Stress: The Most Productive Primary Prevention Target?

Preliminary White Paper

JoyWalk.org

The purpose of this White Paper is to document the connection between psychological stress and health and well-being outcomes. It is preliminary because additional information is being added to a more comprehensive version.

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Stress:

The Most Productive Primary Prevention Target?

A White Paper

This paper provides background on the far reaching effect stress has on health. During her presentation, Dr. Joy will present *Managing Stress to Improve Population Health and Patient Engagement* with evidence and experience-informed strategies that reduce stress and improve patient engagement.

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Executive Summary

Psychological stress is a ripe target for primary prevention of morbidity, mortality, injuries, and accidents. Improved emotion regulation and stress coping skills revealed by research over the past decade provide the opportunity to significantly reduce perceived and experienced stress. Countries, including the UK and Greece, have recognized the detrimental impact of stress on population health and mandated employers to reduce occupational stress to acceptable levels.

Psychological stress has an adverse impact on:

Maternal Stress during Gestation

- Health of offspring at and after birth
- Birth weight and duration of gestation
- Perinatal period complications
- Health across the life span

Childhood Stressors

- Increased risk of drug and alcohol abuse
- Increased risk of mental illness
- Increased risk of teen pregnancy
- Increased risk of involvement in criminal activity
- Decreased likelihood of high school graduation
- Decreased likelihood of college admission
- Decreased likelihood of college graduation
- Increased risky behaviors (e.g., driving recklessly, not wearing seatbelts and condoms, etc.)

Workplace Stress

- Worse perceptions about work increase burnout and disengagement, both of which increase the risk of morbidity including fatigue, hypertension, and obesity.
- Social support at work is protective against the detrimental effects of chronic stress. Toxic, uncivil, and unsupportive workplace environments add to chronic stress to decrease employee well-being.
- The health outcomes experienced by employees differ in line with whether the organization (overall score, supervisors, and co-workers) is viewed as supportive of a healthy work environment. Employees whose workplace scores as consistently positive experience better health than workgroups that are average or negative. Average groups fare better than consistently negative groups on employee well-being.[1]

General Stressors

- Increased risk of mental illnesses
- Increased risk of a broad spectrum of mental and physical illnesses

Disaster-related Stress

- Increased serious mental health problems
- Increased intimate partner violence (+31%)

Health-related Behavior

- Worse food choices
- Decreased physical activity
- Lower quality and duration of sleep
- Less social support (social support is protective against deleterious outcomes from stress)
- Increased addictions and maladaptive drug and alcohol use including binge drinking

Outcomes Associated with Improved Stress Management

- 50% reduction in development of cardiovascular disease[2]
- Reductions in a broad spectrum of chronic illnesses

Research has provided us with much better tools than we had a dozen years ago. These new tools allow us to address psychosocial stress inexpensively with large groups. Unmanaged or poorly managed stress increases the incidents of mental and physical illnesses and contributes to undesirable behaviors including addiction, crime, and violence.

Throughout this paper, I've relied heavily on researchers to speak the points for me. Researchers are shouting that stress makes people sick. With the improved tools available, we have no excuse not to pay attention. This is a solvable problem.

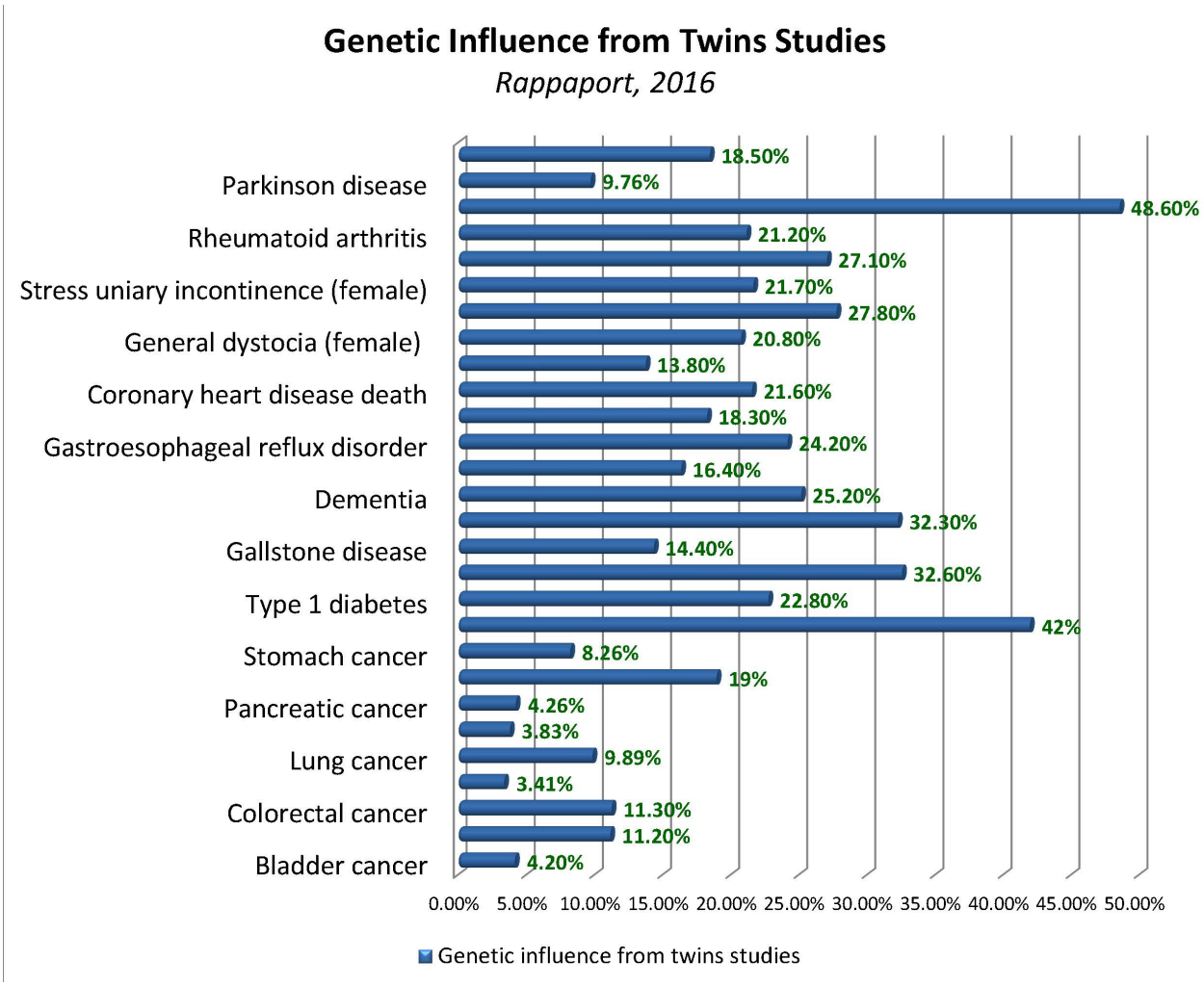
If Genetics is not the Holy Grail, What is?

Excitement and anticipation was in the air as the human genome mapping project was nearing completion. When the ambitious project was finished, the end result did not satisfy our high and hopeful expectations.

Health research is genome-centric in its view of causation. The influence of media attention to genetics and the ability to detect and manipulate genes has led to the illusion that genetic factors are the determinants of health.[3] Genetics only contribute more than 40% of the cause in two diseases, thyroid autoimmunity at 42% and asthma at 49%.[4] Cancers have a median contribution from genetics of 8.26%; neurological diseases have a median of 26.1%; and lung diseases have a median of 33.6%.[5]

Genetics x exposures during life, including psychological and physical exposures, are required to determination causation of illnesses and diseases with any accuracy.

A PubMed query with the keywords "disease causes AND genetics" produced 685,089 results on July 21, 2018; a search with the keywords "disease causes AND exposure" produced 86,060 results. Genetics is responsible for less than 50% of the cause of illnesses and diseases in any category, yet it receives eight times more attention in the research.



Epigenetics

We now know that stress can flip DNA/RNA switches and turn on pathology for diseases that seem to remain dormant in the absence of acute or chronic stress.

"It can be concluded that changes in gene expression and their association with behavioral traits or psychopathologies remain among the more powerful experimental tools to uncover the mechanisms leading to brain disorders. Recent findings demonstrate that complex "epigenetic" mechanisms, which regulate gene activity without altering the DNA code have long-lasting effects within the mature neurons."[6]

"Major Depression (MD) is a complex, multifactorial disorder that will not be solved by a single gene.[7] However, "increasing evidence reporting gene x environment (G x E) effects in MD, with **stress often representing the key environmental trigger of MD onset in vulnerable individuals**."[8]

Re-Focusing on Primary and Primordial Prevention

Historically, primordial prevention contributed more to life expectancy increases and quality of life than all other health promotion efforts combined.

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"Public health historians . . . calculate that the majority of the life expectancy increase during the last 200 years resulted from control of infectious diseases, more abundant and safer foods, better sanitary conditions, and other nonmedical social improvements."[9]

Public perception largely attributes increases in life expectancy to advances in modern medicine.[10] This misguided perception leads to over reliance on modern medicine to maintain health. Individuals abdicate their role to their physician which has resulted in epidemic level increases in chronic illnesses.

The benefits of Primary and Primordial Prevention are far from the consciousness of the average citizen in 2018. When prevention is mentioned, whether by a layperson or the CDC, the focus is on secondary prevention.

Tuberculosis was the leading cause of death in 1900 accounting for 11.5% of all deaths. When individuals are asked how TB, which was also known as consumption, phthisis, or the white death, to .2% in 2016[11], the vast majority of individuals incorrectly attribute the decline to modern medicine.[12]

"The public is unaware that the most important health determinants are often found outside of hospital walls."[13]

> *"The public is unaware that the most important health determinants are often found outside of hospital walls."*[14]

Primary prevention has saved millions of lives. This chart shows the strong impact Primary Prevention had on the leading cause of death in 1900. The introduction of antibiotics improved treatment, not prevention. Primary Prevention is the reason Tuberculosis is rare in the United States.

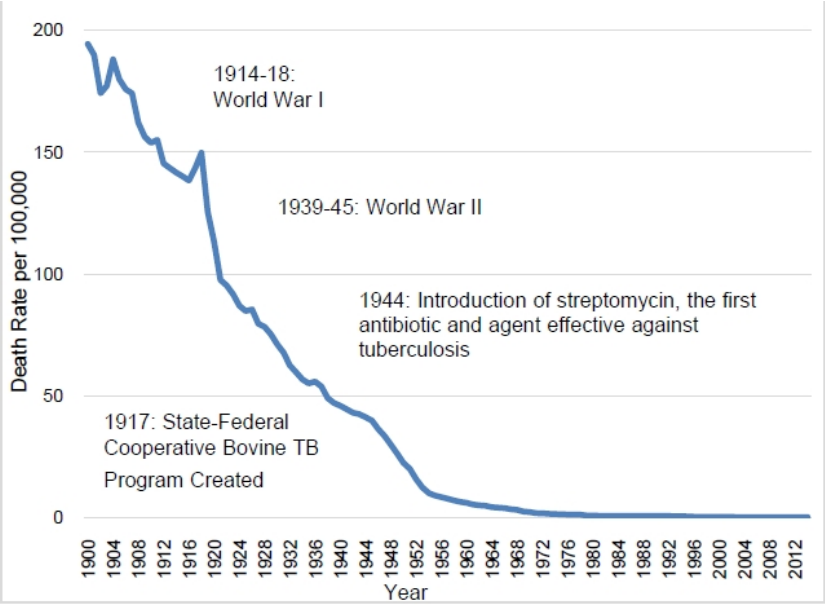

Figure I Merrill RM, Lindsay GB, Hedin RJ, 2014

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"Health education programs beginning as early as 1889 promoted improved housing conditions, personal hygiene, and overall cleanliness, as well as instruction on how to properly sneeze and cough and against spitting in public."[15]

"Overlooking the contributions of the social determinants of health and the public health's historical role in mortality decline may lead to creating health policies that rely too heavily on medicine as the primary way to improve population health. By giving most or all of the credit to modern medicine, contemporary efforts to address social determinants of health and public health interventions, which have a greater ability to improve population health, are likely to be neglected and underfunded. Misattribution of credit may also contribute to overfunding the medical sector of the economy and impede efforts to contain health care costs."[16]

"When people don't understand the connection between public health and primary prevention and health outcomes, "people will be less likely to support public health interventions or policies that seek to improve population health by addressing health disparities and circumstances shaping health by the distribution of money, education, power and resources (social determinants of health)."[17]

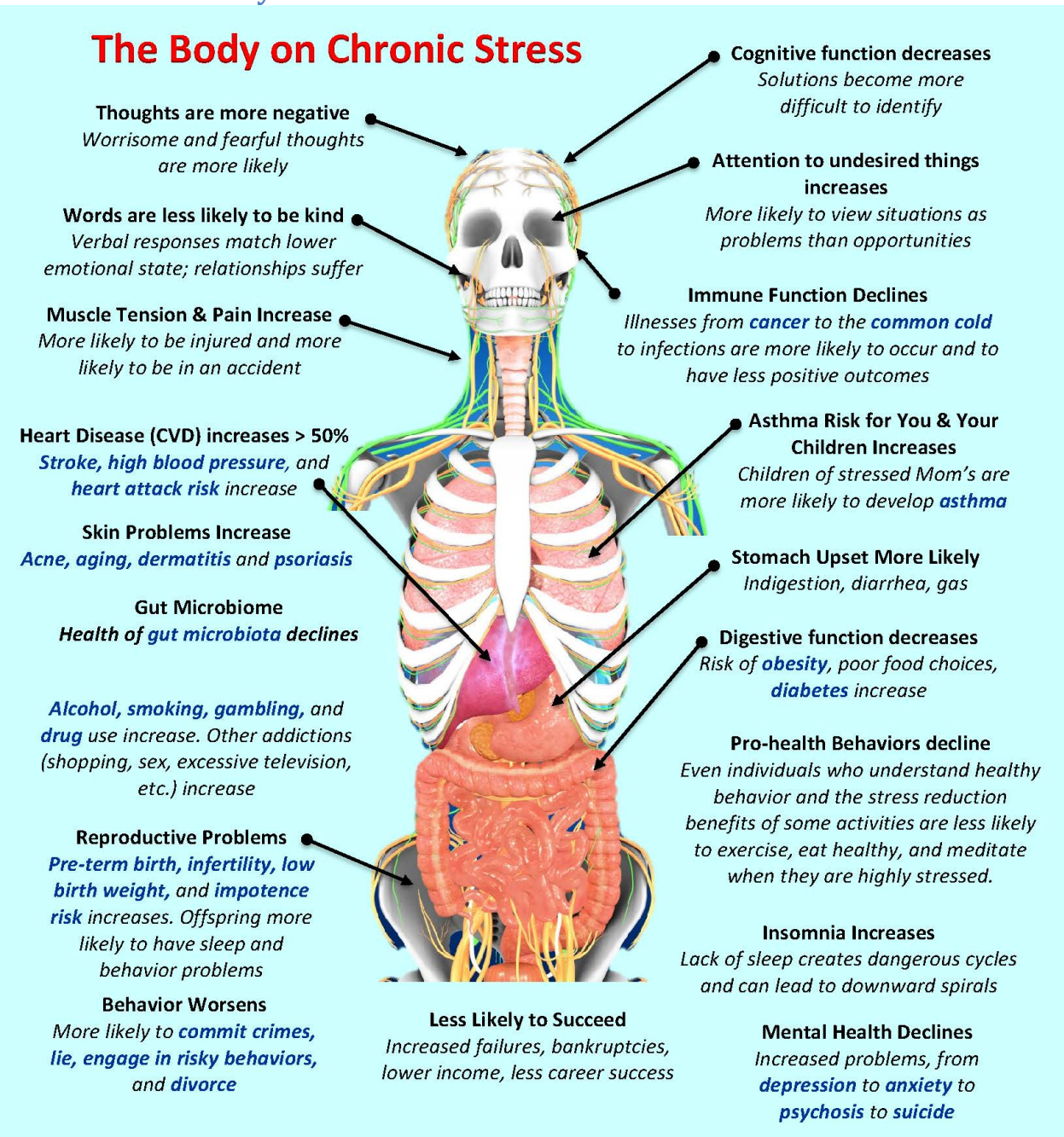
"Efforts to improve the nation's health in a democratic society are strongly influenced by the public's belief that interventions are effective. When people are unaware of the major role that non-medical health interventions play in reducing leading causes of death, they will be less likely to support contemporary endeavors that address these non-medical factors. Conversely, when people perceive that modern medicine is the primary reason why the nation strongly reduced leading causes of death, they may be suspicious and unsupportive of societal efforts to curtail the overuse of expensive medical technology and redirect resources to other health determinants."[18]

Chronic Stress contributes to chronic illness and premature deaths at a far greater degree that TB did in 1900.

In 2012, researchers at the Harvard School of Public Health reviewed two hundred studies on the association between psychological well-being and cardiovascular disease. They found strong evidence for **multiple pathways through which psychological well-being reduced the incidence of heart disease including increased pro health behaviors and biological functions.**[19]

We've had robust research indicating a connection between psychological ill-being and adverse health outcomes. When we study healthy people, we learn that healthy people have health promoting habits including traits that increase resilience and decrease the experience of psychological stress.

Overview: The Body on Chronic Stress



Background

Humans have a tendency to ignore things that are commonplace; we take them for granted. This paper brings together research documenting the enormous influence stress has on physical and mental health, relationships, crime, and overall positive or negative outcomes in every life.

Demonstrating the important impact of stress in our lives doesn't help unless there are solutions. When the health impact of stress was recognized more than fifty years ago, the

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general advice was useless. It was not evidence-based and created a new source of stress, stress about being stressed. A recent study affirmed that perceiving stress as “dangerous” or “harmful” increases the associated health decrements.[20]

During her talk at MGMA’s 2018 Conference in Boston, Dr. Joy will discuss exciting research that finally provides effective tools that help individuals reduce the amount of stress they experience in response to acute stressors and daily hassles. These strategies reduce stress for everyone, whether they spend their days in boardrooms or in a box under a bridge. Strongly supported by research and her experience teaching groups from widely divergent areas of society, the opportunity to reduce the amount of cumulative stress experienced and speed recovery from stressful events and reap the health benefits is clear.

Fifty years of being admonished to “Think Positive” was met with “How?” A clear answer is finally available; one that makes life-changing differences for individuals from all walks of life.

Social Determinants of Health

From an interview with a Ph.D. student in public health:[21]

> Q. How is the current system failing to address social determinants of health?
>
> A. The clinical world has not paid attention to the social determinants (public health world). Social determinants say there is a root cause that needs to be addressed.
>
> The integration of social determinants is critical for physical and mental health.
>
> Q. Is it up to the clinical world to teach the public or is it someone else’s job?
>
> A. It is the job of public health to provide this knowledge. The problem is public health has inadequate funding and attention. How often do you see a public health official interviewed by the media? The media interviews individuals from the clinical health world which adds to the distorted perception that clinicians are responsible for our individual health outcomes.
>
> The clinical world can definitely help raise awareness although clinical training tends to encourage a clinical focus so beginning during their training they could increase awareness about public health solutions.

The social determinants of health are frequently ignored by the general public who tend to think the hospital can fix anything they mess up with poor health decisions.

The prevalence of chronic stress and acute stress contributes significantly to morbidity and premature mortality. In a study of college students, more than 20% reported experiencing a serious life event during the past three months.[22] The average poor mental health days among adults in counties across the country is over 3 days a month and some counties report significantly higher rates.[23]

Thoughts Precede Reality

The World Health Organization (WHO) defines health as a "State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity."

It may seem that we don't have the time, energy, or resources to pursue well-being on that level when we are faced with an epidemic of chronic diseases. It's time to step out of the box.

Positive health promotion, especially primary prevention, can reduce the chronic disease burden by keeping individual's healthy, increasing patient compliance, and speeding recovery.

Research in positive psychology has demonstrated that individuals who are resilient, psychologically flexible, and open to new experiences are not only happier and more successful; they enjoy better health and live longer including lower incidents of chronic and debilitating diseases in old age.

The health of the body appears to begin in the mind. We've moved beyond the Placebo Effect to an understanding that genetic dispositions have switches that appear to be turned on by stress and remain off when individuals have healthy psychological traits.

Psychological traits and habits that reduce stress provide positive long-term benefits at the genetic and biological level of physical health.

Stress has an adverse impact on health through several pathways:

Biology, including but not limited to:

- Metabolism
- Immune Function
    - Prolonged wound healing
- Gut Microbiome
- Hypothalamic-Pituitary-Adrenocortical (HPA) Axis
- Epigenetic
- Health behaviors and decisions
- Autonomic Nervous System (ANS)
- Decrements in relationship health (as stress increases, relationship health worsens)
- Increased stress reduces success which can also increase financial strain

Both mental and physical health can be viewed through three lenses:

- Maintenance
- Restorative
- Deteriorative

It does not make sense to limit our view of these processes to actions when habits of thought affect the outcome significantly.

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For example, **Positive Psychological Well-Being** (PPWB) seems to be "positively associated with restorative behaviors and biology."[24]

Resilience is associated with better health. Resilience, unpacked, is primarily comprised of three psychological characteristics:

- Optimism
- Healthy Self-Esteem
- An Internal Locus of Control

Hardiness, like resilience, is associated with increased well-being.[25] Hardiness contributes to increased resilience because a hardy person perceives their experiences as less stressful compared to perspectives that are not hardy. There isn't necessarily one right way to perceive any given situation; each choice we make about how to perceive a situation has downstream effects on psychological stress, biology, as well as the actions we choose to take related to the situation. Psychologically flexible individuals are able to choose from a variety of possible interpretations of a situation. Leaning toward less stressful perspectives reduces stress.

Hardiness Characteristics	Not Hardy Characteristics
Commitment	Alienation
Control	Powerlessness
Challenge	Threat

"The interactive combination of commitment, control, and challenge defines hardiness as the existential courage to face stressful circumstances openly and directly, and the motivation to do the hard work of dealing with them constructively."[26]

"Hardy attitudes lead to maintenance and enhancement of performance under stress. In contrast, low-hardy individuals tend to engage in avoidance coping styles, such as cognitive and behavioral disengagement and denial, to deal with a stressful situation as the existential courage to face stressful circumstances openly and directly, and the motivation to do the hard work of dealing with them constructively."[27]

The behaviors of a hardy person differ from those of someone who is not hardy:[28]

- Persons strong in commitment believe that they can find something in whatever is going on that seems interesting or important. They are unlikely to engage in denial or feel disengaged.
- Persons strong in control believe they can beneficially influence outcomes through effort and they are unlikely to feel powerless.
- Those strong in challenge believe that life is best when they continue to grow in wisdom through learning from experiences, whether positive or negative. They are unlikely to expect uninterrupted comfort and security.

Reality is flexible. The interpretation two people experiencing the same situation whose basic circumstances are the same can be significantly different. Our mind will automatically create a

back story to make sense of our experience. We can consciously or unconsciously choose to accept the default meaning our mind supplies or we can consciously choose a different perspective. Bereaved spouses that "make meaning of the experience earlier in the process are less likely to experience psychological maladjustment."[29]

Finding benefits (a silver lining or a blessing in the wound) in our perception of an adverse or traumatic event leads to fewer depressive symptoms and higher levels of well-being according to a meta-analysis that reviewed 87 studies about individuals who experienced traumatic events.[30]

Self-awareness is both a primary means of alleviating psychological distress and the path of self-development for psychologically healthy individuals. Four decades ago, Feinstein et al. wrote that "increased awareness of the self is both a tool and a goal . . . The importance of self-awareness goes beyond well-being and mental health to include substantial impacts on day-to-day functioning. It has important effects on performance, with reflection and mindfulness encouraging persistence with tasks despite performance-related stress and rumination related to interpersonal difficulties."[31]

Primary Prevention

A lengthy perusal of the Center for Disease Control (CDC's) website revealed that they are ignoring Primary Prevention possibilities. When they list the risk factors, they begin with behaviors that are influenced, often strongly influenced, by how much stress the individual is experiencing.

CDC's Common Risk Factors[32]

Much of the chronic disease burden is attributable to a short list of key risk factors; most US adults have more than one of these risk factors:

- High blood pressure
- Tobacco use and exposure to secondhand smoke
- Obesity (high body mass index)
- Physical inactivity
- Excessive alcohol use
- Diets low in fruits and vegetables
- Diets high in sodium and saturated fats

If we don't let folks know that stress is making it harder for them to control their behavior and make good choices they won't know that reducing stress will help them achieve other goals.

Indicators of Stress

The vast majority of chronic health conditions have a relationship with chronic stress. The relationship may be caused by:

- Biological changes caused by exposure to stress
- Behavioral changes caused by chronic stress
- Epigenetic changes (or switches turned on) by chronic stress

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- Reduced social support that stems from decrements relationships experience when exposed to chronic stress

In many cases, the condition follows more than one pathway. The body and mind function best when stress is managed to low levels. My theory is that the profusion and redundancy of ways our mind and body signal that we are experiencing stress is the body's way of saying "Help me! Help me!"

The origin of stress begins with our thoughts. If we feel capable of dealing with a situation, we experience far less stress than we do when we feel incapable. Experiments repeatedly demonstrate that how capable we feel is easily modified before and after the fact. Simple priming methods effectively lower stress in otherwise stressful situations.

As soon as we think a thought, redundant systems provide feedback through our emotion and energy that provide immediate information about whether the thought is increasing, decreasing, or maintaining the same level of stress we experienced before we thought the current thought.

If stress wasn't critical to health, the body's feedback system would not provide immediate feedback or redundant feedback. The body is designed to survive. If we ignore the initial indicators of stress, the body's response shouts louder. Indicators of stress are embodied in our physical body, our behavior, our psychology, and our ability to think.

Physical	Behavioral	Psychological
Muscle tension	Hurrying	Irritability
Headaches	Increased accidents	Less emotional control
Exhaustion/fatigue	Decreased productivity	Often worried
Weight changes	Increased use of drugs	Feeling overwhelmed
Sleep disturbances	Increased use of alcohol	Easily frustrated
Teeth grinding	Unhealthy eating patterns	Thoughts of running away
Frequent illnesses	Isolation	Loss of sense of humor
Stomach aches	Cigarette smoking	Difficulty making decisions
Hypertension	Procrastination	Crying spells
Sweating or trembling hands	Conflicts with others	Intense bouts of anger
Sexual dysfunction	Restricted breathing	Attitude critical of others
Diarrhea or constipation	More sedentary	Restlessness
Back pain	Bossiness	Nervousness
Restlessness	Compulsive gum chewing	Anxiety
Indigestion	Inability to get things done	Boredom, no meaning
Increased pain	Increased relationship conflict	Edginess, ready to explode
Dizziness	Engage in riskier behaviors	Feeling powerless
Racing heart		Loneliness
Ringing in the ears	**Cognitive**	Unhappy for no reason
Immune function decreases	Trouble thinking clearly	Easily upset
Digestive function worsens	Lack of creativity	Burnout
Central Nervous System issues	Forgetfulness	Depression
More accidents	Memory Loss	Anxiety
Increased risk of pre-term births	Inability to make decisions	Suicidal Thoughts
Increased risk of adverse epigenetic changes	Poor concentration	Suicide
Increased risk of adverse behavior and health outcomes in offspring		

I've been collecting indicators of stress from published research for years; each of the indicators appears as an outcome of stress in published research.

Chronic Conditions

In addition to some of the most significant health problems of our time including CVD, Type 2 Diabetes, obesity, and addictions, the following chronic illnesses and problems are associated with the perception of stress:

- Irritable bowel syndrome (IBS)
- Mood Swings
- Chronic Fatigue System (CFS)[33]
- Gulf War Illness (GWI) [34]
- PTSD[35]
- Alzheimer's disease[36]
- Adjustment disorders[37]
- Asthma[38]

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- Rheumatoid arthritis[39]
- Atopic dermatitis[40]
- Functional Somatic Syndrome (FSS)[41]
    - Fatigue
    - Abdominal or musculoskeletal pain
    - Symptoms unexplained by modern medicine
    - Chronic Fatigue Syndrome (CFS)
    - Fibromyalgia syndrome
    - Irritable Bowel Syndrome

FSS "are prevalent in the general population and account for a large proportion of health care visits in both primary and secondary care . . . They cause substantial suffering in patients and lead to a considerable amount of direct and indirect costs."[42]

Although the origin of FSS illnesses is not known, it is considered a stress-related disorder that may also involve genetic factors and/or viral infections.[43]

A high percentage of FSS patients report childhood trauma including emotional, physical, or sexual abuse.[44]

Type 2 Diabetes

"Chronic stress is a strong risk factor for type 2 diabetes . . . Moderate to high stress levels were associated with a **2.4-fold increase** in the odds of diabetes three years later . . . perceived stress levels on incident impaired glucose metabolism in women over a five year period."[45]

An in-depth study indicates optimism can protect against developing Type 2 Diabetes and of developing co-morbid conditions in individuals who have Type 2 Diabetes. "Optimism is a psychological trait characterized by positive expectations about future outcomes that has been associated with better psychological and physical well-being, particularly during times of stress. Optimism is thought to play a protective role in stress-related conditions such as the metabolic syndrome, reduced immune functioning, and cardiovascular diseases. There is considerable evidence that the protective role of optimism may involve in part greater engagement in health protective behaviors Optimism is linked with adaptive coping styles and health protective behaviors (e.g., such as better treatment adherence, lower consumption of saturated fat, increased vitamin intake, as well as increased physical activity; There is evidence that stress may play a role in the development of T2D. Meta-analyses of prospective cohort studies suggest that people exposed to job strain or who work long hours have a greater risk of developing T2D. Other longitudinal studies have also observed an increased risk of T2D in people with a history of moderate and severe childhood abuse or childhood neglect. It has also been shown that higher perceived stress in adulthood increases the risk of T2D in a prospective 35-year follow-up study our results support the assumption that optimism helps people with T2D to preserve a better physiological adjustment to stress. It is plausible that this could make optimistic people with T2D less likely to develop common comorbid diseases. The stress response is an adaptive response to the challenges of the environment through the adjustment of multiple physiological systems, but repeated or sustained stimulation of these systems can

disrupt dynamic responses to acute challenges or stress resulting in impaired stress reactivity and recovery. For this reason, factors such as optimism that facilitate similar responsivity to stressful circumstances in people with T2D as in healthy individuals could help to reduce the consequences. Optimism was related to better physical and mental subjective well-being. Therefore, our results support that an optimistic point of view in T2D is associated with better ratings of subjective physical and mental health, as well as a pattern of stress responsivity closer to that of healthy individuals. Taking into account the damaging impact of chronic diseases on health-related quality of life and psychological well-being, our results provide valuable information about the possible protective role of optimism in a diseased population."[46]

Primordial Primary Prevention efforts should be directed at the general public. Psychosocial stress has a significant negative impact on physical health, mental health, crime and violence, and relationships.

If you visualize one of the automated models of an infectious disease spreading, stress does the same thing. It isn't as fast as a flu epidemic, but it is just as widespread. Stress causes worsening behaviors. When someone is rude to someone else because of stress it often increases stress in the person who they were rude to and that rudeness may be passed along. Escalating stress leads to worse behaviors including theft, rape, violence, and murder. All of those have consequences to society. The stressed parent who breaks a law may go to prison, causing a traumatic childhood event in their child's life that predisposes the child to worse health outcomes across the lifespan.

Everywhere you look, whether it is mental or physical health outcomes or drugs, addictions, or career success—good stress coping skills increase success and their absence worsens outcomes.

Primary Prevention of Crime

Cost	Lowest Per Person Cost	Increased Costs	Significant PP Cost	High PP Cost	Highest PP Cost
Line of Defense	Primordial Primary Prevention	Primary Prevention	Secondary Prevention	Tertiary Prevention	Terminal Prevention
Who it Protects	Everyone	Everyone	Potential Victims	Potential Victims	Potential Victims
Goals	Reduce the amount of crime that occurs	Reduce the amount of crime that occurs	Reduce the amount of crime that occurs	Punish, Deter, Prevent Likely Future Crimes	Punish Prevent Likely Future Crimes
Methods	Prevent Crime by preventing criminal intent before it occurs	Prevent Crime by reducing risk that individuals at risk of being criminals will commit crimes	Police presence, patrols, Laws that penalize wrong doers, Fines	Incarceration Parole	Death Penalty

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Primary Prevention of Mental Illness

Cost	Lowest Per Person Cost	Increased Costs	Significant PP Cost	High PP Cost	Highest PP Cost
Line of Defense	Primordial Primary Prevention	Primary Prevention	Secondary Prevention	Tertiary Prevention	Terminal Prevention
Who it Protects	Everyone	Everyone Target at-risk	Proactively Address MI when it manifests	Patients with debilitating Mental Illnesses	Patients in Crisis
Goals	Reduce experienced and perceived stress Improve stress management and emotion regulation skills	Improve Stress Management and emotion regulation skills	Encourage help seeking early and often when chronic or acute stress are experienced	Day Programs combined with drug rehabilitation	In-patient facilities
Methods	Prevent mental illness by reducing chronic and acute stress	Prevent Mental Illness by training individuals to be more resilient	Trained counselors Clinician training and referrals	Empowering programs and cognitive therapy	Tend to them with loving kindness until they are able to function on their own

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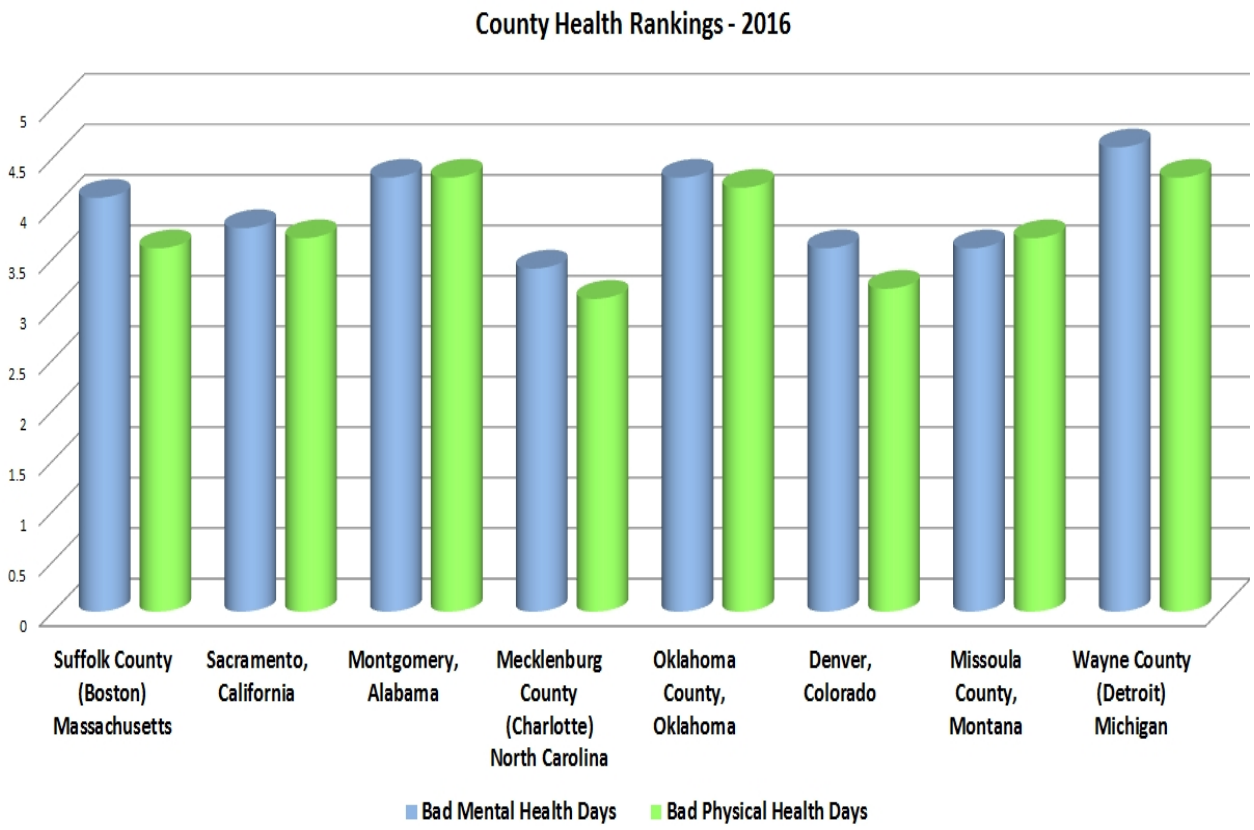
Primary Prevention of Physical Illnesses

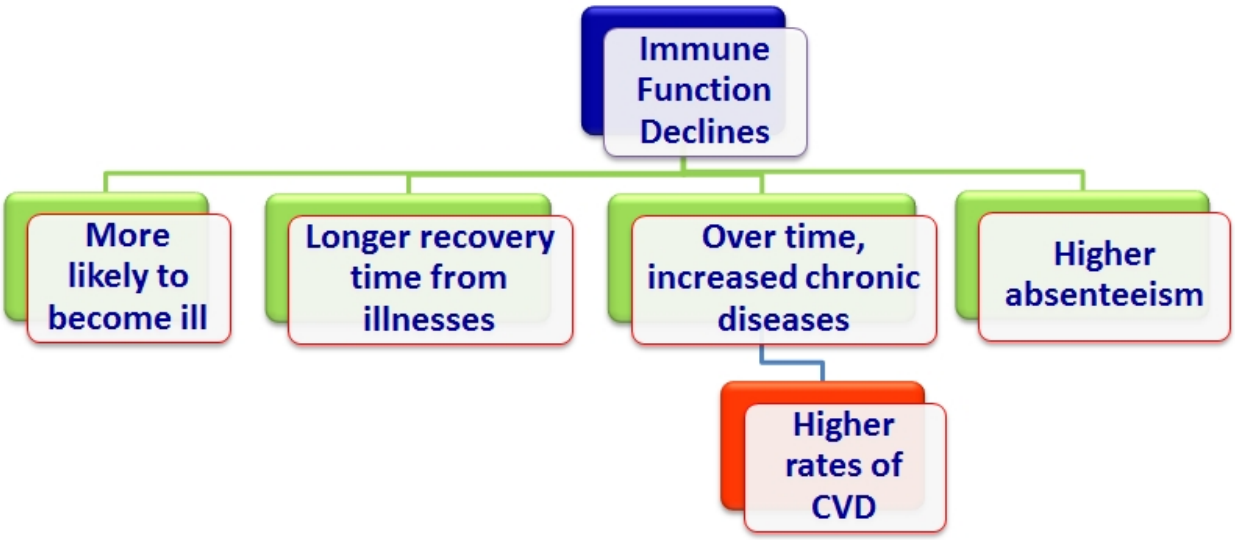
Cost	Lowest Per Person Cost	Increased PP Cost	Significant PP Cost	High PP Cost	Highest PP Cost
Line of Defense	Primordial Primary Prevention	Primary Prevention	Secondary Prevention	Tertiary Prevention	Terminal Prevention
Who it Protects	Everyone	Everyone	People at high risk of illness, early symptoms	High Occupational Stress Risk	High Risk from Environmental Factors
Goals	Reduce the incidence of illness and accidents	Reduce the incidence of illness and accidents	Slow, stop, or reverse the trajectory of illnesses and diseases early	Mandate consideration and mitigation of workplace stress from work policies and incivility	Reduce contributory factors that lead to increased incidence of illnesses and diseases
Methods	Maintain Health by maintaining immune function, increasing pro-health behaviors, strengthening supportive relationships, and good digestive function by decreasing chronic stress	Recognize chronic stress as the earliest symptom of ill health. Encourage individuals exposed to stressful events to apply stress management and emotion regulation strategies Consider the psychological stress implications of legal mandates (i.e. EHR) Immunizations, Sanitary Conditions, Other established Primary prevention Strategies	Strong public and clinician awareness of the link between ill-health and chronic stress that reinforces corrective actions with knowledge, skills development, and social support	Some jobs are inherently stressful. Require training in stress management and a positive, supportive culture. Connection between stress and business outcomes taught in business courses.	Childhood contributors such as neglect, and all forms of abuse, racism and other forms of discrimination will improve as the result of Primordial and Primary Prevention. Apply freed resources to help those who are still at-risk more than we currently help.

We are not doing well at managing psychosocial stress. I've been watching county health rankings for years. Our average poor mental health days run on average between 3.5 – 5 days per month per adult. That's an average so some folks are having good days every day and others have bad days but to have the numbers reflect an average over 10% and almost 15% in some locations means mental health issues are rampant.



Physical Health

One of the primary reasons chronic stress has such an adverse impact on health outcomes is because it can cause the immune system to become dysfunctional. It's not the only pathway through which chronic stress affects health, but it is a significant factor.



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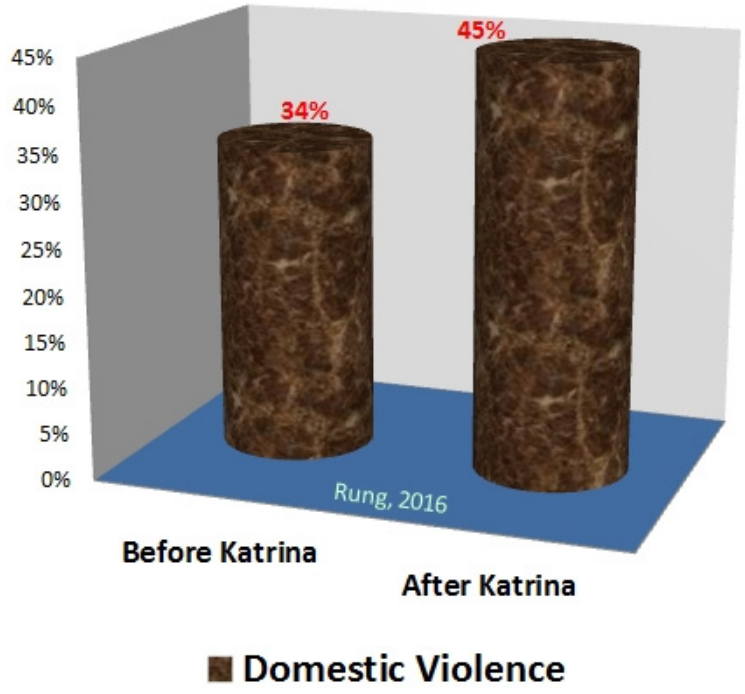
In a large sample of adults, the investigators suggested that in order for FSS to manifest, there had to be an early life trauma followed by chronic stress that triggers the illness. In 30% of the participants, stress predicted increases in active symptoms and stress was required to maintain symptoms.[47] Increasing resilience can help patients reduce their symptoms.[48]

Uncontrollable Sources of Stress

As 5 million barrels of oil spilled into the Gulf of Mexico in the spring of 2010, humans living near the area experienced decrements to their mental health and relationships. The Deepwater Horizon Oil Spill (DHOS) increased reports of:[49]

- Anxiety disorders
- Individuals who experienced 14 or more mentally unhealthy days during the prior month
- Increased financial stress
- Increased major depressive episodes
- Increased thoughts of suicide and suicide planning behavior
- Increased PTSD
- Increased domestic violence

Experiences of domestic conflict and interpersonal violence are associated with hurricane disasters as well as with oil spills.[50] Hurricane related stressors have a significant impact on domestic violence. The aftermath of Hurricane Katrina led to a 31% increase in domestic violence.[51]



The increased stress experienced by women may have contributed to downstream problems with their offspring who were exposed to higher stress during pregnancy.

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While the oil spill was not within the control of individuals who resided in the region, whether the individuals respond from an empowered (strong) psychological position or from a vulnerable psychological position is modifiable. While individuals who are resilient before they face adverse conditions fare better, recovery improves when individuals change their sense of empowerment and locus of control even when the change is delayed by years.[52]

Relationships

Following the Deepwater Horizon Oil Spill, a group of more than 2800 women were studied to determine how the spill affected them. The spill caused a significant increase in stress for individuals in the study group. 16% of the study participants reported that "the number of fights they had with their partners had increased since the oil spill, and 11% reported that the intensity of fights had increased."[53]

Intimate Partner Violence

Significant life stressors are a risk factor for partner aggression.[54] Exposure to intimate partner violence increases depression, generalized anxiety, suicidal ideation, and numerous somatic symptoms.[55] Following Katrina, displaced individuals living in FEMA trailers experienced intimate partner violence at three times the national average and the rate increased another 5% over the next year.[56]

"The level of exposure to Katrina was associated with an increased likelihood of violent methods of conflict resolution among post-partum women in Louisiana. A similar pattern was seen following DHOS."[57]

Identifying the connection between psychological stress and intimate partner violence indicates improved coping skills could be an effective way to reduce intimate partner violence.

"Approximately 1.5 million women are raped and/or physically assaulted by an intimate partner in the United States each year making this a serious public health issue."[58]

Crime

Crime, among children and adults, increases as stress escalates. Even white collar crime increases with stress—it happens every time there is an economic downturn.

"The findings from this research show the significant associations between stress, anger, fighting and bullying behavior, indicating a need for a renewed focus on positive stress response techniques for elementary school children . . . Prolonged exposure to stress can have significant negative health implications for children, including problems such as headaches, abdominal pain, school absenteeism, overeating, and tobacco use. Children from minority, inner-city households are particularly at risk for suffering from stress-induced problems as they are exposed to higher levels of daily stress than other children, are more likely to have stress negatively impact their behaviors and social skills, are more likely to be exposed to violence, and have an increased risk of being a victim of bullying."[59]

Better stress management skills and addressing unacceptable behavior as a problem originating in stress would help decrease the incidences of violence, aggression, bullying and the crimes they lead to when children become adults.

Chronic Stress

Heart disease and diabetes are strongly associated with stress.

Decreased immune function as the result of chronic stress can contribute to numerous causes of chronic illnesses and deaths.

Poor mental health increases the risk of alcohol and drug abuse which can contribute to liver disease.

The literature suggests individuals experiencing stress are more likely to be involved in accident via three pathways: delayed response times, riskier decisions, and fatigue because stress interferes with the ability to sleep.

See Appendix for a CDC chart indicating the ten leading causes of death by age range.

Studies that examine "**the impact of daily stressful events demonstrate the impact of daily stressors on psychological distress should not be underestimated** . . . **Minor stressful daily events are known to have a cumulative negative impact on affect, behavior, and (mental) health status of individuals** . . . Minor stressful daily events are associated with an increase in negative affect (bad mood) and a general decrease in positive affect in clinical and nonclinical population samples . . . **It has been demonstrated that increased negative affective stress reactivity is a risk factor for the development of psychopathological disorders such as depression.**"[60]

Chronic stress is now directly correlated with physical and mental health outcomes experienced by individuals with a history of chronic and acute stress. The experience of chronic stress may be the result of "a negative bias in the appraisal of stimuli, that is, to perceive ambiguous stimuli as a threat."[61]

"When chronically stressed individuals are compared to individuals who experience the same stressors, 53% of the variance can be explained by self-esteem, self-efficacy, and social support."[62]

Individuals who report experiencing high mental distress are twice as likely to have three or four health-risk behaviors than individuals who report only one or no health-risk behaviors.[63]

Stress Analogy

Use a ***rubber band*** to describe stress. In the Sweet Zone, the rubber band is relaxed. As the band is stretched from the sweet zone to the Hopeful Zone, with increasing levels of stress until you reach the powerless zone.

Sweet Zone – *Eustress*

Joy, enthusiasm, and passion

Hopeful Zone – *Slight Stress*

Feeling hope, upbeat, and gratitude

Blah Zone – *Low Stress*

Apathy, boredom, and pessimism indicate someone is in the Blah Zone.

Drama Zone – *Medium Stress*

Life is dramatic in this zone, frustration, irritation, and indignant attitudes are the norm in the Drama Zone.

Give Away Zone – *Medium to High Stress*

Exemplified by blame and pointing at others – essentially giving away the power to change what is not liked.

Hot Zone – *High Stress*

Anger, rage, and revenge are the emotions associated with the Hot Zone.

Powerless Zone – *Horrendous Stress*

Despair, grief, depression, and hopelessness exemplify individuals whose emotional state is in this zone.

When we feel safe, our stress level is lower than when we feel threatened. We can consciously shift our perspective so that we feel comfortable in more situations.[64]

Stress and Health – General

Stress affects health through numerous pathways.

"The American Psychological Association reported that **33% of Americans are living with extreme stress** and 48% of Americans believe their stress has increased over the past five years."[65] Biomarkers indicate that a change at systemic levels of a stressed individual might result in predisposition the person to diseases.[66]

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"Stress has been widely cited as "the 20th century epidemic" and a "worldwide epidemic" according to the United Nations and the World Health Organization. In the U.S. 70% of employees consider the work place a significant source of stress, and 51% report that job stress reduces their productivity. As of 2011, health care utilization as the result of stress costs US companies $68 billion annually and reduces their profits by 10%."[67]

In a longitudinal study of 330 consistently married, dual-earner husbands and wives, the level and rate of change in **work insecurity was related to the change in anxiety symptoms over time**. Similarly, **the level and rate of change in anxiety symptoms during a 3-year period were linked to subsequent illness more than five years later**.[68]

Clinical Focus

"Stress activates the hypothalamic-pituitary-adrenocortical axis and the sympathetic-adrenal-medullary axis, leading to the release of stress hormones (e.g., cortisol and catecholamines) that trigger dysfunctions of the immune system related to various diseases. Here we describe part of this process in a nutshell. On the one hand, cortisol secretion decreases lymphocytes counts (notably natural killer cells), which results in increased vulnerability to diseases and infections. On the other hand, catecholamines induce an elevation of pro-inflammatory cytokines. Abnormally high concentrations of pro-inflammatory cytokines are related to several conditions and risks including cardiovascular risk factors and coronary heart disease, diabetes mellitus, inflammatory and autoimmune diseases, depression and schizophrenia. Indeed, psychological stress predicts a variety of somatic diseases and mental illnesses. Stressed individuals are more at risk of developing depression and psychosis. Somatic complaints related to stress can range from minor or mild symptoms and diseases such as sore throat, headache sand influenza, to life threatening conditions such as heart attacks, cancer, and organ failure. Further, chronic diseases can be triggered by high levels of stress. In particular, the onset of autoimmune diseases is preceded by important stress episodes in 80% of cases. Differentiated exposure to stressors explains part of the gender differences in health."[69]

"High-status individuals have more control, which leads to less experienced stress, whereas lower-status individuals experience more stress and use less efficient coping strategies."[70] It is possible for low-status individuals to develop empowered mindsets. In fact, doing so will enhance their ability to achieve successful outcomes in other domains of their life—at least in countries where upward mobility is not controlled by gender or other labels. "Cognitive appraisals mediate the relationship between stressors and outcomes such as well-being and health."[71]

When situations are perceived as threat threatening, the physiological responses promote exhaustion and disease.[72] When situations are perceived as challenges the appraisals have less damaging outcomes and promote productivity and focus.[73]

Healthy proactive coping skills could offset perspectives that include stress among those living in poverty including:

- Stress from perspectives that elicit bitterness as the result of invidious social comparisons
- The perception of social inequality
- Living in a neighborhood that is deprived in relationship to nearby neighborhoods can lead to additional adverse health outcomes due to feelings of exclusion and stigmatization[74]

"In general, economically deprived groups have fewer buffering resources, making them more prone to stress and therefore more likely to cope via health-risk behavior than higher economic groups."[75]

Stress and Mitochondria, Energetics, Epigenetic, and Cellular Responses

Clinical Focus

"Cells respond to environmental stressors through several key pathways, including response to reactive oxygen species (ROS), nutrient and ATP sensing, DNA damage response (DDR), and epigenetic alterations. Mitochondria play a central role in these pathways not only through energetics and ATP production but also through metabolites generated in the tricarboxylic acid cycle, as well as mitochondria–nuclear signaling related to mitochondria morphology, biogenesis, fission/fusion, mitophagy, apoptosis, and epigenetic regulation.

Recent studies have highlighted the importance of mitochondrial functions in epigenetic regulation and DDR with environmental stress."[76]

"Mitochondrial dysfunction underlies many diseases, combined with altered organellar regulation it is associated with cancers, neurodegenerative diseases, and Type II Diabetes."[77]

Glucocorticoids

Chronic stress is known to change the HPA axis function including changes in glucocorticoid production.

Clinical Focus

"Elevated production of endogenous glucocorticoids are associated with the rare endocrine cancer known as Cushing's disease and with chronic illnesses including osteoporosis, hypertension, mood disorders, muscle and skin atrophy, and increased susceptibility to infection."[78]

All the direct downstream effect of changes in glucocorticoid production are not yet known. We do know it is a probably path to increased morbidity and mortality with pervasive effects on biological processes.[79]

Stress and Heart Disease

Chronic and acute stressors have a deteriorative effect on cardiovascular health. Positive emotions, which reflect low levels of stress, have a restorative effect on cardiovascular health.

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Recent research on the possible involvement of gut microbiota in the etiology of cardiovascular disease is a new area of research.[80] The connection between stress and gut microbiota has shown a connection between the gut microbiome diversity and stress.

Clinical Focus

"Laboratory research on allostatic load, the body's response to chronically stressful life conditions, has established that these psychological responses experienced over time can lead to altered functioning of the hypothalamic-pituitary-adrenal (HPA) axis and to increased risk of cardiovascular disease (CVD). Excess cortisol produced under chronically stressful circumstances contributes to central adiposity (deposits of fat in the midsection of the body), an established risk factor for CVD. Chronic exposure to stressful life conditions is linked to primary hypertension and may contribute to chronic inflammatory processes culminating in atherosclerosis.)"[81]

Across both healthy and patient populations, optimism is the most reliably associated with a reduced risk of cardiac events. In terms of (Positive Psychological Well-Being) PPWB's association with behaviors and biology, studies are significantly[82]

"Dispositional optimism—assessed 1 day before 51 men were to undergo bypass surgery—was associated with a faster rate of recovery in the short-term, as indicated by medical staff ratings and the patient's ability to walk around the room. In a different sample of 300 men and women awaiting bypass surgery, high levels of dispositional optimism were associated with a reduced risk of being hospitalized for CHD-related or surgery-related problems 6 months later. Effects in this latter study remained significant despite accounting for baseline disease severity, cardiovascular risk factors, and depression."[83]

"Among approximately 200 women, those with the greatest optimism had the slowest rate of carotid atherosclerosis progression 3 years later after controlling for a range of cardiovascular risk factors."[84]

Cross-sectional studies "indicate that higher levels of PPWB are positively associated with restorative health behaviors and negatively associated with harmful health behaviors including."[85]

- A reduced risk of smoking
- In older adults, less excessive alcohol consumption
- Increased physical activity
- Better quality sleep
- Consumption of healthier foods

Stress and Physical Activity

Happiness and daily, or regular, exercise was measured a large university sample revealing happiness increases the likelihood that someone will be physically active.[86] The relationship is bi-directional as exercise can also lower stress.

"Some short-term longitudinal studies with cardiac patients have demonstrated positive associations between optimism and increased physical activity."[87]

"One longitudinal study reported a reduced risk of sedentary behavior among people with greater PPWB followed from ages 10 years to 30 years. Each standard deviation increase in childhood locus of control was associated with a 7% reduced risk of a sedentary lifestyle in adulthood, controlling for childhood characteristics."[88]

"PPWB leads to more physical activity. Among 2,100 initially inactive but healthy men and women, the happiest men were more likely to engage in physical activity than were their less happy peers an average of 2 years later."[89]

"In a study of 1,000 community dwelling men and women, individuals with the highest versus lowest levels of dispositional hope or curiosity were less likely to develop incident hypertension over a 1 year follow-up when controlling for potential confounders, anger, and anxiety."[90]

Stress and Obesity

The effect of stress on food consumption is pervasive. "Stress may discourage healthy behaviors like physical activity, proper diet, and it may reduce the consumption of healthy food like fruits and vegetables and increase the consumption of fatty and sweet foods."[91]

"Increase in childhood locus of control was associated with a reduced risk of being overweight."[92]

The CDC's website ignores this low-hanging fruit.

Stress and Suicide

Two people in the same situation can feel very different about the situation. One may be hopeful while the other is hopeless in a set of circumstances where a disinterested observer would not see any differences between their situations. The difference is in the meaning they give to the situation—their internal interpretation of the situation.

When we look at the leading causes of death, both suicides and homicides are strongly associated with unhealthy habits of thought.

Studying the effect of negative cognitive distortions, such as hopelessness and negative evaluations of self and the future "indicated that distortions have a direct effect on suicidal thinking . . . Findings underscore the importance of both cognitive distortions and deficits for understanding suicidality, which may have implications for preventative efforts and treatment."[93]

The following are warning signs of suicide. If several factors are present, especially if there are also risk factors (shown in the next chart), take action to help.

Suicide Warning Signs: Act Now

- Talk of death
- Internet searches for methods
- Depression (prolonged)
- Feeling sad
- Feeling angry
- Self-criticism
- Pessimism
- Personality change(s)
- Making a will
- Plan to hurt self
- Feeling hopeless, "beyond help"
- Withdrawal from family
- Rejecting compliments
- Makes a plan to commit suicide
- Difficulties at school
- Difficulties in sports
- Difficulties at work
- Setback viewed as a failure/sign of low worth
- Change in sleep patterns
- Change in eating patterns
- Physical symptoms of emotional pain
- Plan to hurt others
- Giving away possessions
- Withdrawal from friends

- Increased drug or alcohol use
- Neglect of appearance
- Desperation
- Anxiety
- Panic
- Agitation
- Rage
- Not financially self-supporting
- Feels shame
- Sudden improvement after lengthy sad withdrawal
- Lacks sense of purpose
- Reckless behavior/driving
- Sense of being trapped
- Uncontrolled anger
- Seeking/planning revenge
- Dramatic mood changes
- Believe they are a burden to others or society
- Suicidal Thoughts (ideation)

Risk factors are not immediate signs of a potential suicide attempt although the presence of risk factors should increase your concern if you notice any of the warning signs.

Risk Factors for Suicide

Prior suicide attempts	Personality disorder
Suicide plan	Schizophrenia
Stress related to LGBTQ	Depression (especially longer than 2 weeks)
Mood disorders	Feels hopeless
Homicidal ideation	Anxiety
Preoccupation with death	Psychosis
Mental disorder	Alcohol or drug abuse
Low self-esteem	Physical illness with loss of function
Impulsiveness	Self-harm behavior
Aggressive tendencies	Exposure to violence
Social isolation	History of childhood abuse
Alienation from family/friends	New school during last year
New residence during last year	Suicide of close friend or family member
Lack of social support	Suicide of close friend or family member
Family changes	Loss of status
Relationship conflict	Recent disappointment or rejection
Absentee parent	Feels mental/behavioral health stigmatizing
Dysfunctional environment	Perfectionism

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Suicide clusters	Feeling disconnected: religious/spiritual
Traumatic experience	Cultural acceptance of suicide
Bullied or Bully	Irresponsible portrayal of suicide by media
Smokes cigarettes	Self-inflicted high demands
Abused as a teenager	Abused (especially before age 10)
Multiple tattoos; face tattoos	Multiple body piercings
Rx for mental disorder	Facing painful life-threatening diagnosis

Stress and Pain

Pain, especially chronic pain, changes with the level of stress someone is experiencing. Lower stress reduces the perception of pain. Social support can reduce the experience of pain.94 Expecting an experience to be painful increases the amount of pain experienced. The presence of a romantic partner can reduce pain but if the individual has an insecure attachment style, the presence of the partner can increase the experience of pain.[95]

The unhealthy habit of thought referred to as catastrophizing is related to:[96]

- Higher levels of pain and suffering
- Increased need for medical advice
- Higher use of over-the-counter medicine
- Increased disability related to pain

Given the current problems with chronic pain prescriptions and historical success at cognitive therapy to reduce and control chronic pain, psychological contributions to pain should be routinely considered and addressed.

Stress and Addictions

"Eudaimonic well-being is inversely associated with drinking problems in cross sectional analyses although other factors play a role; the relationship is not consistent in all published studies."[97]

Chronic stress is a risk for mental illnesses from depression and anxiety to schizophrenia and psychosis. Mental illnesses increase the risk of substance abuse.[98] Co-morbid substance abuse and mental illnesses compound the problems and make solutions more complex.[99]

Stress and Mental Illness

Stress is strongly correlated with mental health. In a study, stress explained nearly half of the variance in mental health at Time 1. Stress was the strongest cross-sectional predictor of mental health at Time 3.[100]

THE PERCENTAGE OF HIGH SCHOOL STUDENTS WHO:	2007 Total	2009 Total	2011 Total	2013 Total	2015 Total	2017 Total	Trend
Experienced persistent feelings of sadness or hopelessness	28.5	26.1	28.5	29.9	29.9	31.5	
Seriously considered attempting suicide	14.5	13.8	15.8	17.0	17.7	17.2	
Made a suicide plan	11.3	10.9	12.8	13.6	14.6	13.6	
Attempted suicide	6.9	6.3	7.8	8.0	8.6	7.4	
Were injured in a suicide attempt	2.0	1.9	2.4	2.7	2.8	2.4	

For the complete wording of YRBS questions, refer to Appendix. | Source: National Youth Risk Behavior Surveys, 2007-2017

Figure II https://www.cdc.gov/healthyyouth/data/yrbs/data.htm

Men who perceive a loss of control at work or at home had increased incidence of depression and anxiety.[101]

Adjustment Disorders

In teaching stress management skills to low SES individuals with multiple mental health issues and to recovering addicts, I've noticed that individuals use the best tool they have access to. When an individual does not have access to healthy skills, maladaptive or dysfunctional methods are used.

Adjustment disorders are a newly defined stress response syndrome.[102] "The disorders in this section [of the DSM-5 and ICD-11] can be regarded as **maladaptive responses to severe or continued stress,** in that they interfere with successful coping mechanisms and therefore lead to problems of social functioning."[103] The limited research on adjustment disorders indicate stress scores of individuals with AD are higher than those found with patients who have anxiety disorders or other mental disorders.[104]

One interesting outcome of the adjustment disorder research is confirmation that perceived resources affects the level of stress perceived and the indirect effects on health-related aspects.[105]

Major Depression (MDD)

"Major depression is a risk factor for cardiovascular and metabolic diseases and a major risk factor for suicide."[106] "There is a wide consensus and support from preclinical and clinical data that stress exposure conceivably plays a causal role in the etiology of major depression and depression-like disorders."[107]

An estimated 350 million people around the world suffer from depression.[108] The World Health Organization (WHO) ranks depression as the most common psychological disorder worldwide and expects it to move up to second place soon.[109] If we implement solutions that use the latest research are applied we can reverse this trend and reduce suffering in many lives.

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"The onset and recurrence of adult depression can reliably be predicted by the presence of environmental stressors, often labeled "life events."

Clinical Focus

"Abnormalities in the regulation of key neuroendocrine responses to stress in a proportion of patients with depression, with a hyperactivity of the HPA axis that is probably driven by hypersecretion of the hypothalamic peptide corticotropine releasing hormone . . . In humans, psychological stress significantly increase pro-inflammatory (but inhibits anti-inflammatory) cytokine production in patients responding to stress and anxiety."[110]

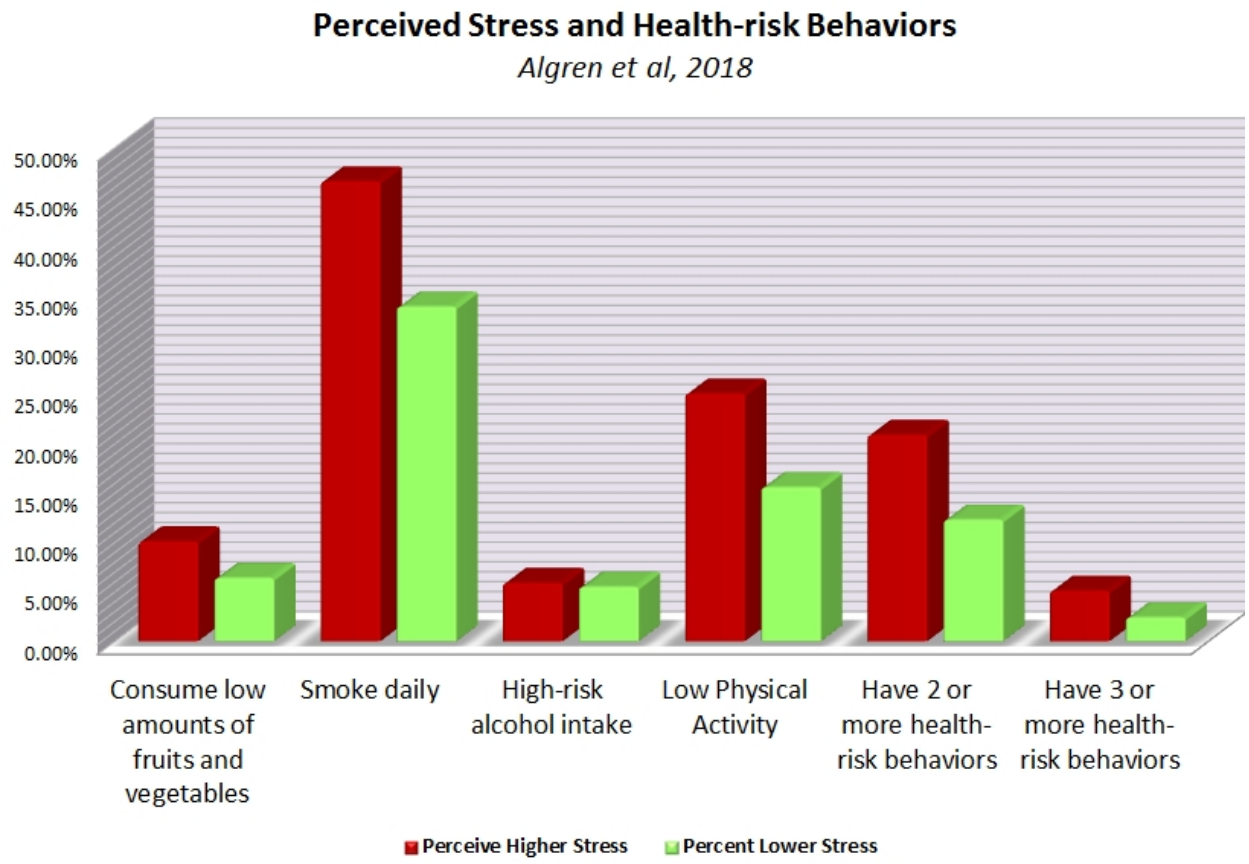
Stress Induced Depression

"Stress Induced Depression (STRID) is a recently defined form of depression characterized by significant working memory impairment, prolonged course, and exhaustion that continues after depressive symptoms ease. Symptoms include deep mental and physical fatigue, disturbed and non-restorative sleep, irritability, perceptual hypersensitivity, emotional liability, and pronounced cognitive disturbances (mainly memory and concentration problems). The majority cases are clearly induced by psychosocial stress, either at work or often in combination with stress in the family."[111]

Stress and Economic Inequalities

Individuals living with fewer economic resources are exposed to a greater number of stressors. Residents of deprived neighborhoods in a report on more than 5,000 residents indicated their perceived stress level was 26% higher than perceived stress in the general population.[112] They also tend to have fewer positive psychological traits that increase resilience such as optimism, healthy self-esteem, and an internal locus of control.

The prevalence of dysfunctional and maladaptive coping strategies is higher in areas with fewer economic resources. Economic disadvantages are maintained, in part, by the lack of positive coping skills. Individuals in high poverty areas cope with stress through "risky, but often pleasurable, behaviors such as eating high-fat foods, smoking, and drinking alcohol."[113]



Stress and Nutrition

Happiness was positively associated with consumption of fruit and vegetables, and consumption of breakfast and lunch in a large sample of university students.[114]

"Research has demonstrated that increased consumption of hedonic "snack type" products, which are nutrient dense and high in sugar and fat, may be used in order to cope with the negative emotions associated with daily hassles."[115]

"Among more than 17,000 college students across the world, those with the highest versus the lowest levels of satisfaction were more likely to consume fruit and avoid fat. Results were independent of age, gender, and country of origin."[116]

"Optimism seems to be related to healthier food consumption. Patients undergoing cardiac rehabilitation who were initially optimistic reduced their dietary intake of saturated fat 18 weeks later, accounting for age, initial dietary goal, and depression. Cross-sectional studies show a similar pattern. For example, among Finnish 31-year-olds, optimistic individuals reported eating more fruits, vegetables, and low-fat dairy products (and fewer sweets. In the same sample, optimistic men reported eating more fiber rich bread, and optimistic women reported eating more fish."[117]

Positive Psychology

"There is accumulating evidence (cross-sectional, longitudinal and experimental research) that positive well-being is associated with many resources valued by society, such as:

- Healthy behaviors
- Lower delinquent activity
- Higher incomes
- Superior mental health
- Higher education
- Longer life
- Better performance ratings at work
- Improved social and personal functioning
- Lower heavy Internet and game use

The results reveal that happiness has multiple benefits, being associated with and precedes numerous successful outcomes, as well as behaviours paralleling success. Furthermore, the evidence suggests that positive affect—the hallmark of well-being—may be the cause of many of the desirable characteristics, resources, and successes correlated with happiness."[118]

"Marked associations between positive psychological states, such as happiness, and perceived stress, indicate there is an inverse relationship between these variables."[119]

"There is a significant association between happiness and health outcomes, such as:

- Exercising regularly, or higher levels of physical exercise
- Not smoking, or less cigarette use
- Less alcohol intake
- Higher sleep quality and quantity
- Prudent diet

Therefore, happy individuals are less likely to engage in a variety of harmful and unhealthy behaviours, including smoking, unhealthy eating, and abuse of drugs and alcohol."[120]

"Given the consistency of findings with optimism and disease endpoints, it is not surprising that optimism was also often reliably associated with healthier behaviors."[121]

Clinical Focus

"At the biological level, cortisol output has been consistently shown to be lower (or at least a more flexible response) among individuals reporting positive affect, and favourable associations with heart rate, blood pressure, and inflammatory markers such as interleukin-6 have also been described."[122]

Resilience

Resilience is a protective factor that helps individuals exposed to chronic and acute stressors maintain healthy minds and bodies. Resilience mediates the effect of childhood trauma on psychological distress.[123]

Optimism

Optimism reduces the impact of stressful situations through multiple pathways.

Optimistic individuals use more effective methods to cope with stressful situations and adjust better to stressful situations

"It is not just the case that those higher in optimism levels will see the future as more favorable but also that they could be more likely to differ in their behaviors when compared to low-level optimists when adjusting to stressful situations" . . . positively changing perceptions of situations allows for effective coping.[124]

Occupational Stress

Several countries, including the United Kingdom and Greece mandate employer management of stress in the workplace. The United States is behind in this area. Individuals, companies, and society pay a price for the downstream health effects of stressful occupations.

Hardiness, like resilience, is associated with increased well-being.[125] Hardiness contributes to increased resilience because a hardy person perceives their experiences as less stressful compared to perspectives that are not hardy. There isn't necessarily one right way to perceive any given situation; each choice we make about how to perceive a situation has downstream effects on psychological stress, biology, as well as the actions we choose to take related to the situation. Psychologically flexible individuals are able to choose from a variety of possible interpretations of a situation. Leaning toward less stressful perspectives reduces stress.

Hardiness Characteristics	Not Hardy Characteristics
Commitment	Alienation
Control	Powerlessness
Challenge	Threat

"The interactive combination of commitment, control, and challenge defines hardiness as the existential courage to face stressful circumstances openly and directly, and the motivation to do the hard work of dealing with them constructively."[126]

As in other areas, the focus has been on physical health hazards from chemicals, and dangerous equipment and environments while the psychological costs have been ignored by employers and the government. Failure to consider the psychological cost extracts a considerable price. For example, physician burnout, which was already high, increased rapidly after the electronic health record (EHR) requirement was implemented in 2009.

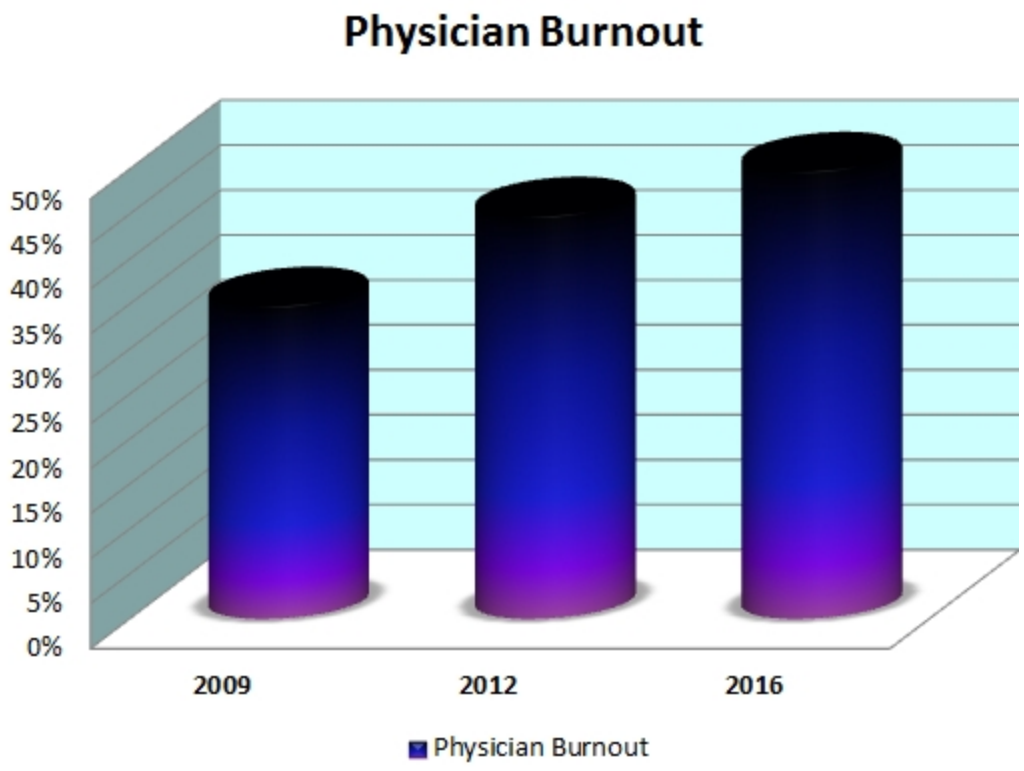


Figure III Burnout: Prevention and Recovery, Resilience and Retention, 2017

We already have a shortage of physicians and nurses. With over half of physicians currently experiencing at least one symptom of burnout and ten percent of those who would end their careers tomorrow if they could, taking the psychological impact of increased human-to-computer interaction into account would have been the right choice.[127]

Physicians whose practices have fewer functions in their electronic medical records systems are less stressed than physicians in practices whose electronic medical records have more functions.[128]

Modifiable individual differences can reduce experienced stress and the negative effects of occupational stress on individuals, their families, companies, and communities.

After controlling for gender differences, ages, educational levels, marital status and roles, the effect of job burden on depression and well-being can be measured using:[129]

- Workload and psychological demands, such as over-tasking (too much to do), time pressure and complex operations
- Capital, which is related to job autonomy skills, social support, feedback, job stability and job prospects, such as personal job skills, job autonomy, fair treatment, future development, work stability, sense of identity, respect sense, income and social support
- Personality traits involving feeling overwhelmed, laid-back, and postponing"[130]

Job strain can be offset by increasing emotion regulation and specifically, the ability to navigate oneself to positive emotional states. Another study showed that positive emotions have a protective effect against the effects of job strain.[131]

- "There is statistically significant negative correlation between experiencing positive emotions and occupational strain levels,

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- The relationship is not influenced by demographic, personality and behavioral variables or by profession Specific positive emotions (joy and tranquility) exert a greater influence in reducing strain
- Overall positive emotions predict occupational strain levels"[132]

"A plausible interpretation of these findings can be given through Fredrickson's theoretical framework which suggests that positive emotions experiencing leads to cognitive broadening and personal resources building, which in turn helps employees discover new ideas and strengthens their problem solving abilities. Moreover positive emotions diminish negative emotions arousal and they have a direct "anti-negative" emotions effect. Finally positive emotions lead through upward spiral mechanisms to psychological resilience and well-being, which help employees sustain occupational stressors and handle strain efficiently."[133]

Even if teaching increasing skills just had a significant impact on occupational stress, given the amount of time and how much occupational stress contributes to the burden of chronic diseases, it would be worthwhile to provide emotion regulation training to employees. But emotion regulation skills, one developed, help an individual manage stress in every area of their life including relationship stress, financial strain, and life's other challenges.

Job strain has a negative impact on productivity, absenteeism, customer satisfaction, errors and accidents,[134] and creativity.

Burnout

Burnout is a serious problem for large numerous occupations including clinicians, law enforcement, teachers, and call center and other front line customer facing occupations. It is associated with an increased risk of depression and suicide.

"Up to half of outpatient providers report high levels of emotional exhaustion, depersonalization, and a sense of low personal achievement."[135] The origins of high burnout are associated with:[136]

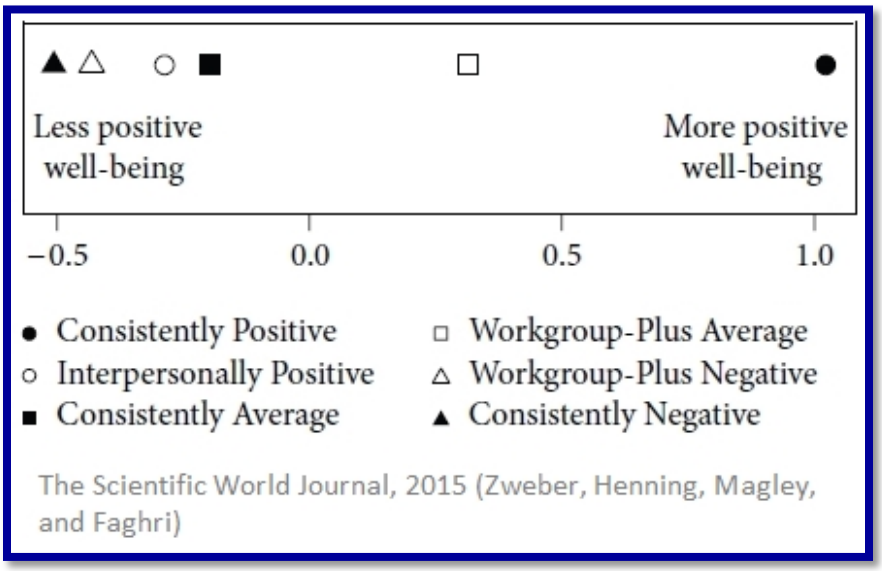
- Feeling undervalued and unsupported
- Having too much paperwork
- Long waits for specialists and tests

Burnout can have a negative impact on provider health and patient care.[137] Burnout is associated with:[138]

- Adverse events including medical errors
- Unexplained work absenteeism
- Reduction in quality of care
- Higher number of negative rapport-building statements
- Job dissatisfaction
- Poor patient satisfaction
- Intention to exit the profession
- Lower quality of personal and family life

The tendency is to focus on the individuals who are burned out and the problems associated with the problem. However, looking at individuals whose circumstances are very similar who do not become burned out points to solutions that are not apparent when the focus is on the problem.

Individuals who do not become burned out tend to be more resilient. Since resilience can be increased with training, widespread training to increase resilience would make individuals better prepared to deal with the stresses and strains associated with many occupations. Burnout is not a function of time in the occupation. Many studies show higher rates of burnout in younger clinicians.[139]



The Scientific World Journal, 2015 (Zweber, Henning, Magley, and Faghri)

Employees working in supportive environments experience higher levels of well-being.[140]

Interventions that improve co-worker support for health will have an additive effect on overall employee well-being beyond the impact from top down and supervisory support.[141]

It is not enough to have a health and wellness program; workplace support from co-workers, managers, and the overall organization impact the benefits employees receive.

Stressed Executives

Executives who experience chronic stress made more errors and had longer reaction times, significantly impairing the quality of their responses.[142] When they experienced acute stress, their reaction times were blunted.[143]

"The incidence of chronic stress in business executives, managers, and chief executive officers (CEOs) is particularly prevalent and demands various coping strategies for handling tension, anxiety, depression, and even hostility. This condition can lead to several mental and physical health issues reduce employee effectiveness and consequently affect organizational performance."[144]

The body's natural response to stress leads to:[145]

- Altered circulation
- Metabolism
- Learning and memory impairments

- Pathological conditions that can include:
  - Insomnia
  - Hypertension
  - Fatigue
  - Heart disease

Epidemiology

We study the epidemiology of many illnesses, bacteria, but we don't begin with thought.

We're missing an easy target.

"The evidence for stress as a cause for a range of diseases in modern industrial societies has been growing stronger in recent decades. Psychosocial factors like anxiety, social isolation, stressful life events, and lack of control over work accumulate during life and increase the risk of premature death or poor metal health."[146]

At every stage of life, from our time in utero through advanced ages, stress impacts our health and well-being. When our mother is chronically stressed we may be born early and/or have a low birth weight. Low birth weights are associated with higher levels of Type II Diabetes later in life.

If our parents are stressed after we are born, their stress can influence us directly by stressing us and if the parents have a violent relationship, exposure to domestic violence can lead to additional negative impacts.

All the chronic diseases and most the predominant ones that cause earlier deaths are influenced by psychosocial stress.

Exposure to potentially traumatic events (PTEs) has an additive (dose dependent) effect on illnesses even when psychiatric disorders are controlled for. "Among individuals with two or more PTEs, the odds of having cardiovascular, respiratory, chronic pain, other problems, or any physical health condition, were significantly higher than those without PTE exposure. Exposure to four or more PTEs was associated with increased risk of all the physical conditions examined. Our findings are consistent with studies suggesting "broad-spectrum effects" of PTEs and risk for a range of chronic physical problems."[147]

Sexual violence, physical violence, unexpected death of a loved one and network PTEs were associated with greater odds for most of the physical conditions studied.[148]

In a study that reviewed General Practitioners and Practice Assistants, 26.3% of the practice personnel reported high levels of stress.[149]

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Clinical Focus

"At the biological level, cortisol output has been consistently shown to be lower (or at least a more flexible response) among individuals reporting positive affect, and favourable associations with heart rate, blood pressure, and inflammatory markers such as interleukin-6 have also been described."[150]

Students and Stress

Students around the world repeatedly and consistently report high levels of stress.

"The level of stress among university students and the associations between perceived stress and health complaints suggest the need for multiple approaches. Interventions aimed at preventing, treating, and caring for students' distress, and also prevention strategies to help minimize the impact of stressful situations."[151]

In a large study of more than 7,000 university students in the UK and Egypt, physical health symptoms had a step ladder (dose dependent) relationship to perceived stress.[152] Students who perceived higher levels of stress reported higher levels of psychological, circulatory/breathing symptoms, and aches and pains.[153]

Another study found an interesting connection between halitosis and academic-related chronic stress that appears to be the result of changes in salivary microbiota changes that occur as the result of the stress.[154]

Stress and Pro-health Behavior

"Health behaviours and perceived stress account in part for the relationship between positive psychological states and good health, providing support to the double pathway in which well-being seems to have an effect on health outcomes."[155] It also underscores the importance of a person's cognitive appraisal of stress and its effect on their lifestyle.

Stress causes mood decrements. Recent research has described emotions as indicators of stress level. Students with positive psychological states (frequent positive feelings, positive affect (mood), subjective well-being, life satisfaction, or happiness) feel little or no stress, even during exam periods.[156]

"Given evidence that positive affect improves health behaviors naturally"[157] . . . and the strong evidence that education alone has not improved health behaviors that require lifestyle changes, focusing energy on a solution that is proven to work makes more sense than continuing to do what we've been doing when it does not improve the results.

"To date, numerous environmental health-related lifestyle factors have been extensively studied, such as dietary habits, substance abuse (e.g., smoking), physical exercise, and sleeping quality. The hallmark of this vast literature is "lifestyle choices", which suggests that all these

factors are amenable to change. As a consequence, health professionals, stakeholders, health organizations, and even governments, in different time periods and countries, have implemented numerous health promotion programs targeting either specific health-related risk factors (e.g., smoking) or disorders (e.g., cardiovascular diseases). **The effectiveness of these programs has been broadly questioned because they do not seem to intercept the gradual rise of chronic diseases, especially in developing countries . . . We can deduce that these programs presumable fail to empower and achieve behavioral change among individuals.**"[158]

For example, the CDC's website lists obesity as a lifestyle choice despite the growing body of evidence that stress adversely impacts weight, especially the dangerous weight in the midsection, that gut microbiota impact weight gain or loss, and a variety of illnesses, diseases, and medications that lead to weight gain. Stigma and guilt about weight is an added stressor that makes it more difficult to achieve a healthy weight. Adding stigma and guilt to the equation is like handing someone carrying a heavy backpack that is setting off on an arduous journey a 10-pound bar bell and asking them to carry it when it serves no purpose.

Blaming individuals who are overweight or obese for their condition, a condition most of them already would like to change psychologically demotivates and disempowers them, which makes it less likely they will achieve their goal.

Wellness programs and other health promotion efforts tend to educate individuals on the evidence—the reasons they should change—while ignoring decades of robust research that shows us how to effectively motivate individuals to change their behavior.

For the most part, individuals who feel empowered are intrinsically motivated improve themselves. Optimism and self-empowered beliefs facilitate goal attainment.

"Optimism was found to be positively related to positive reinterpretation and growth, use of instrumental social support, active coping, acceptance, suppression of competing activities, and planning, and negatively related to mental disengagement, behavioral disengagement, focus on and venting of emotions, denial, and religious coping."[159]

"Chronic or extreme stress has detrimental effects on daily decision making by favoring choices of immediate physical reward in an effort to relieve emotional distress, thus creating a vicious cycle of adversity."[160]

"Stress management/health promotion interventions resulted in additional lifestyle modifications of diet, exercise, social support, and daily routine."[161]

Empowered individuals feel lower levels of stress (without effort or exerting willpower) and they have more self-control. Our belief that we have willpower, which is an empowered belief, increases the amount of willpower we exert. The research on how the behavior of individuals who feel empowered is different from the behavior of individuals who do not feel empowered highlight the reason improved emotion regulation skills (which reduce perceived and actual experienced stress) is a productive target for primary prevention. "Healthy choices reflect an empowered individual, capable of controlling stress and making decisions that have long-term benefits."[162]

An internal locus of control is associated with better health related behavior.[163]

A sense of mastery reduces the amount of perceived stress and improves pro-health behaviors in adults.[164]

Fat Shaming

I am embarrassed for humanity that fat shaming has become commonplace.

There are myriad pathways through which stress adversely affects weight management.

Chronic stress interferes with digestive function and healthy gut microbiome. Chronic stress leads to worse dietary decisions. When someone is relaxed, making healthy choices is much easier than it is when they are stressed. Most dieters who are committed to a diet fail when they feel too stressed. When they fail, not only do they not stick to the diet, they consume higher fat and calorie foods than they do when they're not on a diet. Studies of individuals who suffer from severe obesity have shown that a large percentage of the patients were abused as children.

Almost half of people who regularly exercise don't do it when they feel too stressed even when they know exercise will help their stress.

Chronic stress interferes with self-control and the ability to exert willpower.

Chronic stress also reduces cognitive abilities so if someone is stressed about money and when someone fat shames them, it increases their stress burden and makes them less able to find solutions to either issue because of cognitive narrowing caused by stress.

Fat shamming harms individuals and, by extension, it is harmful to society as a whole.

Fat shamming is counter-productive. The person who is looking at someone who is obese and negatively judging them is experiencing unnecessary stress. Negatively judging another is stressful to the person who is judging. The negative emotion is an indicator that the way the person is looking at the situation is stressful for their mind and body and that there is another way to look at the same situation that would be less harmful to the person who is doing the judging.

Fat shamming is harmful all around. Obesity is not simply a matter of dietary choices. Not everyone has access to the same foods and good psychological health that leads to consumption of healthy foods.

Many of the illnesses that cause obesity begin with chronic stress. The root cause where all problems are best dealt with—is primary prevention because it improves health in all areas at the lowest cost.

Fat shamming is the opposite of primary prevention.

The body of research demonstrating that it isn't as simple as calories in and calories burned is enormous. Chronic stress plays a multi-factor role (changes body chemistry/digestion/gut microbiome, food choices, and exercise frequency). Being fat shamed is stressful. The people who do it are harming the people they do it to and are working counter to what they want, which is the reason they feel the

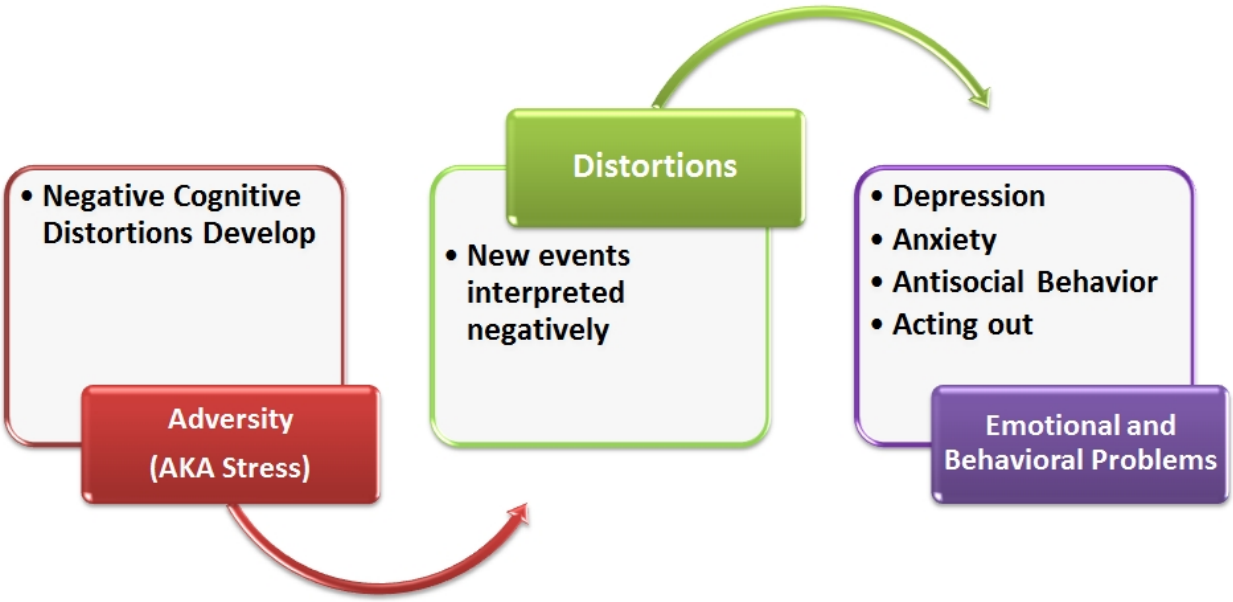
negative emotions that lead them to fat shame others. They don't know how to interpret their emotions—another thing recent research reveals most people get wrong.

Stress and General Behavior

Negative Cognitive Distortions

Negative Cognitive Distortions are cognitive distortions that bias an individual's processing of experiences with a distorted bias towards negative interpretations, even when the event is ambiguous. Individuals with negative cognitive distortions exhibit increased behavioral problems.[165]

When children experience stressful life events, they are more likely to develop negative cognitive distortions. The negative cognitive distortions increase the risk the child will experience emotional and behavioral problems.



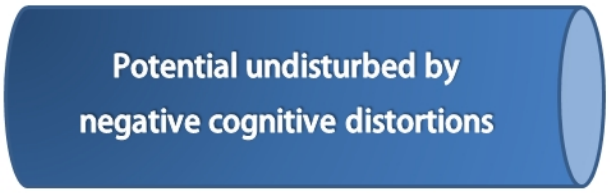
Adapted from: Panourgia, Constantina, and Amanda Comoretto. "Do cognitive distortions explain the longitudinal relationship between life adversity and emotional and behavioural problems in secondary school children?" Stress and Health (Wiley online library) 33 (March 2016): 590 - 599.

We cannot eliminate negative life events from a child's life. We can equip children and adults with coping skills that help them avoid negative cognitive distortions that lead to emotional and behavioral problems.

Negative cognitive distortions include what I refer to as unhealthy habits of thought. When an individual has developed unhealthy habits of thought they can do okay until they experience high stress that leads to dysfunctional thinking about the stressful situation and increases the risk of developing emotional and behavioral problems.[166] Ruminating about adverse experiences increases perceived and experienced stress.[167]

Some unhealthy habits of thought include: [168]

- **Negative selective abstraction** involves focusing on negative aspects of situations leading to an unbalanced view (i.e. focusing on the fact that your double decker ice cream cone fell while ignoring the fact that the ice cream shop replaced it free of charge.)
- **Overgeneralizing** that the negative outcome will be repeated in the future (*My crush refused my offer to date; no one will ever want me.*)
- **Catastrophisation:** negative expectations about the future (*The worse outcome is the most likely.*)
- **Personalization** is inappropriately attributing the cause of external events to oneself (i.e. viewing a layoff as *I'm not competent* while ignoring all the other good employees who were also laid off because of the company's financial situation or the complimentary letter of recommendation the company provided.)
- **Temporal causality or predicting without sufficient evidence** that because something happened in the past it will happen again (A Kennedy was assassinated on the birthday of every woman in our family; if we have more female children more Kennedy's will be assassinated.)
- **Self-reference** involves believing that everyone is focused on you, especially when making a mistake (*I won't get on the crowded dance floor because everyone will see I am not a skilled dancer.*)
- **Dichotomous thinking** focuses on the extreme results of a situation and may be positive or negative. It's also known as **black and white thinking** (*If you're a democrat you want to raise taxes; if you're a republican you're a racist.*) Undistorted thinking recognizes that labels are meaningless when it comes to determining the personal characteristics of an individual.



Panourgia, Constantina, and Amanda Comoretto. "Do cognitive distortions explain the longitudinal relationship between life adversity and emotional and behavioural problems in secondary school children?" *Stress and Health* (Wiley online library) 33 (March 2016): 590 - 599.

Potential disturbed by negative cognitive distortions

"Life adversity contributed to psychopathology and negative cognitive distortions explained the relationship."[169]

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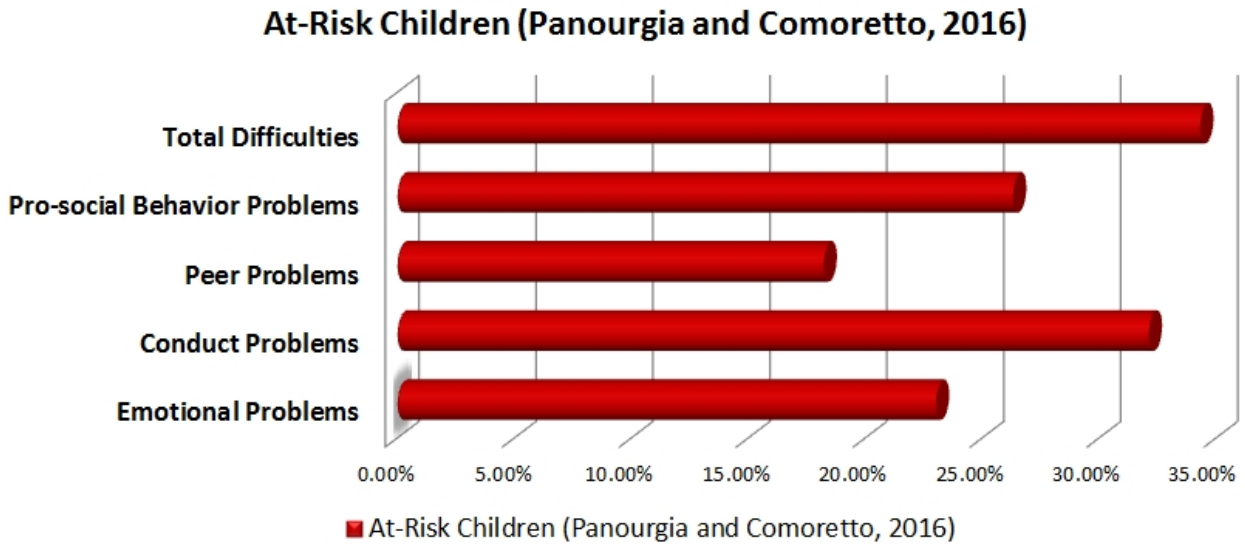
Negative or Stressful Life Events can be due to an adverse environment, natural disasters, or other events where the individual has little control.[170]

- A close family member dies, especially unexpectedly
- A parent or sibling is incarcerated
- Financial setbacks, especially the loss of a home
- Violence in the home (against the child or domestic violence between adults)
- Witnessed a crime or gruesome accident
- Earthquakes, floods, and tornadoes
- Any sort of abuse including bullying

In a study of children in a low income environment, only 8.1% had not experienced a Stressful Life Event during the past year. Of the children in the longitudinal study, children in borderline or abnormal ranges comprised a large percent of the group.



Emotional Intelligence

Emotional Intelligence is a phrase used to describe a collection of skills and traits including:

- Being aware of emotions and managing your own emotions
- Controlling and expressing emotions
- Awareness of the emotions of others
- Ability to handle interpersonal relationships in a way that recognizes the emotions of others

"EI (Emotional Intelligence) is one of the best predictors of adaptive coping strategies to stressful situations."[171] It has been proposed that EI reduces the adverse consequences of stressful life events on well-being.[172] By increasing healthy responses that individuals experience, EI decreases maladaptive emotional reactions, enhances positive moods, and reduces negative moods.[173]

Individuals who have high Emotional Intelligence experience fewer negative emotions and recover faster when they experience negative emotions.[174]

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The strategies that will be shared in the talk that accompanies this White Paper, *Managing Stress to Improve Population Health and Patient Engagement,* increase three of the four dimensions of emotional intelligence:

Higher levels of emotional clarity were associated with lower levels of stress in nurses in research that evaluated their understanding of their personal relationships, and profession and intragroup communication.[175]

Beyond Emotional Intelligence

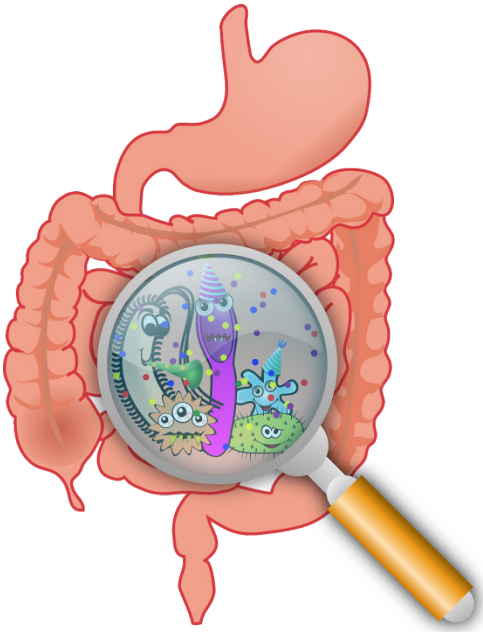
Emotional intelligence doesn't take emotions as far as they can go based on current research. Positive psychology has contributed significantly to our knowledge of healthy mental constructs and dysfunctional and damaging mental constructs.

The current practices not only ignore research on motivation, the carrots and sticks wellness programs provide are often counter-productive.

Stress and Gut Microbiome

"The effect of psychological stress on the gastrointestinal microbiota is widely recognized.[176]

A new organ was identified when human genome mapping was done.[177] The gut microbiome has been classified as an organ even though it is not genetically human. Research on the impact of gut microbiome on mental and physical health is pouring out of universities at a rapid rate. It's an area to watch.



"The composition and biological function of the GI microbiota influence the host immune system and are therefore linked to host health an disease, and the GI microbiota."[178]

"GI Microbiota plays a role in colorectal cancer, Type 1 Diabetes, obesity, and inflammatory bowel disease (IBD). IBD (Crohn's disease and ulcerative colitis) is a complex chronic inflammatory disorder of the GI tract that is a major public health problem."[179,180]

In animal experiments, stress induced for only a week led to "gut microbiome changes that increase susceptibility to colonization by pathogenic bacteria."[181] Humans often experience chronic stress that lasts for years.

Another study linked exacerbated colitis to changes in gut microbiota induced by psychological stress.[182]

Thought is Mood Congruent

What we think changes as our emotional state changes. Individuals who experience more positive moods think positive thoughts more often.[183]

Recovery from Stress

People who use their emotions to guide their cognitive process when they experience stress, recover better.[184]

"An impaired capacity of recovery from negative emotional states is more harmful to health than an acute rise of activation."[185]

Recovering from stress induced negative emotions is an active process that can be promoted with positive emotions. "Resilient individuals use positive emotions in order to recover from negative emotional states."[186]

The strategies that will be shared in the talk that accompanies this White Paper, *Managing Stress to Improve Population Health and Patient Engagement,* provide proven skills-based methods that speed recovery from stress.

Patient Engagement

Providing serious diagnoses in a clinical setting involves the patient receiving information that can be perceived as threatening. Negative emotions can negatively affect the patient's understanding and retention of the information being provided. Educating the community on healthy emotion regulations strategies can help them cope better when they are faced with psychological threats. This will help the patient be ready to understand and adhere with the prescribed treatment pan.[187]

When a patient lacks good coping skills, following-up after they have an opportunity to process the diagnosis can increase their understanding and adherence with the treatment plan.

Assume that a smaller than normal percentage of communication is received by the patient when the situation is highly stressful to facilitate better communication. Clinicians often assume the patient heard and processed information during a stressful encounter as fully as they do during routine encounters. Conscious recognition of the impact stress has on cognitive abilities enhances communication.

Working Memory

When a patient is stressed, chronically ill, or mentally ill, their working memory may be impaired. This chart from Europe's Journal of Psychology summarizes the consistency of working memory being impacted by these factors. Taking this into consideration when communicating with patients will improve communication. If the patient cannot recall instructions, they cannot follow instructions.

Table 1

A Summary of Factors That Influence WM

Factors	Acute vs Chronic effect	Malleability Low/Med/High	Mechanism/Presumed cause of effect	Consistency/ Inconsistency in literature
Individual Differences				
Intelligence	C	L	Biological	C
Gender	C	L	Biological	I
Age	C	L	Biological	C
Personality	C	L	Biological	I
Mental illness / Medical conditions	C	M	Preoccupying thoughts/Biological	C
Manipulated				
Emotion	A	M	Preoccupying thoughts	C
Stress/Anxiety	A	M	Preoccupying thoughts	C
Dieting	A/C[b]	H	Preoccupying thoughts	C
Craving	A	H	Preoccupying thoughts	I
Stereotype threat	A	H	Preoccupying thoughts	C
Temperature	A	H	Preoccupying thoughts/Biological	Insufficient
Mindfulness	Uncertain	H	Preoccupying thought control	Insufficient
Practice	Uncertain	H	Uncertain	I
Sleep	A	H	Uncertain	C
Bilingualism	C	M	Uncertain	C
Musical training	C	M	Uncertain	Insufficient
Altitude/Hypoxia	A/C*	H	Biological	Insufficient
Exercise	A/C*	H	Biological	I
Diet	A/C*	H	Biological	Insufficient
Drug Use	A/C*	H	Biological	C
Brain stimulation	A	H	Biological	C

[a]May be either an acute or chronic effect, depending on circumstances.

Figure IV Europe's Journal of Psychology, 2018, Vol. 14(1), 188–231, doi:10.5964/ejop.v14i1.1472

Stress management and emotion regulation skills help individuals recover and improve working memory capacity.

If someone is chronically stressed, they need more help following instructions. Check lists that provide a step-by-step process, Apps, and text reminders are all ways to increase adherence. Caution should be taken with intrusive reminder (like text messages). If the patient would be ill served by frequent reminders of their condition, the adverse emotional impact of the reminders might off set their benefits. Generally, if treatment will lead to recovery or the situation is hopeful, reminders that increase support for a positive outcome will be good. For someone whose projected outcome is not good, reminders may not be beneficial because of the biochemical cascade caused by negative emotions.

Improved Patient Adherence: Glycaemic Control

"A meta-analysis of randomized controlled trials of psychological interventions for type 2 diabetes found s**tress reduction improved long-term glycaemic control among type 2 diabetes patients.**"[188]

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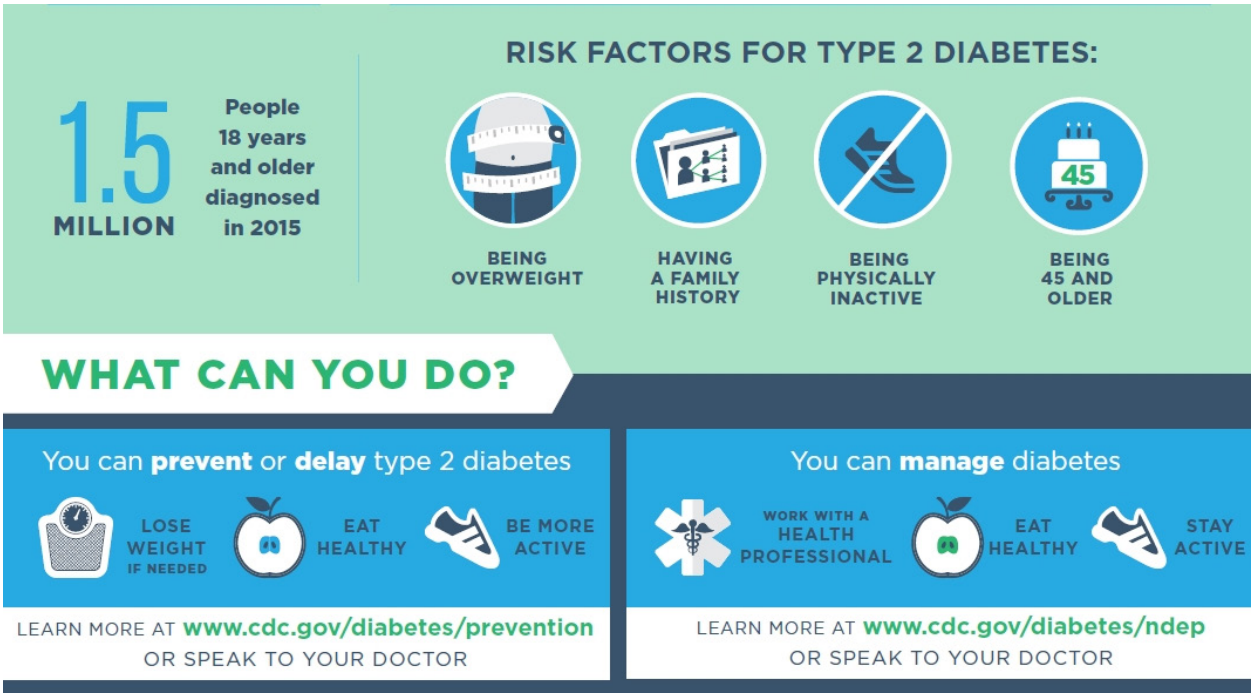
Where is Stress in the Conversation?

Stress and Diabetes

Stress is missing in action from the conversation. Here is a chart from the CDC website. Stress is not mentioned anywhere. The body of evidence that psychological stress affects the development and progression of type 2 diabetes along multiple paths is significant.



Heart Disease

"Heart disease and stroke are an epidemic in the United States today. Many of the people who are at high risk for heart or stroke don't know it. The good news is that many of the major risks for these conditions can be prevented and controlled through healthy lifestyle changes."[189]

Optimism is most robustly associated with a reduced risk of cardiovascular events. In general, PPWB is also positively associated with restorative health behaviors and biological function and inversely associated with deteriorative health behaviors and biological function.[190]

Factors Mediating the Relationship Between Depression and Heart Disease

Risk Factor Clustering

"The presence of depression and its symptoms, including anhedonia (characterized by apathy and lack of pleasure), helplessness and hopelessness, can inhibit the primary prevention behaviours associated with CVD. That is, individuals with depression may be more likely to report risk factor behaviours that contribute to CHD onset, such as smoking and high alcohol consumption . . . the prevalence of smoking was higher in those with mental disorders than in

the general population, a finding which has also been observed for alcohol use. While there is good evidence that alcohol use can precede the onset of MDD individuals with existing depression may use alcohol as a form of self-medication. In fact, depression has been found to act as a mediator between stress and excess alcohol. Interestingly, alcohol consumption has been closely associated with other risk factors for heart disease such as smoking and dietary habits, particularly in depressed populations.

Studies have demonstrated that depression affects other key primary and secondary prevention behaviours such as physical activity. Not only are those experiencing depression as a sole condition more likely to be sedentary than those without, but there is evidence that for cardiac patients, depression impedes exercise regimes after a coronary event. A recent review evaluating 11 studies (representing 20,000 cardiac patients) found post-MI depressive symptoms to be a significant risk factor for a sedentary lifestyle or poor compliance to a physical activity program.

More recently, diet has been identified as a key factor that may mediate the relationship between depression and CVD. Not only are low levels of Omega-3 fatty acids – derived from foods such as fish – associated with increased risk of CHD and high prevalence mental disorders like anxiety, but case-control studies have demonstrated that low Omega-3 levels are related to depression levels after a recent cardiac event. Conversely, CAD patients experiencing depression have been shown to report higher levels of Polyunsaturated Fatty acids (PUFAs), compared with non-depressed patients.

Additionally, the association between depressive symptoms and high risk behavior related to alcohol, smoking, physical activity and diet may precipitate other medical conditions, such as diabetes mellitus, overweight and obesity, hypertension, and hyper cholesterolaemia, all associated with the onset of heart disease.

Indeed, the inextricable link between depression, heart disease and lifestyle factors suggests that a multi-faceted approach may be required when developing appropriate depression management or secondary prevention interventions in this patient population.

Evidently, lifestyle as a mediating factor in the relationship between depression and heart disease affects both primary CVD prevention activities, as well as secondary prevention behaviours. Important components of the latter, adherence to cardiac rehabilitation programs and medication regimes can often be compromised by the presence of depression after a heart event, increasing the risk of recurrent CVD events."[191]

Noncompliance with Cardiac Rehabilitation and Medical Regimens

"The World Health Organisation (WHO) considers cardiac rehabilitation "an integral component in the overall management of patients with CVD." While it is recommended that patients who are hospitalized with heart disease as an index admission are referred to early outpatient rehabilitation, evidence suggests that patients experiencing depression post-discharge are less likely to complete a cardiac rehabilitation program compared with their non-depressed counterparts, increasing the likelihood of a recurrent CVD event. For these patients, increased

attrition levels may be due to the cognitive and/or somatic symptoms of depression including hopelessness, reduced motivation, social exclusion, fatigue and helplessness. In any case, noncompliance to rehabilitation and medical regimes in this population has been identified as "a formidable problem impacting on the failure of risk-reduction therapies, on patient morbidity, and on health care costs." The presence of depression has been specifically linked with the under-utilisation of appropriate health services and poorer self-care, specifically in relation to medication adherence."[192]

Anxiety and Anger

"Similarly to depression, there appears to be a bi-directional, rather than purely causal, relationship between anxiety and CVD. Anxiety is both highly prevalent in patients with existing CHD and has been shown to independently predict subsequent CVD events over decades.

If appropriate treatment programs are to be provided for patients after a heart event, the role of negative mood and traits, as well as other psychosocial factors, may need to be taken into consideration."[193]

Figure V https://millionhearts.hhs.gov/learn-prevent/prevention.html

What is wrong with this picture?

Pointing to *lifestyle changes* as if they are easy and as if individuals are equipped to make the changes creates guilt, which increases stress and reduces the likelihood that positive health changes will be successful.

Reducing stress makes pro-health decisions including diet, exercise, smoking, and alcohol easier. Less self-control or willpower is required to choose healthier when stress is lower.

Obesity

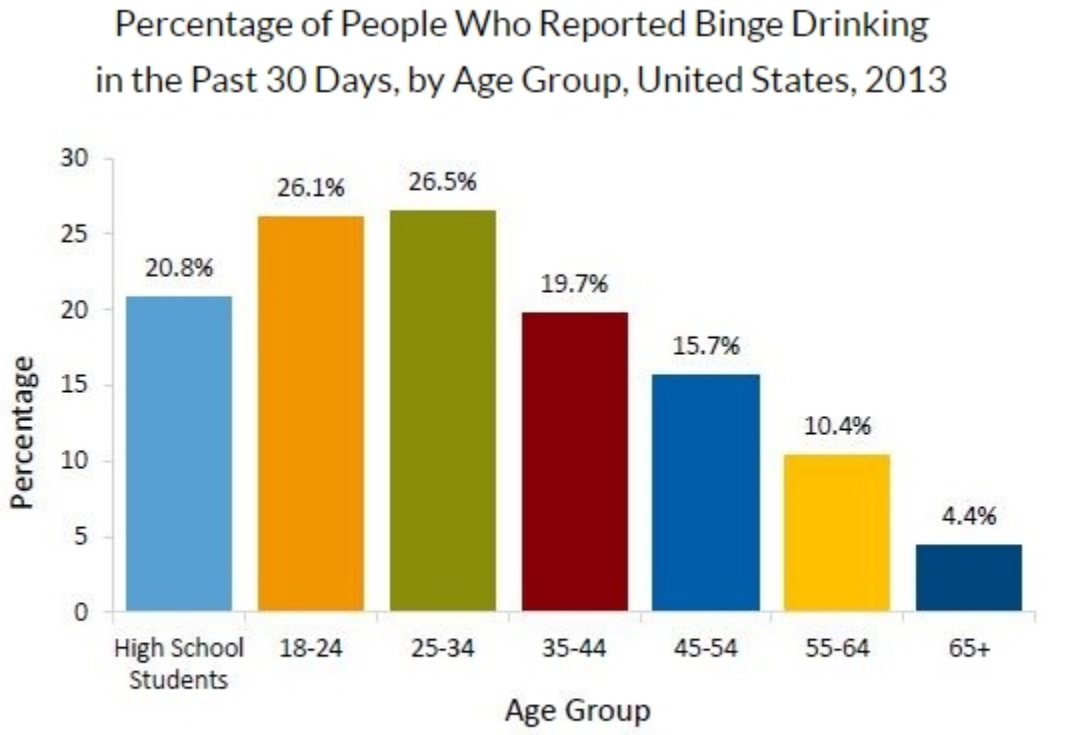
A moderate association between unhappiness and obesity was seen in a large sample of university students.[194]

Smoking Cessation

"Most cross-sectional studies are consistent with the longitudinal studies, indicating that individuals higher versus lower in eudaimonic well-being are less likely to smoke or be dependent on nicotine."[195]

"High levels of perceived stress are associated with increased smoking levels, smoking initiation, and a reduced likelihood of quitting smoking.[196]

Alcohol



Note: High school students are defined as those in grades 9-12.
Sources: CDC. Youth Risk Behavior Surveillance System and Behavioral Risk Factor Surveillance System, 2013.

Figure VI https://www.cdc.gov/chronicdisease/resources/publications/aag/alcohol.htm

There is a strong connection between excessive alcohol use, especially beyond the youthful exuberances of college life, and stress. The community guidelines don't mention stress reduction. We can do better.

Community Guide Strategies to Prevent Excessive Alcohol Use[197]

On the basis of strong scientific evidence, the Community Preventive Services Task Force recommends the following strategies to prevent excessive alcohol use and related harms:

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- Increase alcohol excise taxes.
- Regulate alcohol outlet density, which is the number of places that sell alcohol in a defined geographic area.
- Hold retailers accountable for harms resulting from illegally serving or selling alcohol (commercial host or "dram shop" liability).
- Maintain existing government controls over alcohol sales (avoiding privatization).
- Maintain limits on the days and hours when alcohol can be sold.
- Use electronic devices (e.g., computers, telephones, mobile devices) to deliver screening and brief interventions for excessive alcohol use.
- Enforce laws that prohibit alcohol sales to minors.

Healthy Children

Stress and Pregnancy

A large body of evidence links maternal adversity with changes in numerous physiological systems in the offspring.[198] "Early-life factors can predispose individuals to diseases over the life course."[199] This includes time in utero and maternal stress exposure prior to conception. Both the National Institute of Health (NIH) and the World Health Organization (WHO) have stressed the importance of additional research in this area by designating it as a high research priority.[200] "Studies have raised concerns that offspring of mothers exposed to stress during pregnancy may have an increased risk of specific diseases such as malformations, asthma, and mental and behavioral disorders."[201]

In a study that evaluated 66,203 live births, maternal life stress during pregnancy increased the disease risk in eleven of 16 diagnostic categories including:[202]

- Conditions originating in the perinatal period
- Congenital malformations
- First diagnosis of infection
- Mental disorders (ages 0 – 2.5 years)
- Eye problems prior to age 4.5
- Ear problems
- Respiratory problems
- Digestive problems
- Skin problems
- Musculoskeletal problems
- Genitourinary diseases
- First diagnosis of parasitic diseases
- Any disease

Emotional stress in the same study was associated with increased risks relating to:

- First diagnosis of infection
- Circulatory diseases
- First diagnosis of parasitic diseases

Interestingly, a decreased risk for first diagnosis of endocrine and metabolic, diseases of the eye, and the circulatory system (up to age 3) was noted in the group with the highest quartile of emotional stress.

This study evaluated life stress which relates to daily stressors and not adverse life events. After adjusting for maternal smoking, hypertension, and gestational diabetes, birth rate, and length of gestation the results remained fairly constant.

Women cannot be insulated from daily hassles. They can, however, learn emotion regulation skills that lessen the amount of perceived and experienced stress they feel as a result of those daily experiences. The woman who shrugs off the rudeness of a stranger and thinks, "People will be people" or counts her blessings that she is not married or related to the rude person and never thinks about the encounter again is well-served. The woman who dramatically relays the story to everyone she encounters over the next few days, re-hashing the experience and the way she felt when she was offended by a stranger increases the amount of stress she experiences.

Regardless of whether the source of stress is work, home, school, driving, financial strain, health concerns, body image concerns, time stress, or the bloodshed the nightly news pumps into your homes, the response to the situation determines how much stress it causes.

Although the role of nutrition should also be considered a significant factor in fetal health, the research reflecting that stress affects food choices and causes less healthy choices (higher fat and sugar content) than the choices the same individual makes when they are not stressed indicates nutrition can suffer due to stress.

"Since stress during pregnancy has negative consequences for the fetus and newborn infant, the main challenge is to ensure early identification and prevention of high stress levels."[203]

Clinical Focus

"The potential biological mechanisms underlying such developmental plasticity, including epigenetic processes and changes at the molecular, cellular, and organ level in the offspring, provide new ideas to the fetal origin of chronic disease concept. Specifically, in relation to maternal stress during pregnancy, numerous subclinical alterations in physiology, including changes in immune, brain, cardiovascular, autonomic, endocrine, and metabolic function have been described, such as changes in fetal heart rate, insulin resistance, increased concentrations of immunoglobulin E in cord blood and changes in hypothalamic-pituitary-adrenal (HPA) axis function."[204]

Schools

Schools are a perfect place to teach good stress management skills to future generations. Stress symptoms can also be an indicator of other problems, such as abuse. The CDC doesn't mention

teaching stress management skills. They nod to self-esteem increases coming from physical exercise but ignore research that shows that psychological health increases the likelihood of exercising.

CDC[205]

"Increase the quantity and quality of physical education and physical activity in schools. Regular physical activity in childhood and adolescence improves strength and endurance; helps build healthy bones and muscles; helps control weight; reduces anxiety and stress; increases self-esteem; and may improve academic performance, blood pressure, and cholesterol levels.

Improve the nutritional quality of foods and promote healthy foods and beverages in schools. Healthy eating in childhood and adolescence supports proper growth and development and can prevent health problems like obesity, cavities, iron deficiency, and osteoporosis.

Improve the quantity and quality of health education focused on chronic disease prevention. Preventing chronic diseases is a learning process, and schools are an excellent place to gain skills for understanding and avoiding conditions like obesity, diabetes, and asthma. Students can learn how to make smart food choices; exercise to build strong, fit bodies; and monitor their health.

Improve monitoring and management of chronic conditions. Using proven practices to better manage students with chronic health conditions like diabetes, asthma, and food allergies can help schools improve student health and reduce absenteeism.

Unhealthy behaviors and chronic diseases are increasingly common in children and adolescents in the United States. The percentage of children aged 6 to 11 years who were obese increased from 7% in 1976-1980 to nearly 18% in 2011-2014. Similarly, the percentage of adolescents aged 12 to 19 years who were obese increased from 5% to 21% during the same period. About 1 in 4 adolescents suffers from a chronic condition, such as diabetes and asthma."[206]

The Youth Risk Behavior Surveillance System (YRBSS) reveals the connection between adverse circumstances and risky behavior.

The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of health-related behaviors that contribute to the leading causes of death and disability among youth and adults, including—[207]

- Behaviors that contribute to unintentional injuries and violence
- Sexual behaviors related to unintended pregnancy and sexually transmitted diseases, including HIV infection
- Alcohol and other drug use
- Tobacco use
- Unhealthy dietary behaviors
- Inadequate physical activity

Psychological Distress Following Adverse Childhood Experiences (ACES)

Children who experience adverse childhood experiences experience worse psychological and physical health outcomes as children and adults.[208] ACES are defined as: [209]

- Child abuse
- Neglect
- Growing up in dysfunctional households
- Domestic violence in the childhood home
- Mental illness or incarceration of a household member
- Parental divorce or separation
- Household drug or alcohol abuse

Suicide risk increases 2 – 5 times when any ACE is experienced and four or more are associated with an even higher suicide risk and lifetime depressive disorders and poor mental health in general.[210] The relationship between ACES and depressive symptoms, drug abuse, antisocial behavior, and psychological distress is dose dependent.[211]

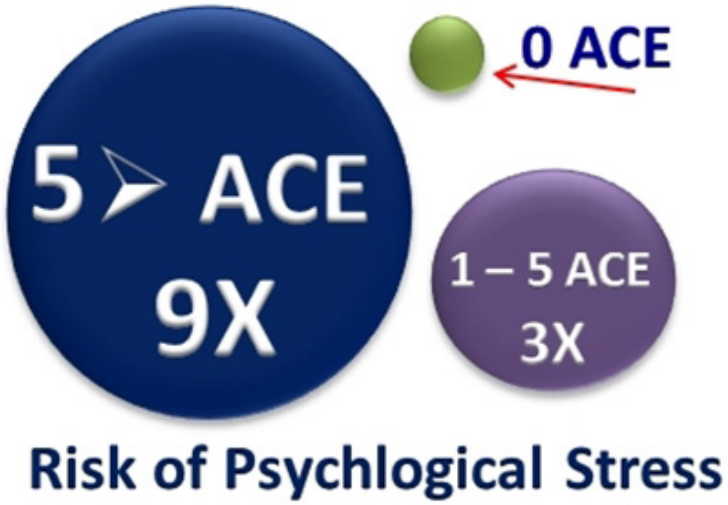

Figure VII Manyema, M., Norris, S. A., & Richter, L. M. (2018)

The percent of children who experience ACES varies but it is high. Studies show between 60 – 90% of all children experience at least one ACE.[212]

Not every child who experiences ACES, even some children who experience repeated and severe abuse, manage to grow up and live successful lives. Posttraumatic Growth occurs in highly resilient individuals. As adults, individuals exposed to childhood adversities "present with emotion regulation difficulties" which are a risk and maintenance factor for psychopathologies.[213] The burden from emotion regulation deficits includes individual costs as well as "maladaptive social and occupational functioning." Emotion regulation can be skills-based.[214]

Subtle forms of adversity, such as maternal insensitivity, as well as severe physical or sexual abuse can lead to emotion regulation challenges.

"Sexual and physical abuse or other types of early disadvantage, can increase several-fold the risk of being diagnosed with a depressive illness in adulthood."[215]

Childhood experiences can reduce resilience, increase poor health outcomes, and may lead to cortical thinning in regions of the brain that are associated with self-awareness and making evaluations.[216]

- Emotional neglect and abuse are associated with FSS.

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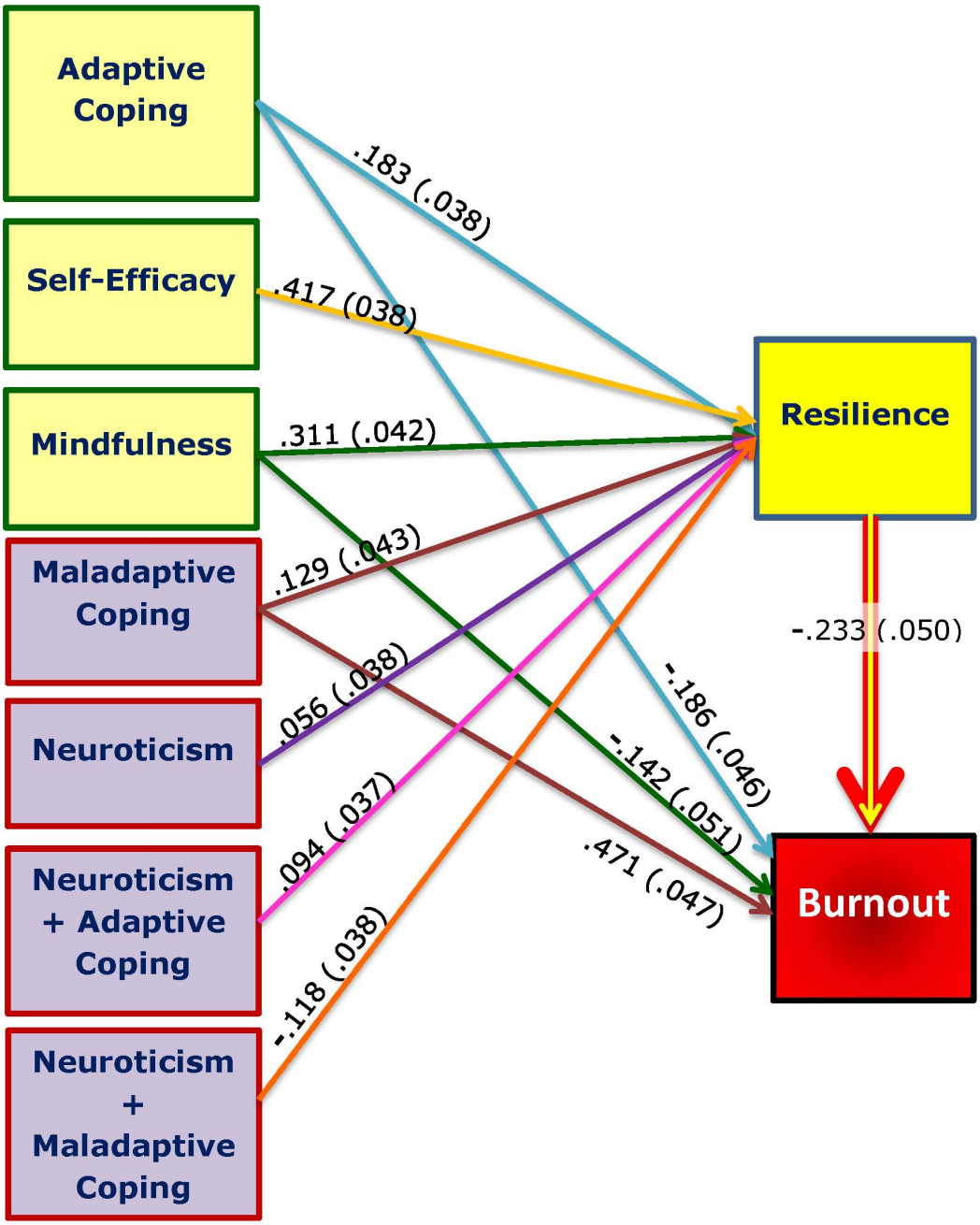
- Unstable environments
- Caregivers who fail to meet the child's emotional needs
- Caregivers who exhibit demeaning and humiliating behavior toward the child

Adults exposed as children have weaker beliefs in their personal competence and lower levels of acceptance of themselves and their lives.[217]

Workplace Health Promotion

Resilience

The following chart shows the strong preventative impact resilience provides against burnout.



Adapted from: Rees, C. S., Heritage, B., Osseriran-Moisson, R., Chamberlain, D., Cusack, L., Anderson, J., et al. (2016, July 19). *Can We Predict Burnout among Student Nurses? An Exploration of the ICWR-1 Model of Individual Psychological Resilience.* Frontiers in Psychology, 7(1072), 1-11.

Neuroticism is one of the Big Five higher-order personality traits in the study of psychology. Individuals who score high on neuroticism are more likely than average to be moody and to experience such feelings as anxiety, worry, fear, anger, frustration, envy, jealousy, guilt, depressed mood, and loneliness.

being outcomes. It is preliminary because additional information is being added to a more comprehensive version.

Sleep Quality

(BDNF) a brain-derived neurotropic factor in humans is a protein related to canonical nerve growth. Studies have identified decreased levels of BDNF in stress related mental disorders including depression, PTSD, and burnout syndrome. These mental disorders are all associated with sleep disturbances.[218]

Clinical Focus

"Sleep is associated with physical and mental health. Sleep loss impairs various endocrine, physiological as well as neuronal functions and is often followed by higher stress vulnerability, reduced environmental adaptation and cognitive impairment. Moreover, insomnia is often observed in many stress-related disorders. Evidence indicates that BDNF could play a role in this association:

1. In animal studies BDNF levels decreased after chronic stress
2. Serum BDNF levels decreased stress-related major depressive disorder
3. BDNF plays a role in sleep homeostasis
4. Insomnia is associated with decreased serum BDNF levels

"Higher levels of environmental mastery, personal growth, purpose in life, and self-acceptance were associated with a reduced risk of sleep problems."[219]

"Among ethnically diverse adolescents, happiness was positively associated with more sleep each night and negatively associated with irregular sleep duration."[220]

Optimism was positively associated with getting enough sleep in an elderly sample. The most optimistic children slept a sufficient amount each night and took less time to fall asleep.[221]

Adults with low life satisfaction were more likely to report insufficient sleep than were the very satisfied."[222]

Concluding Remarks

Researchers are repeatedly telling us that stress makes people sick. It's time to address this issue.

"Successful coping with everyday stress could serve as a mechanism to motivate achievement, personal growth, self-confidence, and coping self-efficacy. Indeed, even successful attempts at coping could facilitate motivation and an opportunity to challenge one's skills. Given that the consequences of stress can involve both positive and negative outcomes, actively (re)-framing what one perceives to be the outcomes of stressors may be key in facilitating adaptive responses to stress. Indeed, past studies have found that perceptions of the outcomes of stress

are an important mediator in the relationship between stress and negative health outcomes. Recent studies in stress have successfully reduced stress responses by reframing the effects of anticipated stressors as more positive."[223]

Individuals who learn how to adjust their perspective can reduce stress without changing the situation. Success at regulating emotions supports the benefit and importance of positive "expectations about stress and recovery."[224]

"**Targeting improved mental health and reducing stress could have the potential of slowing the progression from glucose intolerance to frank diabetes, or lead to better glycaemic control . . . Interventions to improve mental health may mitigate the growing incidence of type 2 diabetes .** . . With type 2 diabetes set to surpass cardiovascular disease as the number one chonic disease affecting society, addressing the increasing burden associated with type 2 diabetes will become a key healthcare priority. Using causal modeling techniques in this large national cohort study, perceived stress was found to be a strong independent risk factor for diabetes. The findings provide support for perceived stress to be considered alongside other modifiable risk factors for type 2 diabetes, such as obesity and physical activity in public health primary prevention and screen programs."[225]

"If appropriate treatment programs are to be provided for patients after a heart event, the role of negative mood and traits, as well as other psychosocial factors, may need to be taken into consideration."[226]

"Educational institutions should be aware how/if their student selection practices and pre-requisites, courses, exams and course assessment methods, as well as the social and/or living environments of the university might contribute to students' stress, in order to tailor interventions aimed at preventing, treating, and caring for students' distress."[227] Hungarian nursing students with high stress and more frequent psychosomatic symptoms used maladaptive coping methods more often and less effective ways of problem solving and health maintenance.[228]

"The final model shows a significant relationship between stress and suicidal ideation through self-efficacy or dispositional optimism. The findings extended prior studies and provide enlightenment on how self-efficacy and optimism prevents stress-induced suicidal thoughts."[229]

Historically, stress management and emotion regulation have been viewed as personality or character traits. Few efforts have been made to modify individual competencies or underlying positive psychological habits such as optimism and healthy self-esteem. New methods, including the re-defining of emotions as sensory feedback, provide new and effective tools that increase our ability to proactively manage small and large stressors in order to achieve better health and relationship outcomes. Dr. Joy's experiences teaching strategies has demonstrated that diverse groups including high school students, university teachers, health care workers, low SES recovering addicts, and individuals with challenging mental illnesses benefit from increasing their ability to regulate their emotions.

Humans are not pre-programmed computers that all respond the same way when a button is pressed. We have control over how we respond when we have tools we understand how to use.

For many individuals, the research demonstrating that positive emotions are healthier is enough to break through barriers that prevent them from adopting less stressful perspectives about life. Dr. Robert Holden identified barriers individuals construct when they develop their schemas about when it is okay to be happy including dysfunctional rules such as, "I can't be happy until everyone else is happy" and "I shouldn't be happy when some people or animals are suffering somewhere in the world."[230]

"**Health promotion interventions would benefit from incorporating stress reduction strategies to address health-risk behavior in deprived neighborhoods . . . People with poor stress management skills had more health-risk behaviors than those who had effective stress management skills . . . Increasing stress management skills decreased health-risk behaviors over a six month period . . . As mental health has been associated with health behaviors, we recommend the adoption of general mental health promotion initiatives in deprived neighborhoods"**[231]

"Moreover, interventions should promote a more active way to deal with perceived work-related stress, increasing the use of coping strategies centered on individual competencies and pragmatic attitude. Interventions at the organizational level should aim to promote a more supportive social network and to improve role definition and decision latitude in the nursing profession."[232]

"How individuals interpret demands is crucially important as interruptions can awaken ruminative thinking over work issues, and hence impair post work recovery. Prior research has demonstrated that factors such as positive work values were positively related to job satisfaction, negatively related to physical symptoms, and moderated the relationship between work stressors and level of wellbeing. Thus, investigating employees' work beliefs on wellbeing could provide important practical recommendations on how to enhance employees' motivation and performance. Prior research has demonstrated that beliefs in delay of gratification, and in self-reliance were predictors of job performance and task efficiency among employees in a financial management organization."[233]

There is a "significant relationship between stress, anger, fighting and bullying behaviors in urban PE, possibly indicating a need for renewed focus on anti-aggressive approaches and positive stress response techniques."[234]

Whether we are concerned about physical health including the leading causes of death, mental health, or crime and violence, increasing stress management skills in the population will move us toward the results we want.

Unless and until we determine how much of the chronic illness burden is the result of stress, it will be more difficult to isolate and address other factors.

Note about Quotes and Citations

Citations that lack quote marks vary from paraphrasing or simple support for the concept expressed in the journal article cited. When quotes marks are used the sentence is a direct quote with the possible exceptions that it may have been modified for ease of reading in the following ways:

- Spellings were changed to American English where the original used UK English
- Lists in prose have been changed to bulleted lists
- Sources cited in the cited journal articles were omitted. All quoted articles are Open Access; the citations referenced in the articles are easily accessible and available without going through a paywall.
- Every effort has been made to maintain the integrity of quoted material by retaining the context in which it was used in the original publication.

Note about the research supporting this White Paper

Due to the requirement that citations be supported by permissions, a great deal of the evidence that is available to support the points made in this paper were omitted as Journals routinely asked for payment between $125 - $150 to include a single citation. The citations in this paper include primarily Open Access (Creative Commons CC or CC-BY) citations and a few where the author has a relationship with an author who was willing to provide permission or a quote.

Image Sources

Uncited concept illustrations were created by Jeanine Joy. Picture images are from Creative Common (CC) sources or Stock Photo sites where Dr. Joy's rights to use them was purchased. Some images a combination of CC and modifications made by Dr. Joy.

Appendix

CDC Chart – Causes of Death

10 Leading Causes of Death by Age Group, United States – 2016

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,816	Unintentional Injury 1,261	Unintentional Injury 787	Unintentional Injury 847	Unintentional Injury 13,895	Unintentional Injury 23,984	Unintentional Injury 20,975	Malignant Neoplasms 41,291	Malignant Neoplasms 116,364	Heart Disease 507,118	Heart Disease 635,260
2	Short Gestation 3,927	Congenital Anomalies 433	Malignant Neoplasms 449	Suicide 436	Suicide 5,723	Suicide 7,366	Malignant Neoplasms 10,903	Heart Disease 34,027	Heart Disease 78,610	Malignant Neoplasms 422,927	Malignant Neoplasms 598,038
3	SIDS 1,500	Malignant Neoplasms 377	Congenital Anomalies 203	Malignant Neoplasms 431	Homicide 5,172	Homicide 5,376	Heart Disease 10,477	Unintentional Injury 23,377	Unintentional Injury 21,860	Chronic Low. Respiratory Disease 131,002	Unintentional Injury 161,374
4	Maternal Pregnancy Comp. 1.402	Homicide 339	Homicide 139	Homicide 147	Malignant Neoplasms 1,431	Malignant Neoplasms 3,791	Suicide 7,030	Suicide 8,437	Chronic Low. Respiratory Disease 17.810	Cerebro-vascular 121,630	Chronic Low. Respiratory Disease 154.596
5	Unintentional Injury 1,219	Heart Disease 118	Heart Disease 77	Congenital Anomalies 146	Heart Disease 949	Heart Disease 3,445	Homicide 3,369	Liver Disease 8,364	Diabetes Mellitus 14,251	Alzheimer's Disease 114,883	Cerebro-vascular 142,142
6	Placenta Cord. Membranes 841	Influenza & Pneumonia 103	Chronic Low. Respiratory Disease 68	Heart Disease 111	Congenital Anomalies 388	Liver Disease 925	Liver Disease 2,851	Diabetes Mellitus 6,267	Liver Disease 13,448	Diabetes Mellitus 56,452	Alzheimer's Disease 116,103
7	Bacterial Sepsis 583	Septicemia 70	Influenza & Pneumonia 48	Chronic Low Respiratory Disease 75	Diabetes Mellitus 211	Diabetes Mellitus 792	Diabetes Mellitus 2,049	Cerebro-vascular 5,353	Cerebro-vascular 12,310	Unintentional Injury 53,141	Diabetes Mellitus 80,058
8	Respiratory Distress 488	Perinatal Period 60	Septicemia 40	Cerebro-vascular 50	Chronic Low Respiratory Disease 206	Cerebro-vascular 575	Cerebro-vascular 1,851	Chronic Low. Respiratory Disease 4.307	Suicide 7,759	Influenza & Pneumonia 42,479	Influenza & Pneumonia 51,537
9	Circulatory System Disease 460	Cerebro-vascular 55	Cerebro-vascular 38	Influenza & Pneumonia 39	Influenza & Pneumonia 189	HIV 546	HIV 971	Septicemia 2,472	Septicemia 5,941	Nephritis 41,095	Nephritis 50,046
10	Neonatal Hemorrhage 398	Chronic Low Respiratory Disease 51	Benign Neoplasms 31	Septicemia 31	Complicated Pregnancy 184	Complicated Pregnancy 472	Septicemia 897	Homicide 2,152	Nephritis 5,650	Septicemia 30,405	Suicide 44,965

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

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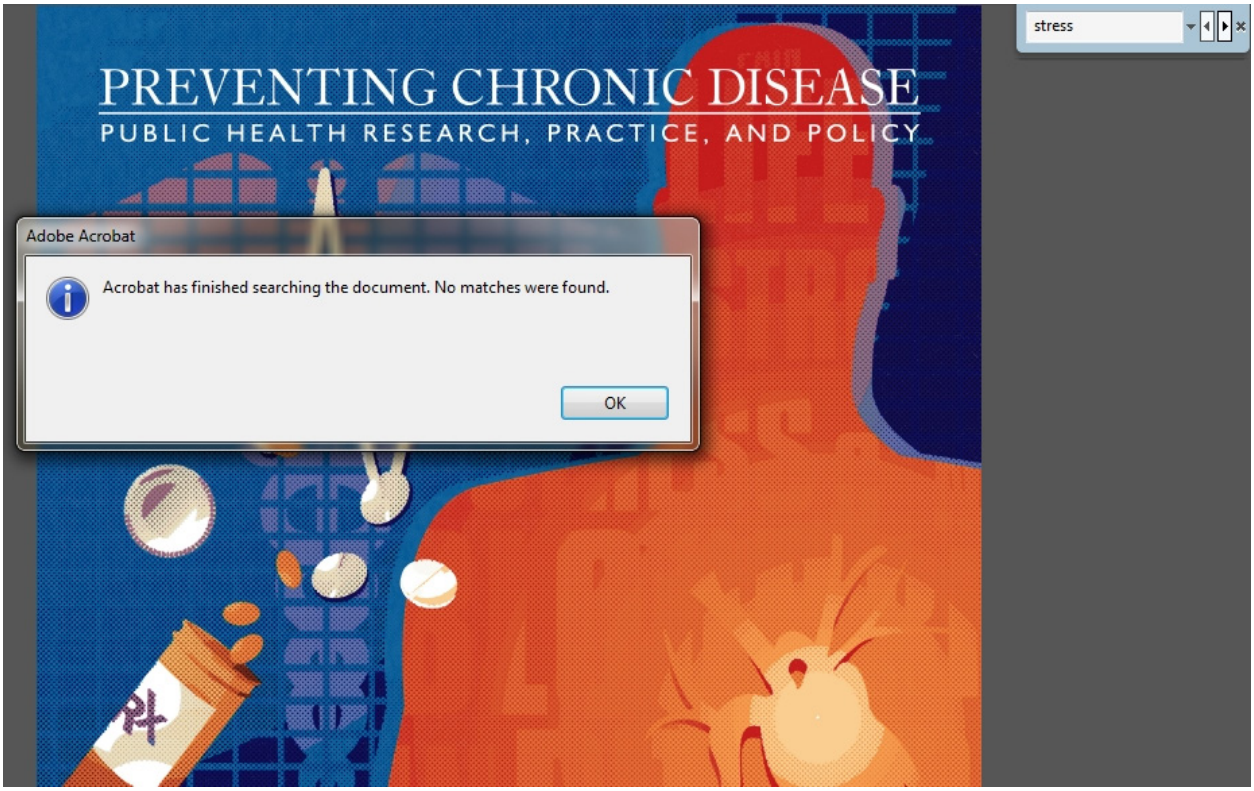
CDC Not considering Psychological Health Effect on Physical Health

I'm always excited when I learn the government has published something with the word "prevention" in the title but so far, I've been disappointed every time. This is no exception. I used the search function to look for the word stress and it is not in this CDC Publication about preventing chronic diseases.



The CDC publishes a Best Practices for Cardiovascular Disease Prevention Programs. It does not contain the word "Stress."

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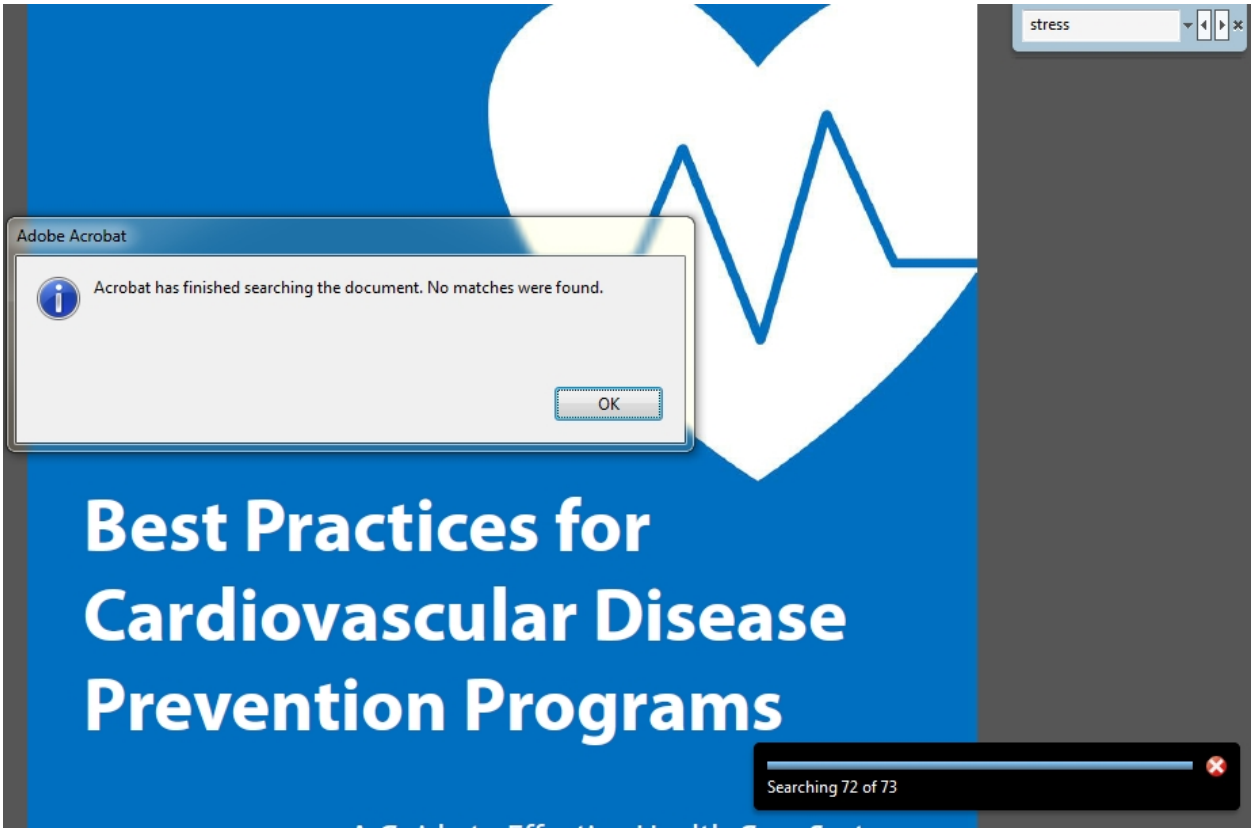

Figure VIII https://www.cdc.gov/dhdsp/pubs/guides/best-practices/index.htm

The title of the guide is misleading. It should be named "disease management" because its aim is on controlling and slowing progress of manifested disease—not on preventing the manifestation. There is considerable research supporting the benefit of stress reduction after illnesses have manifested.

The absence of stress isn't because reducing stress doesn't matter. It is because earlier attempts to reduce stress were not effective and sometimes created stress about being stressed.

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Jeanine Joy, Ph.D. teaches people to use their brain more intelligently.

She is a lateral thinker who aggregates research from diverse disciplines to create practical solutions that help people increase success, reduce stress, and improve relationships at work and home.
Jeanine began researching resilience with one goal: to find out what makes some humans thrive in spite of adversity. She discovered that resilience shares a root cause with every area that affects human thriving including relationships of all types, physical, mental, behavioral, and emotional health, and success in academics, career, and sports.

Her purpose in pursuing this knowledge was always to help other people so she began teaching pieces of the solution to groups as soon as the hypothesis worked for her and friends who were willing to apply the strategies.

She developed an engaging way of sharing complex subjects that seem simple. She creates ah-ha moments that frequently lead audiences to wonder why they hadn't seen what is now so clear before.

She makes complex information easy to understand and apply.

Jeanine has read over 7,000 scientific journal articles while writing nine books that cover topics that include: employee engagement, burnout prevention and recovery, resilience and retention, positive health promotion, maintaining, suicide prevention, primary prevention, and restoring mental health. Her work is not silo'd in a single scientific discipline which affords her a deeper understanding of factors that contribute to whether a life is full of fun or suffering.

Dr. Joy is the founder and CEO of Happiness 1st Institute, a Thrive More Now Company. In 2019, Dr. Joy will walk 2,800 miles across America giving speeches to spread the word about life-changing strategies you can learn from her book today. (JoyWalk.org)

FAQ

What inspired your work?
A psychiatrist told me that people with histories like mine didn't put themselves through college, have successful careers, and they weren't good mothers right before he asked me how I'd done it. I didn't know I was more resilient than most but I figured if I was, I ought to be able to figure out why and once I did, I'd be able to help other people.

Why are you walking 2,800 miles across the United States during 2019 (Joywalk.org)?
It takes almost twenty years for information from research to reach the public. When new knowledge can literally save lives, not using it is unconscionable to me. When it is a new drug or new technology, it gets to market fast because there is a profit motive. We need a pathway that brings new information that helps people live the lives they want to them faster. I don't think the path should be profit driven because that just puts the best marketers, not the best information, in front of people. If people are aware of the problem, we'll create a brilliant solution that will do things like stop the school-to-prison pipeline. It's wonderful to have solutions but not using them once they are known isn't okay.
During the Joy Walk I will raise awareness about this issue and share knowledge from research that can improve lives now and hasn't reached the folks who need it because we don't have a quick path to market.

What is the biggest mistake most people make?

They don't understand how toxic stress is. If they knew, they'd take the time to learn better ways to manage stress. A lot of people wear the amount of stress they can take like a badge of honor. The solution isn't doing less. The solution is to use your mind more intelligently. Stress isn't situational. Individual responses vary. Something that stresses Sue out may not cause Courtney any stress at all because Courtney has healthy coping skills.

How does stress harm people?
Stress has a direct effect on every important aspect of our mind and body. Immune function, digestive function, cognitive function, and central nervous system are all negatively impacted by chronic stress. We are smarter when we are less stressed and not as smart or able to find solutions to our problems when we feel more stressed. Over time, the changes in these processes and in our biochemistry and even our gut microbiome increase the risk of adverse epigenetic changes and of illnesses and diseases. We now know that chronic stress can change our DNA and turn on diseases that would have remained dormant if we experienced less stress. Across a lifetime, people with good stress coping skills live an extra ten years (on average). But more importantly, they don't become chronically ill until the last two years. People who experience high-stress average 6 - 8 years of chronic illness before their earlier deaths.

What books have you written?

Mental Wellness Made Easy: The Smart Way to Manage Stress: Emotion Regulation and Stress Management for Everyone

Harness the Power of Resilience: Be Ready for Life

Burnout: Prevention and Recovery, Resilience and Retention, Evidence-based, experience-informed, root cause solutions

Mental Health Made Easy Maintain and Restore Your Mental Health: Develop Health Habits of Thought, *The Smart Way™ to Permanently Reduce Stress*

Prevent Suicide: The Smart Way, Transformative Empowering Processes Provide A Better Way to Prevent Suicide

Empowered Employees become Engaged Employees: Using Science to Solve the Employee Engagement Crisis, *The Smart Way: Applied Positive Psychology in Action*

Rescue Our Children from the War Zone: Teach Social and Emotional Skills to Improve Their Lives: *Applied Positive Psychology 2.1*

True Prevention--Optimum Health: Remember Galileo

Is Punishment Ethical? The Fallacy of Good and Evil

How do I know which book to buy?

The first thing you need to know is not to buy more than one of them unless there is a specific reason. I am not at all shy about telling you that I use some of the same material in multiple books. Although the topics may seem to be widely varied, when you look at the root cause of human thriving, all the above topics and more converge to a single root cause. My work is

focused on increasing the health of the root cause. The aspects of the books where I teach the reader about that are repeated. As I teach more people, my methods do evolve and improve. For example, *Prevent Suicide: The Smart Way* was my second book and the way the skills that will help a person prevent suicide are described is better in my more recent books. I recommend *Prevent Suicide: The Smart Way* as the best book for a reader today is if they are more interested in understanding the risk factors and warning signs, research related specifically to suicide, and how to prevent an imminent suicide. If the interest in in preventing suicide in general, I'd recommend *Mental Wellness Made Easy.* I've taught thousands of people from all walks of life in the years between writing Prevent Suicide and Mental Wellness Made Easy and what I say and how I say it has improved as a result of feedback from those individuals.

After I wrote *Our Children* with 760 citations and *Empowered Employees,* I began shifting away from including heavy documentation of the science to make the books more accessible to readers. Not everyone is obsessed with the science of human thriving. Most people just want to know how to thrive more and don't care a whole lot about the research that led to the method.

Now, at the end of 2018, I'm using a new method that further removes the scientific aspects from my books. I am creating White Papers that document the science that the book can refer to and focusing on the tools that help people thrive in the books. This will make my books shorter, which will allow me to reduce the price.

One last note, because we found people were reluctant to purchase a book with "mental health" on the cover, we re-titled Mental Health Made Easy to Mental Wellness Made Easy. Very little is changed between the two books other than the title.

What topics do you speak on?

I've yet to find a topic where the root cause of human thriving cannot be an important message. When the root is healthy, every area of life improves including physical, mental, and behavioral health, relationships of all kinds, and success towards goals regardless of whether they relate to education, career, or goals on the playing field.

While I teach and speak on all my books, I haven't had time to write all the books I've been working on. Here is a broader list of topics I am prepared to speak about:

Suicide Prevention

- For Veterans
- For LGBTQI
- For Children
- For LEOs
- For Doctors, Nurses, and other Clinicians

Physical Health Maintenance

- Increased physical activity
- Better nutrition
- Preventing obesity

- Preventing Heart Disease
- Preventing Type II Diabetes
- Pain Management

Addictions

- Addiction Prevention
- Addiction Recovery

Burnout

- Burnout Prevention
- Burnout Recovery

Healthier Pregnancies

- Preventing Pre-Term Births
- Preventing Low Birth Weights

Crime and Violence Prevention

- Preventing Violence
- Preventing Mass Shootings
- Preventing Domestic Violence
- Crime Prevention
- Recidivism Reduction

Social Issues

- Increasing Graduation Rates
- Poverty Prevention
- Preventing Loneliness
- Childhood Trauma (Recovery from and Prevention)
- Reducing binge drinking

Preventing Mental Illnesses

- Mental Health Maintenance
- Depression prevention and recovery
- Anxiety prevention and recovery
- PTSD prevention and recovery
    - Stress Management
    - Increasing Resilience
    - Healthy Emotion Regulation

How do we contact you to give a talk or for a book signing event?

The fastest way is to click here and send me a note.

During 2019, when I am walking across the country there will be times when my access to email is limited. I will be active on social media. Try to reach me through Twitter, Instagram, Facebook (Happiness1st) or Facebook (JoyWalk), or LinkedIn.

Or, if my route takes me near you, come hear one of my talks or arrange to walk a few miles along side me.

What surprises people the most about your work?

The thing I hear most often is surprise at how simple and easy changes make such a big difference in how much stress they feel. We get stuck in one way of thinking and that makes us believe things can't get better. When they spend less than an hour learning how to make slight adjustments and feel refreshed and empowered, the most common thing they do is begin beating themselves up for not doing it sooner. That is counterproductive so I cut that off at the pass by encouraging them to appreciate what they know now rather than beating themselves up for not knowing it sooner.

What do you like most about your work?

I change lives for the better which I find exhilarating. There is both a rush of joy when it happens but also a deep sense of contentment because it isn't a temporary fix. They can build on what I teach and their lives will change more than they ever thought possible—all in a positive direction (as defined by them).

There is also my awareness of the larger benefits to society. Since happy people are kinder and less likely to have poor outcomes, every person who is less stressed (which is the same as saying they are closer to being happy) increases the potential that individuals will have more positive experiences every day. The potential for a domino effect is present. I don't know where the tipping point is, but I'm doing everything I can think of to move us closer to it.