours a company could stay open. Nightfall was no longer synonymous with a day's end of work. Sleep and rest cycles protected by nightfall were now altered. When our ancestors "burned the midnight oil," the light's intensity was not enough to disrupt our body's circadian rhythm. Melatonin, a hormone that is responsible for signaling a natural sleep period, is disrupted by artificial light because the body interprets this as sunlight. According to Dr Christopher Gillin, a psychiatrist and professor at the University of San Diego, two generations ago people were sleeping 90 minutes more than a person today.<sup>9</sup> The average nights sleep now is approximately seven hours, an hour less than the suggested eight hours of nighttime sleep. This represents a 20% decrease over the past century in sleep time. Fifty-eight million Americans—one in three people—report suffering from excessive daytime sleepiness that interferes with their day-to-day activities.

Air conditioning and television are two factors that have impacted our patterns of socialization, with consequences for our stress level—people are outdoors less and many are becoming increasingly socially isolated. One hundred years ago, strategies for staying cool included spending more time outdoors, and neighbors typically socialized more as a consequence. Similarly, televisions, computers, and interactive software programs—especially for children and adolescents—have created situations where entertainment can be obtained easily, and in isolation, as a solitary endeavor. A study released in the *Journal of Pediatrics and Adolescents* in 2006 followed 1,037 children from birth through age 26 years, with follow-up assessments at ages five,

seven, nine, 11, 13, 15, 18, and 21 years. They were evaluated for the impact of social isolation on health and behavior in adulthood. Social isolation tended to persist throughout life, and the longer an individual was isolated, the worse their adult health was. The conclusions of the investigators were as follows:

Twenty-six-year-olds who were socially isolated as children were significantly more likely to be unhealthy as adults, as measured by six cardiovascular risk factors, including weight, blood pressure and HDL (good) and LDL (bad) cholesterol levels. This association remained significant even when the researchers considered established childhood risk factors for poor cardiovascular health, such as low socioeconomic status, low IQ and being overweight. Unhealthy adult behaviors, including smoking, drinking and lack of exercise, also could not explain the connection, nor could the greater exposure to stressful situations typically experienced by isolated children in adulthood. In addition, longitudinal findings showed that chronic social isolation across multiple developmental periods had a cumulative, dose-response relationship to poor adult health.<sup>10</sup>

The message here is one that is worth reflecting on: is the impact of interactive game boys, computer games, and increased time Web browsing ultimately adding to the number of adults troubled with heart disease and obesity? And is the new form of communication developing with the advent of social networking in platforms such as Twitter and Facebook enough to break these patterns of isolation and add value to our lives or is it an added liability?

There is no dispute that communication via cell phones, computers, BlackBerrys, and other PDA devices have made access to one another easy. But this open access has broken barriers to our privacy. Dinner engagements are peppered with furtive message checking; boardroom meetings have at least two networks of conversation occurring simultaneously—the presentation on top of the table and the reactions in real time below the table via BlackBerrys and other PDAs. If one looks at the bigger picture of changing work patterns, the impact and contribution to stress that Black-

Berrys and other PDAs have on reinforcing poor work boundaries begins to look much more all-encompassing and unhealthy. In a national survey commissioned by [Expedia.com](http://Expedia.com), one of the largest online travel agencies, it was found that one in six US employees were unable to use up their vacation time because of overwork.<sup>11</sup> Sadly, another study released in 2000 found that 60% of workers brought a mobile device, such as a BlackBerry, on vacation.<sup>12</sup>

Peter Kuhn and Fernando Lozano of the National Bureau of Economic Research investigated the changing profile of American employees' work hours. They found that the number of employed men regularly working more than 48 hours per week was notably higher than it was 25 years ago. The current population survey data from 1979 to 2006 revealed that this increase was greatest among highly educated, highly paid, older men. Those working 50 hours per week rose from 22.2% to 30.5%.<sup>13</sup> Another study looking at US workers, defined as the top 6% of earners in the country (N = 1564), noted that 62% of the individuals worked more than 50 hours per week, 35% worked more than 60 hours per week, and 10% worked 80 hours per week.<sup>14</sup> Among these workers, 42% took 10 or less of their vacation days each year. The price for this intense focus on work was detrimental to the health of their personal lives: 66% of the men and 77% of the women admitted that managing home life was difficult, 46% noted that their relationships with their spouses were strained, and 50% noted an unsatisfying sex life.

Modernization doesn't necessarily bring with it any added convenience or comfort. Our days are longer, we are getting less sleep, and our families and time with our loved ones are being infringed upon by the frenetic communication style made possible by today's increased technology. Furthermore, the potential for reinforcing work and leisure time balance has become more tilted towards workaholicism. Our responses to our surroundings perhaps require more personal discipline in preserving a sane life.

## THE PHYSIOLOGICAL RESPONSE TO STRESS

The adaptive concept known as allostasis, a critical component in our current understanding of how the body responds to stress,

---

was introduced by Sterling and Eyer<sup>15</sup> in 1988. Allostasis emphasizes adjustment in “the internal milieu to meet perceived and anticipated demand.”<sup>15</sup> A common example of allostasis would include the change in blood pressure as we go from sitting to standing to insure that we don’t faint as a result of blood pooling in our feet and inadequately providing blood to our brain. Another example of allostasis would be the fluctuation of hormones such as insulin to accommodate periods of fasting and feasting.

Bruce McEwen, the Alfred E. Mersky Professor at Rockefeller University in New York and an expert in the neurobiology of stress, has broadened the concept of allostasis to include the way acute and chronic stress affects the brain, immune regulation, memory and neuroplasticity.<sup>16</sup> Because the brain is crucial in responding to stressful events, it is the target for the actions of stress hormones. In short-term exposures, the stress response increases the brain’s capacity to remember dangerous situations—clearly an evolutionary strategy for survival. However, with prolonged exposure to stress, catecholamines and steroid hormones released from the adrenals begin to impair memory function to the point that there is significant brain atrophy in areas affecting cognition and memory in both long-term and short-term processing areas.<sup>16</sup> In addition, the brain effects of chronic stress are also influenced by other hormones, including excitatory amino acids such as glutamate. In animal trials, chronic stress seems to raise the level of the amino acid, glutamate, and other neurotransmitters that augment the degrading effects of the stress hormones on the brain. In some individuals, the combination of all of these stress influences has caused a phenomenon identified by McEwen as an excessive “allostatic load.”<sup>17</sup> Allostatic load represents the culmination of a stress response tipping point in which the resilient capacity of the body is overcome and specific parts begin to degrade. When exactly this tipping point is reached is still the subject of research, especially as it relates to posttraumatic stress disorder, anxiety, and depression.

One important aspect of the maladaptive responses to stress that contribute to brain atrophy is that in some people, excessively or chronically elevated levels of adrenal steroids may not be required to

actually produce brain atrophy. In animal models of stress-induced atrophy, ordinary, periodic, adrenocortical stress responses may be all that is needed for the process to occur such as what one might see with *daily* stress.<sup>18</sup> Thus some people may need to find ways to address even what are considered normal and healthy levels of stress hormones and their potential impact on brain aging. Additionally, in humans, the reactions triggering the stress responses, whether sustained or periodic, are partially dependent on the subjective experience and capacity for coping. McEwen suggests<sup>16</sup> that “individuals with a more reactive stress hormone profile will expose themselves to more cortisol and experience more stress-elevated neural activity than other people who can more easily habituate to psychosocial challenges.” According to McEwen,<sup>17</sup> differences in coping styles may be of paramount importance in distinguishing events related to the trauma of posttraumatic stress syndrome and other psychiatric distress states, the course of illness, and damage in the brain. However, studies suggest that a drop in cortisol levels, when they are chronically elevated, seem to add to a favorable response toward recovery from brain atrophy.<sup>19</sup>

The relationship between an increasing allostatic load, aging, and health consequences in elderly adults was recently studied and found to be highly correlative. The findings showed that elevated allostatic indices, as defined by cognitive function, physical capacity, activation of the hypothalamic-pituitary-adrenal axis (which is active in the stress response), body mass ratios, blood pressure, insulin and lipid levels, and immune function and heart rate, not only predicted increased risk for decline in cognitive and physical capacity but also increased risk for cardiovascular disease.<sup>20</sup> Virtually every target organ is affected in one way or another by the stress response. Additionally, there are studies suggesting that there are genetic factors that predispose some to posttraumatic stress syndrome and possibly other states of chronic anxiety.<sup>21</sup>

Ironically, the coping behavior of those experiencing extreme stress often involves engaging in poor eating habits. In the American Psychological Association report released in 2008, approximately 47% of those who have symptoms of chronic

stress reported overeating or eating unhealthy foods, and roughly 38% skipped a meal.<sup>1</sup> Although these statistics point to the need for nutritional counseling for sufferers of extreme stress, nutritional support—especially from physicians—is relatively uncommon with the exception of support provided for those with diabetes, hypertension, and obesity. This problem must be addressed, since nutritional interventions to address nutrient deficiencies and reduce inflammation can play a critical part in the management of stress-induced syndromes.

Herbert Benson, founder of the Mind/Body Medical Institute at Harvard Medical School and a pioneer in stress reduction, characterized an important element of managing extreme stress by defining the relaxation response. Relaxation response-based approaches used in combination with nutritional, exercise, and stress management interventions have proved effective in the treatment of hypertension, chronic pain, mild depression, and anxiety.<sup>22</sup> Recent studies are exploring the impact of the relaxation response on gene expression and cellular metabolism; in 2008, Dusek et al,<sup>23</sup> at the Institute for Health and Healing at Abbott Northwestern Hospital, evaluated 19 healthy, long-term practitioners of a daily relaxation response (RR) practice, 19 healthy controls, and 20 individuals who completed eight weeks of RR training (short-term practitioners), and examined gene expression by using whole blood samples. The findings uncovered significant alterations in cellular metabolism and responses to oxidative stress in long-term and short-term practitioners of daily RR practice. Furthermore, those that practiced some form of the relaxation response daily showed that this practice counteracted cellular damage related to chronic psychological stress. In other words, this study demonstrated how effectively a daily relaxation response exercise can affect not only mood—but gene expression as well—in counteracting physiological stress effects on the body.

In sum, the events of the past decade have been excessively challenging and stressful. The convenience of every aspect of our modern daily lives has come with a hefty price. We are working longer hours, communicating with each other in a more frenetic fashion, and losing more sleep.

Our body's response to this significant internal and external pressure is reaching a saturation point, and we are displaying signs that stress has now reached a toxic (and perhaps deadly) level. Despite this, we are not using information that suggests that lifestyle interventions such as diet, exercise, proper sleep, and daily relaxation exercises can significantly reverse the extreme damage of this new form of stress—SuperStress—to our advantage.

At a clinical level, the standard of care still mostly involves addressing the acute symptoms of stress by using medications and mental health counseling. However, many Americans, despite their awareness of significant stress, are choosing not to seek mental health advice. This suggests that, in addition to mental health counseling, we need primary care practitioners to teach all the ways the relaxation response can be maximized, as well as provide increased nutritional and lifestyle counseling. How should we deliver a more integrated preventive care for stress reduction?

Benchmarks in time present opportunities for reflection. There are a growing number of publications indicating that the stress and relaxation responses are intricate and systemic phenomenon involving complex systems. Perhaps our clinical management of this more extreme type of stress is too limited given the pervasive all-encompassing nature of its effect on our bodies. As we reexamine our approach to healthcare over the coming months and years, we must continue to find ways to promote the integrative type of approach that is needed for this new epidemic.

## REFERENCES

1. American Psychological Association. Stress in America 2008 Executive Summary. Available at: <http://www.apa.org/releases/women-stress1008.html>. Released October 7, 2008. Accessed August 9, 2009.
2. Office of Applied Studies, Substance Abuse and Mental Health Services Administration. *Results from the 2006 National Survey on Drug Use and Health: National Findings*. Available at <http://www.oas.samhsa.gov/NSDUH/2k6NSDUH/2k6Results.pdf>. Accessed August 11, 2009.
3. June 2000. Slow down in economy signaled. Information Please Database. Available at <http://www.infoplease.com/ipa/A080115.html>. Accessed August 8, 2009.
4. December 2000. Supreme Court seals Bush victory. December 12, 2000. Available at <http://www.infoplease.com/ipa/A0801117.html>. Accessed August 8, 2009.
5. 2003. U.S. and Britain launch a war against Iraq. March 19, 2003. Available at <http://www.infoplease.com/year/2003.html>. Accessed August 8, 2009.
6. US Bureau of Labor and Statistics. 2006 Annual averages—household data, tables from employment and earning. Available at: [http://www.bls.gov/cps/cps\\_aa2006.htm](http://www.bls.gov/cps/cps_aa2006.htm). Accessed August 8, 2009.
7. U.S. healthcare costs. Available at: [http://www.kaiseredu.org/topics\\_im.asp?imID=1&parentID=61&cid=358](http://www.kaiseredu.org/topics_im.asp?imID=1&parentID=61&cid=358). Accessed August 8, 2009.
8. Industrial revolution. Available at: <http://www.history.com/encyclopedia.do?articleId=212673>. Accessed August 8, 2009.
9. *The Infinite Mind*. Insomnia. Week of March 31, 1999. Available at: <http://www.lcmedia.com/mind9911.htm>. Accessed August 8, 2009.
10. Caspi A, Harrington HL, Moffitt TE, Milne BJ, Poulton R. Socially isolated children 20 years later: risk for cardiovascular disease. *Arch Pediatr Adolesc Med*. 2006;160:805-811.
11. Overworked Americans can't use up their vacation time. Available at: [http://www.hrsguide.net/usa/worklife/unused\\_vacation.htm](http://www.hrsguide.net/usa/worklife/unused_vacation.htm). Accessed September 29, 2009.
12. Accenture survey finds 83 percent of U.S. workers stayed connected to their offices while on summer vacation. September 2000. Available at: [http://accenture.tekgroup.com/article\\_display.cfm?article\\_id=3619](http://accenture.tekgroup.com/article_display.cfm?article_id=3619). Accessed August 9, 2009.
13. Kuhn P, Lozano F. The expanding workweek? Understanding trends in long work hours among U.S. men, 1979–2006. *J Labor Economics*. 2008;26:2, 311–343.
14. Hewlett S, Luce C. Extreme jobs: the dangerous allure of the 70 hour work week. *Harvard Business Review*. 2006;49:59.
15. Sterling P, Eyer J. Allostatic: a new paradigm to explain arousal pathology. In: S. Fisher S, Reason J, eds. *Handbook of Life Stress, Cognition and Health*. New York, NY: John Wiley & Sons; 1988:629-649.
16. McEwen B. The neurobiology of stress: from serendipity to clinical relevance. *Brain Res*. 2000;886:172-189.
17. McEwen B. The neurobiology and neuroendocrinology of stress implications for post-traumatic stress disorder from a basic science perspective. *Psychiatr Clin N Am*. 2002;25:469-494.
18. Kirschbaum C, Prussner JC, Stone AA, et al. Persistent high cortisol responses to repeated psychological stress in a subpopulation of healthy men. *Psychosom Med*. 1995; 57:468-474.
19. Starkman MN, Girodani B, Gebrski SS, Berent S, Schork MA, Steingard DE. Decrease in cortisol reverses human hippocampal atrophy following treatment of Cushing's disease. *Biol Psychiatry*. 1999;46:1595-1602.
20. Seeman T, Singer B, Rowe J, Horwitz R, McEwen B. Price of adaptation—allostatic load and its health consequences: MacArthur studies of successful aging. *Arch Intern Med*. 1997;157:2259-2268.
21. Seedat S, Niehaus D, Stein D. The role of genes and family in trauma exposure and post traumatic stress disorder. *Mol Psychiatry*. 2001;6:360-362.
22. Stefano G, Gricchione G, Slingsby B, Benson H. The placebo effect and relaxation response: neuroprocesses and their coupling to constitutive nitric oxide. *Brain Res Rev*. 2001;35:1-19.
23. Dusek JH, Otu H, Wohlhueter A, et al. Genomic counter-stress changes induced by the relaxation response. *PLoS One*. 2008; 3:e2576. Available at: <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0002576>. Accessed August 10, 2009.

---

**Roberta Lee, MD**, is Vice Chair of the Department of Integrative Medicine at Beth Israel Medical Center, one of the first Integrative Medicine Departments in an academic medical center. Recognized as an expert on the use of alternative and integrative therapies and botanical supplements in optimizing wellness and managing chronic disease, her book, *The Super-Stress Solution*, will be published by Random House in the fall of 2009.