

# Understanding and Responding to Community Stress: a Guide for Environmental Health Workers

**Pam Tucker, Charlton Coles & Delene Roberts**

DCHI Environmental Health Training Workshop

June 2017

Disclaimer: The findings and conclusions in this presentation have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.

## Slide 1

Good afternoon and welcome to the webinar on Understanding and Responding to Community Stress: a Guide for Environmental Health Workers. This workshop is designed to introduce you to basic definitions of stress, the emotional, mental, and physical consequences of stress and the causes of stress in communities who are exposed or potentially exposed to toxic substances and how you can assist in mitigating the stress in these communities. I am Dr. Pam Tucker. I am originally a psychiatrist by training and have worked in the area of community stress related to toxic exposures since 1994. My colleagues are Delene Roberts, a mental health counselor and Dr. Charlton Coles, a psychologist by training who has worked in the area of community stress and technological disasters.

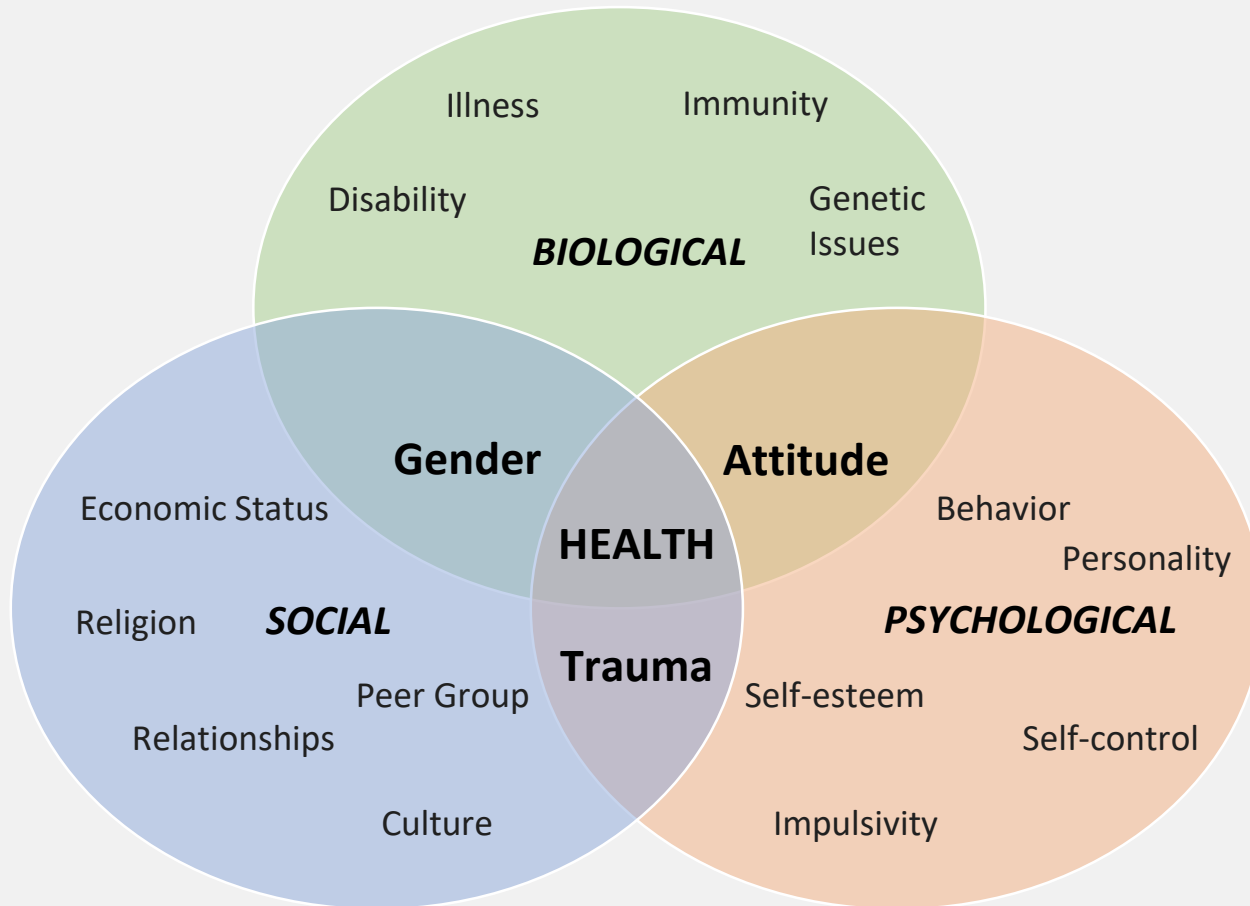
# Community Stress Training for Environmental Health Workers

Session Topics: This session will:

1. Provide an overview of the stress process;
2. List the known causes of stress in communities suffering from environmental contamination,
3. Describe coping strategies that have reduced community-related stress, and
4. Discuss stress-reducing processes that can be employed by environmental health workers.

# What is Stress?

## Biopsychosocial Model of Health



### Slide 3

The principal theme of this webcast is the physical and psychosocial effects of psychological stress on human health. The biopsychosocial model is a broad biomedical view that attributes disease outcome to the interaction of biological factors (genetic, biochemical, etc), psychological factors (mood, personality, behavior, etc.), and social factors (cultural, familial, socioeconomic, medical, etc.). (Reference: [https://www.google.com/?gws\\_rd=ssl#q=biopsychosocial+model](https://www.google.com/?gws_rd=ssl#q=biopsychosocial+model)).

The biopsychosocial model applies to disciplines ranging from medicine to psychology to sociology and was a first attempt to broaden the biomedical model of disease to include social factors such as socioeconomic factors and psychological stressors.

# What Is Stress (cont.)

Looking at the psychological aspects of stress:

- Stress response is the body's method of reacting to a threatening or overwhelming encounter.
- A stress response can make one go into a fight-flight-or freeze mode.
- Stress has a powerful impact on how your body's systems function.

#### Slide 4

The fight or flight mode is a physical response to a threat that helps one to respond to an emergency. The emergency can be real (you witness an accident) or it can be perceived (you worry your child illness is lasting longer than expected and it could be something else wrong).

The stress response acts in a biological sense. It releases hormones and chemicals such as cortisol and norepinephrine as a way to prepare the body for whatever is coming up and help you go into a fight or flight mode or even a freeze mode.

The fight or flight response can make one agitated and/or aggressive towards others. Our senses sharpen, so you can see and hear better. Your brain scans the environment for signs of threats. Your muscles tense, ready for action.

It is even thought that genetics plays a part in how we respond to stress.

With prolonged stress responses sometimes this may show up in symptoms such as problems with concentration and memory. So, one may be unable to complete projects, lose track of time, and not being able to handle normally simple tasks, etc.

# What Is Stress (cont.)

Looking at the psychological aspects of stress:

- Change in behavior (e.g., increased impulsivity)
- Change in personality
- Change in everyday common tasks
- Loss of self-esteem



## Slide 5

When looking at the psychological aspect of high stress, one wants to look and see if a person's behavior has changed. Are you being indecisive, showing poor judgement, or having memory problems. Has their personality changed in a way that they now exhibit more negative behavior at home and at work? Stress will manifest itself in a way that a person can more easily lose self-control in their everyday common tasks. Loss of self-esteem and impulsivity are other ways stress may affect a person's behavior. For example, a person might feel jumpy or be quick to take an action without thinking. A person might also be socially impulsive like engaging in splurge purchases, or smoking or drinking more than normal.

# What Is Stress (cont.)

Looking at the psychological aspects of stress:

- Stress can be engendered by one's:
  - (perceived) social status
  - financial state
  - our cultural values

## Slide 6

Stress can present itself in one's (perceived) social status such as trying to keep up with the "Joneses" and feeling that you are coming up short. You may feel that you do not have the right attitude to be invited to become a member of the desired social group. Our peer group poses problems that we do not seem to be able to measure up to. This can lead to a (perceived) economic status that is not seen to be in the upper level of society. Our religion and our culture also may not be in the same make-up as our co-worker's or even our neighbors, and if we have to be around these folks on a continuous basis this can become too much to handle and our bodies go into the fight or flight mode and the demands to continue to function on a level that is not comfortable to us may show up in forms of stress mentioned earlier.

# What Is Stress (cont.)

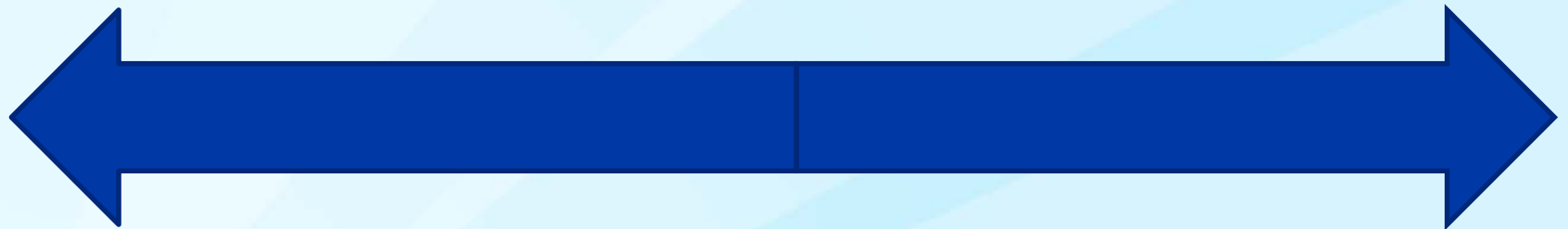
- It is thought that one's gender plays a role in our biological, social, and psychological behavior towards stress.
- Stress is experienced in different ways in each individual.
- Some people can have an extreme stress reaction
- Your overall health and your overall attitude will determine how you handle stress and how you cope with everyday “living” when a perceived stressful situation comes your way.

## Slide 7

It is thought that one's gender plays a role in our biological, social, and psychological behavior towards stress. Stress is experienced in different ways in each individual. In some people, it may cause mental symptoms and in others it may cause emotional difficulties. Your overall health and your overall attitude will determine how you handle a trauma and how you cope with everyday "living" when a perceived stressful situation comes your way.

# Directional Nature of Stress

- Stress can be experienced in either a negative or positive direction:



(negative)

(positive)

## Slide 8

Many people only think of stress in a negative way. However, we know that there are positive stressors as well. Research has demonstrated the benefits of an individual engaging in positive behaviors as a way to boost psychological health.

# Directional Nature of Stress (cont.)

- **Eustress**: Positive or pleasant stress to which the person must adapt.
- **Distress**: Negative or unpleasant stress to which the person must adapt.
- **Traumatic Stress**: Levels of stress high enough to overwhelm most people.



## Slide 9

The positive aspects of stress have been found to:

- Promote flexibility in thinking and problem-solving
- Counteract the physiological effects of negative affect
- Facilitate adaptive coping
- Build enduring social resources
- Promote enhanced well-being

Eustress has also been found to decrease cortisol levels and boost levels of prolactin and growth hormone (associated with greater health) – Codispoti et al., 2003).

Nonspecific psychological distress can encompass:

- Periods of sadness (emotional)
- Nervousness (Physiological)
- Restlessness
- Hopelessness/ Helplessness (Cognitive)

Distress have been associated with elevated levels of cortisol and decreased levels of serotonin, dopamine and norepinephrine

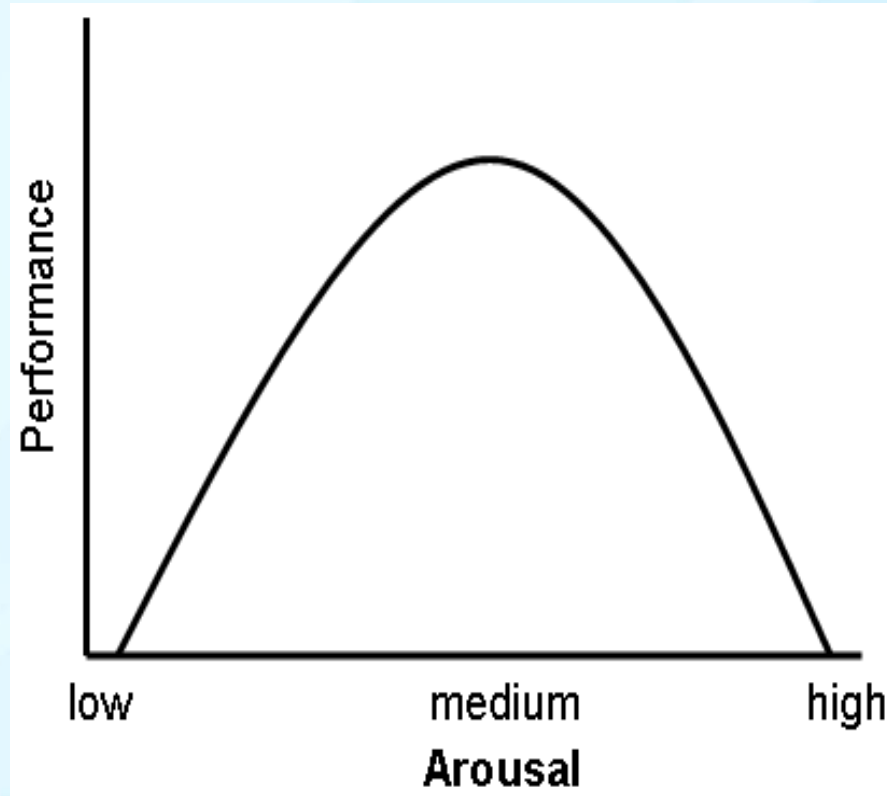
# Types of Stress

- **Acute stress**: Short-term stress conditions of varying degrees of intensity.
- **Chronic stress**: Long-term stress conditions of varying degrees of intensity.
- **Traumatic Stress**: Levels of stress high enough to overwhelm most people.

## Slide 10

We can also think about the temporal nature of stress. Research has shown that the stress can elicit different physical and psychological effects depending on the duration of a stressor. Acute stress can be at different levels of intensity but this type of stress is brief in duration. Chronic stress, tends to be less intense than acute stress (but not always) but the stressors last far longer. Many technological disasters are chronic in nature. Stress levels high enough to cause substantial psychological disruption (regardless of duration) are classified as traumatic stress.

# Intensity of Stressors



(Traumatic)

## Slide 11

The classic Yerkes-Dobson (1908) classic non-linear relationship between levels of arousal and performance – mainly associated with occupational/ industrial psychology, but it has applications to all areas of psychology.

Low levels of arousal – Boredom and disinterest

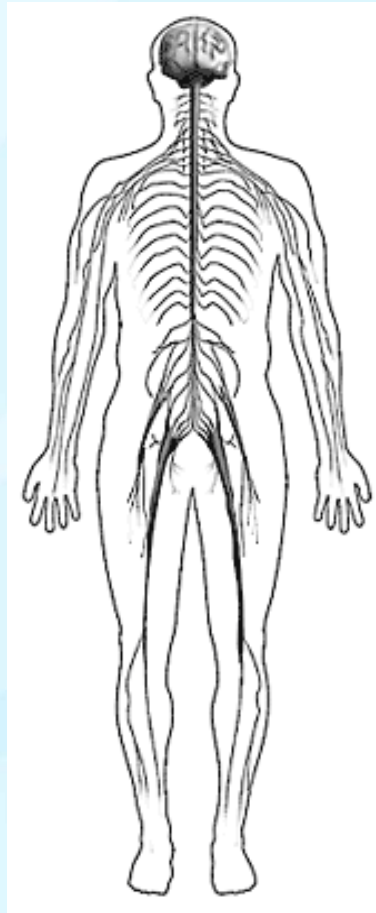
High levels of arousal – Psychological and biological strain (depression and anxiety); too much arousal increases anxiety which tends to decrease performance.

Middle level – “Challenge” level in which an individual is highly motivated and performing at their peak level of efficiency.

Mitigating factors which affect the overall arousal of the system have since been added:

- Social support
- Coping skills
- Personality
- Cognitive appraisal

# Nervous System



## Slide 12

The Central Nervous System (comprising the brain and spinal cord) is the central control system for the body. Therefore, psychological events cause physical changes to the body. We will now take a look at what happens to the body in response to psychological stress and the mechanism by which it happens.

When we think about the overall stress reaction, the mind is essentially the “command center” for the body. Once the mind signals an “alarm,” the stress reaction turns from a psychological (cognitive) experience to a mainly biological one. We know that as biological beings we are simply limited. Over time our bodies can only exert so much effort before fatigue will set in. Too much exertion over time and our bodies will give out.

# The Fight Or Flight Response



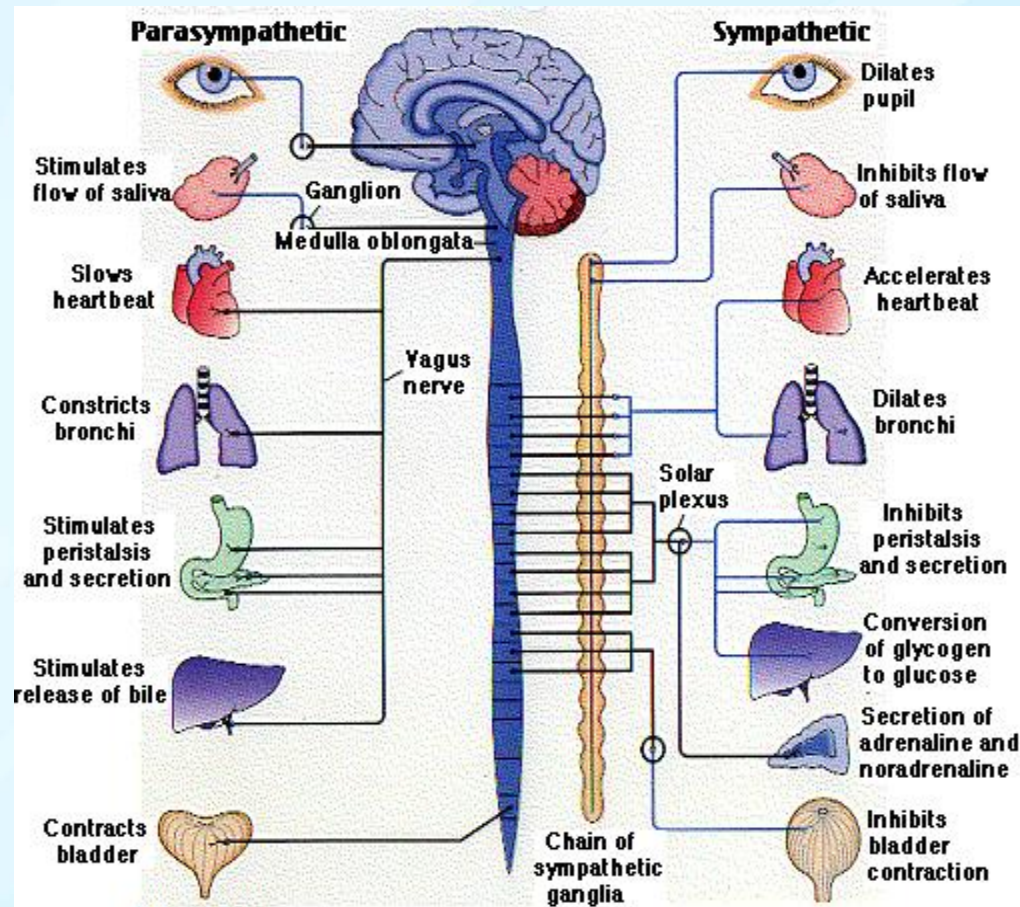
[https://youtu.be/7S\\_BB7R8NMU](https://youtu.be/7S_BB7R8NMU)



Slide 13

Let's watch a short video that illustrates the fight or flight response.

# The Body's Reaction to Stress



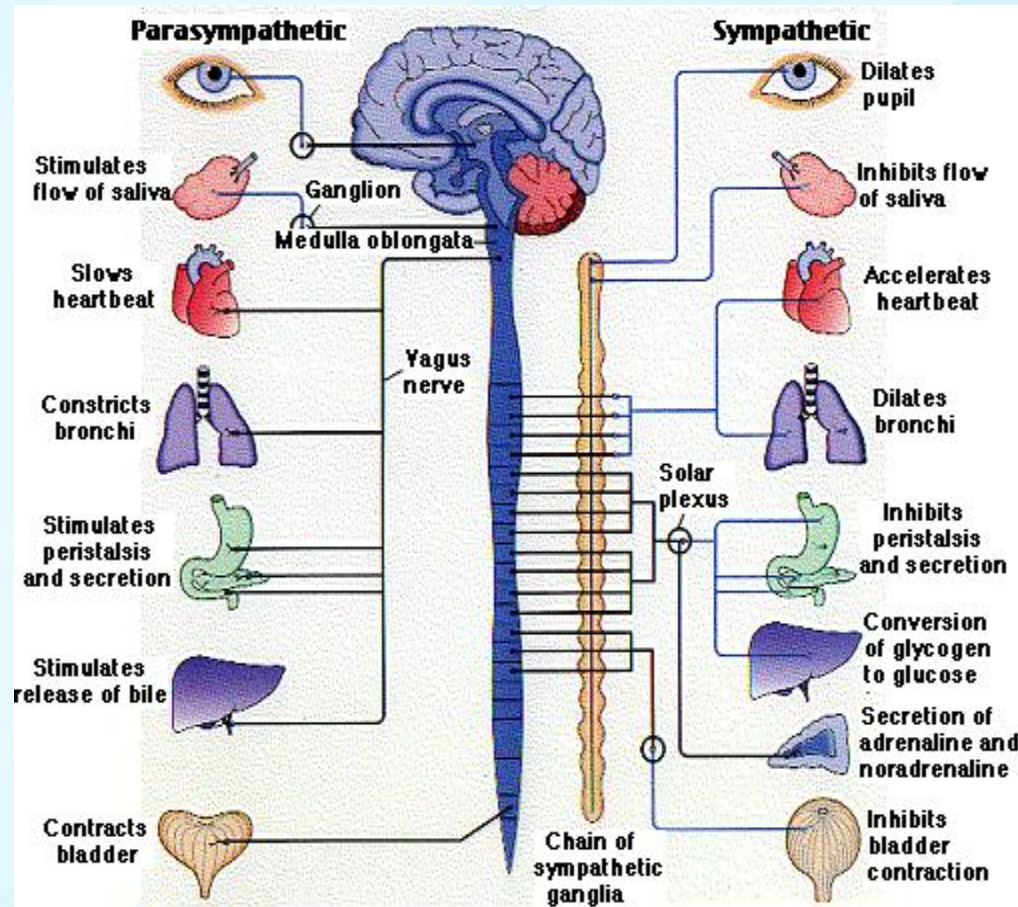
## Slide 14

When we confront a dangerous situation, the hypothalamus first excites the sympathetic nervous system, a group of ANS fibers to accelerate our heartbeat and produce the changes we experience as fear or anxiety. Organs may be stimulated directly (such as the heart) or indirectly by stimulating the adrenal glands (which sit atop our kidneys), particularly the inner layer (the adrenal medulla). When the adrenal medulla is stimulated epinephrine and norepinephrine are released. Epinephrine and Norepinephrine are important neurotransmitters when released in the brain, but when these chemicals are released from the adrenal medulla they act as hormones; thus stimulating the organs and muscles in various ways.

While some systems such as the cardiovascular system are activated... other systems such as digestion and salivation are shut down.

You can think about firefighters and big meals before calls. The meal itself may go basically undigested for a number of hours. Afterwards those firefighters have the twin effects of adrenaline coursing through their system as well as indigestion.

# The Body's Recovery from Stress



## Slide 15

The fight-or-flight response causes a high level of arousal in the nervous system. However, we all know that the system eventually returns to a calm state. Dr. Benson termed the opposite of the fight-or-flight reaction the relaxation response. This response entails the blood pressure going down, respiration slowing down and an overall decrease in arousal. However, the relaxation process is much slower than the stress process. The fight-or-flight reaction is a split second whereas relaxation can take hours.

The parasympathetic system controls the relaxation response. While the activation and mobilization of the sympathetic system is almost instantaneous, the activation of the parasympathetic system is slower and more gradual. Heart rate and blood pressure are lowered and blood flow returns to the digestive system, which ceased during the fight-or-flight reaction.

It is possible to engage the relaxation response by the use of drugs or alcohol. We will discuss the dangers of alcohol to cope with stress later in the session.

# Allostasis

- **Allostasis**: The process of maintaining stability (or homeostasis) through change (Sterling & Eyer, 1988).

## Slide 16

Let's talk more about how the body deals with stress over time. The latest scientific theory about this is called the allostatic load theory. It explains how the biological mediators of stress such as cortisol, epinephrine and inflammatory agents can contribute over time to the risk of certain diseases. Allostasis differs from homeostasis in that homeostasis tightly controls such vital functions as electrolyte levels in the blood and basic functions such as arousal and body temperature whereas allostasis is a dynamic regulatory process that occurs over time to stabilize bodily functions to the stresses that the body faces over time. (McEwen and Tucker, 2011)

# Allostatic Load Theory of Stress

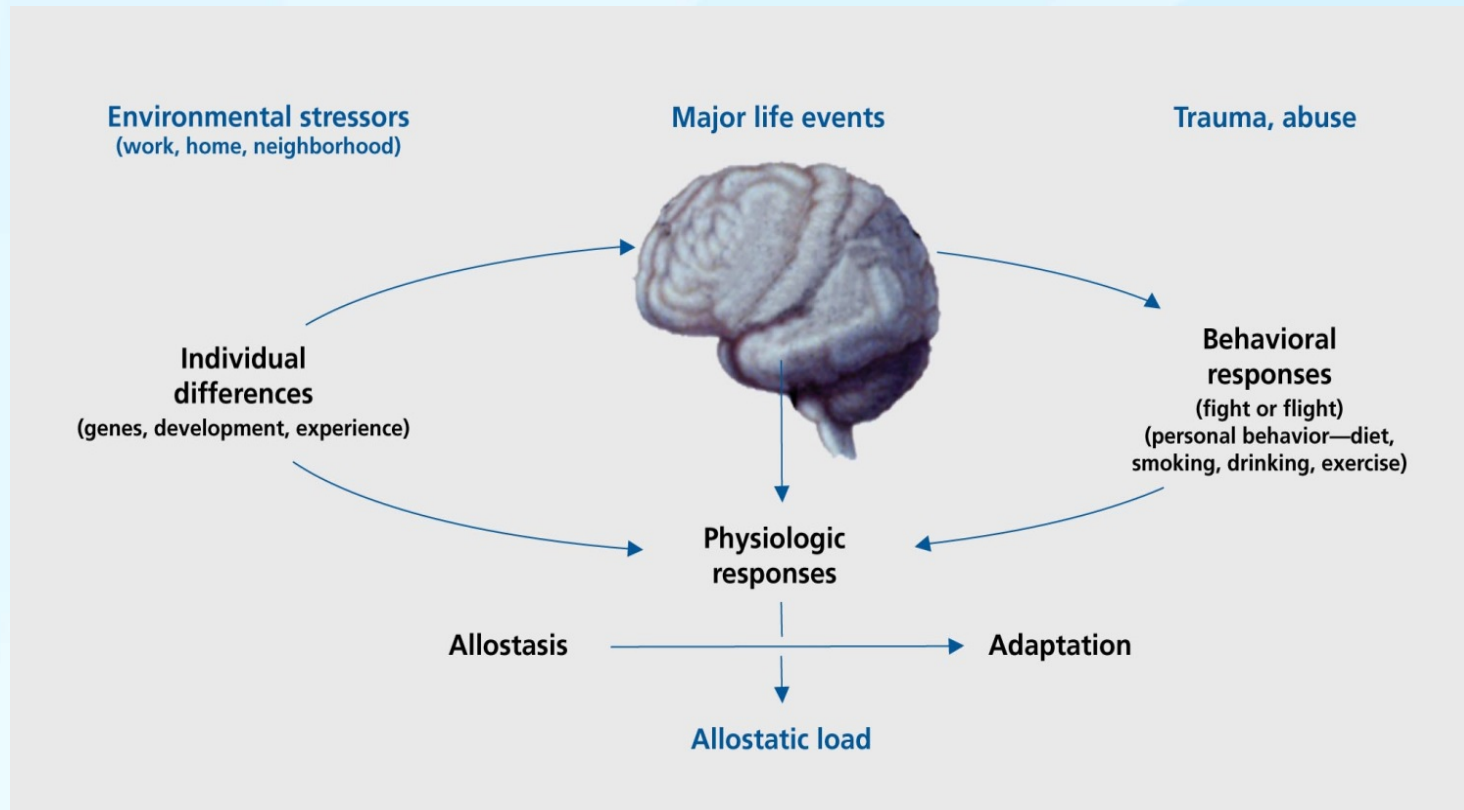
- Allostatic load is the “wear and tear on the body that grows over time when the individual is exposed to chronic stress. It represents the physiological consequences of chronic exposure to heightened neuroendocrine response that results from chronic stress” (McEwen, 1998).



## Slide 17

For example, people who suffer adversity due to poverty and discrimination have shown earlier aging, more depression, and earlier decline of both physical and mental functioning ( McEwen B, 2000). A key hypothesis of the relationship between chronic stress and health is the effect of allostatic load, which is a measure of the cumulative impact of stress on the body. (McEwen and Tucker, 2011) Increased allostatic load from chronic stress can lead to increased risk for some adverse health effects.

# The Interpretation of Stress



## Slide 18

As we said before, the brain is the control center for the body's response to stress. When the amygdala senses a threat and the frontal cortex agrees, the stress response which is physiologic in nature is turned on. There are many things that determine whether someone perceives something as a threat. People who have suffered abuse as children are more sensitive to perceived threats as are people who have suffered major trauma. Some people are more genetically hardy under stress and some ways of bringing up children can make them more able to cope with stress. How one handles the fight or flight response has an impact on health.

# Current Knowledge of Health Effects From Chronic Stress

- Some health effects are affected by chronic above average levels of stress. These effects include:
  - Contribution to risk of hypertension and coronary artery disease,
  - Flares of inflammatory autoimmune disorders and
  - Triggering of GI conditions such irritable bowel disorder (McEwen & Tucker, 2011).
- APA – Stress effects on the body – [www.apa.org/helpcenter/stress-body.aspx](http://www.apa.org/helpcenter/stress-body.aspx)

## Slide 19

Some people are genetically prone to react to an acute stressor by a surge in blood pressure, they are called “hot reactors” and over time, under chronic stress, may be more likely to develop hypertension than someone who does not react to stress with a spike in blood pressure. As part of the physiology of stress, inflammatory mediators are released into the blood stream. These substances such as cytokines can trigger flares of inflammatory autoimmune disorders such as rheumatoid arthritis and lupus. Inflammatory substances are also involved in the formation of plaque in coronary artery disease. Finally, since sympathetic activity during the stress response interferes with the functioning of the digestive system so it is not surprising that GI disorders such as irritable bowel disorder are affected by stress. Chronic stress can cause immune system depression which can lower your resistance to infections.

# Lessons Learned From Toxicological Disasters

- **Superfund and state hazardous sites**
- **Residence near contamination**
- **Emergency evacuations after chemical spills**

## Slide 20

Now let's look at what is known about the psychosocial stress in communities affected by hazardous substances. People who are affected by toxicants can show signs of stress and community disruption. There is a large body of literature about the psychosocial effects of being exposed to chemical contaminants. This knowledge has been gathered from studying the lessons learned from toxicological disasters, which are a type of "technological disasters involving spills of chemicals or radiation that can leave the environment contaminated and human populations at risk for latent health effects" (Tohen et al, 2000) The first site studied by social scientists and psychologists was Love Canal. Since then, many quantitative and qualitative studies have been performed on the psychosocial stress associated with many types of technological and toxicological disasters.

Unlike natural disasters, toxicological disasters have a different life cycle and lived experience. According to the work of Michael Edelstein, an environmental psychologist who performed field studies in environmentally contaminated communities, toxicological disasters present more chronic stress than a natural disaster. Because the invisibility of most environmental contamination, the contamination can go unrecognized and the environmental "disaster" begins when the environmental contamination is discovered and announced. The degree of threat to the community posed by the contamination is initially undefined or contentious. Therefore, many communities get stuck in an under threat phase for years rather than moving into a post-impact stage of cleanup and rebuilding like a natural disaster. The low point of the crisis is not clear due to the prolonged nature of assessment and cleanup. The contamination is usually caused by human error or action so there is a search to find who to blame. There are largely invisible exposures and possible damage to health which leads to long-term psychological uncertainty.

As research on the psychosocial effects of toxicological disasters has progressed, three things were recognized. One of the main determinants of the psychological effects is the individual's experience. Did they suffer first or secondhand from the disaster, did they become ill or have illness thought to be caused by contaminants in the family? Another very important factor in the total psychosocial effects is the community's overall response to the site or the spill. How widely is the social network disrupted by community factions or disagreements? Stephen Couch discusses in this work that toxic disasters tend to form corrosive, divided communities rather than the "helping" communities of that form after a natural disaster.

# **Common Causes of Chronic Stress in Communities: Psychosocial Stressors from Chemical Exposure**

- **Uncertain risks to health from potential or documented exposures**
- **Invisibility of exposures**
- **Latency of health effects**
- **Community turmoil over the degree of threat posed by exposure**
- **Feelings of alienation from others**
- **Concerns over economic loss**
- **Feelings of loss of control over daily life**
- **Frustration over the lengthy clean-up process**



## Slide 21

For the public, life on or near contamination may cause cognitive uncertainty about how much risk a possible or real exposure can pose to their family's health. The usually subtle contribution of low level exposures to health effects may be difficult to grasp and their latency also may cause fear of future health effects. Since the objective evidence of health effects may be absent or based on very technical health assessments, the lack of common agreement about information can lead to various differing degrees of perceived risk to individuals in the community and factions may form around various beliefs about health risk. The factions can clash and this can lead to disruptions in relationships in the community. Additionally, when talking to "unexposed" friends and family, there can be failures to understand the exposed person's concerns and alienation from social networks can take place.

Due to litigation against the potentially responsible parties and redlining of contaminated properties economic losses may be suffered. The average Superfund site can take a decade to clean up and very large and complex ones may become an ongoing process.

# Information as a Stressor

- We will concentrate on this stressor as it is something that the health assessor can help the communities with



## Slide 22

Highly technical information about an unexpected exposure to a chemical can serve as a threat signal to the brain. So, learning about exposures can turn on a fight or flight response that may be difficult to turn off since some exposures have happened in the past and their effects may be nebulous.

Some exposures, especially past unquantified exposures, make it difficult to give a certain answer and that is frightening if the consequences are not understood. At times, people cannot be sure whether they have been exposed to a hazardous substance, how long, how frequently or how much of the substance they've been exposed to over time. Because of possible delayed health effects from exposures, they cannot be sure whether or not a new symptom is the first sign of an exposure related disease. If they do develop an new illness, it may be difficult to prove that it was related to the exposure.

Uncertainty has been thought to be the primary source of much of the psychological effects from an exposure. This uncertainty makes it difficult for an exposed person to understand and know what action to take in response to the exposures. The effects of uncertainty caused by insufficient, technical and contradictory messages were first documented at Love Canal and Three Mile Island. Dr. Andrew Baum who did a ten year study on the levels of stress at TMI said, " information during the TMI incident was the basis of the crisis because inconsistent, hard to interpret information increases perception of threat."

Dr. Henri Vyner, a psychiatrist who worked with veterans suffering from radiation exposure, hypothesized that if after a possible or real exposure, someone cannot form a response or even a coherent explanation of the experience, a traumatic stress neurosis can result. In other words, cognitive uncertainty that cannot be resolved can lead to the development of anxiety.

# Public Uncertainties Related To Possible Exposures

- Uncertainty about past exposures
- Unknown present exposures
- In case of chemical accidents, evacuation uncertainty
- Where does the boundary of the contamination exist
- If exposed, how much of a dose
- How to deal with an exposure
- Financial uncertainty

## Slide 23

It can be very difficult to ascertain how long exposures have been going on once they are discovered. It may be hard to quantitate present exposures. In cases of a severe chemical or radiological accident, it may be hard to decide whether or not to evacuate and how far to evacuate. As noted during many community meetings, it may be hard to draw the boundaries of contamination. If a segment of the community is exposed, they will want to know how much they have been exposed to. If an exposure has occurred, people will have questions about the possible health effects of exposure, what symptoms of that exposure would be. Redlining and possible loss of jobs in a community as well as toxic stigma may cause economic losses.

# Scientific Uncertainty as a Stressor

- The invisible nature of most hazardous substances lead to cognitive uncertainty.
- Uncertainty makes appraisal of the real degree of threat posed difficult and renders adaptation to the threat prolonged and uncertain.
- Scientific uncertainty in health assessments can make a definitive answer about health risk difficult to communicate.

## Slide 24

Let us focus on how scientific uncertainty inherent in health and risk assessment can lead to cognitive uncertainty in the community. One major cause of the stress experienced by the communities near hazardous waste sites is the uncertainty caused by the usually invisible nature of the exposure. Stress is a normal response to the perception of a threat in the environment. Henry Vynner, in his work with atomic veterans was the first to describe how the inability to precisely define a health threat and the invisibility (lack of sensory evidence) of exposures leads to chronic cognitive uncertainty which can lead to a biological state of chronic stress and even anxiety. As scientists, we cannot extrapolate beyond the data and it is very difficult to ascribe individual health effects from an exposure. In my experience, this is perceived by the community as not helpful.

# Official Responses to Scientific Uncertainty

- Many health assessments will have areas of scientific uncertainty.
- It can be, at times, difficult to communicate the true extent of health risk to affected community members.
- Expert and lay perceptions of the risks from chemicals frequently are different. These differences can be bridged.
- The technical nature of health assessments may lead to difficulties in understanding or frank misunderstanding.



## Slide 25

One of the most difficult aspects of an environmental health assessor/educator's job is the communication of potential health risks, if any, from low level exposure to the community. One, depending on the chemical, there may or may not be a knowledge base about possible human effects. Two, health assessments are frequently based on current data and may not be able to address concerns about past exposures and the chance for future health effects. The language used by scientists may be not understood or misunderstood by community members. [example, cancer results being statistically insignificant does not mean the deaths of those people are meaningless or they were insignificant]. Styles of communication may conflict – intellectual versus emotional.

# Lay perceptions of risk from hazardous exposures

- Involuntary nature of the exposure
- Unknowns about nature of the substance and its possible health effects
- Latency of the future health effects
- Uncertainty about how the health effects will appear and if any current health effects are due to exposure
- Cognitive uncertainty is linked to anxiety

## Slide 26

The work of risk communication experts such as Dr. Covello and Sandman also pointed out that the unwanted and involuntary nature of chemical exposures leads to feelings of outrage from inflicted injury on the part of community members and from the beginning, this outrage can undermine trust in public health authorities. This mistrust can make communication of public health information more difficult than a less charged situation.

# Reaching Common Ground With the Public on Scientific Uncertainty

- Technical risk assessments are not sufficient to form a coherent and acceptable risk management strategy.
- Risk communication has evolved from experts explaining the results to a more transparent and inclusive process involving the community.
- Trust of the agency presenting the information is crucial to clear communications of risk.

Slide 27

[Frewer L. 2004. The public and risk communication. Toxicology Letters 149: 391-397]

Risk management is public policy and cannot be solely based on technical risk assessments without input from the community and consideration of variability (at-risk groups) in the population. One way to do this is to address the public concerns as well performing risk assessments for different at risk groups.

Initial risk communication research assumed the public would have extreme difficulty understanding technical uncertainty. Further research shows that this is not so true. By making the uncertainties in risk assessments public, there is a need to explain explicitly and clearly what they are. This increases public trust in an institution trustworthiness but may lower their estimate of its competence. People understand the inability to estimate a risk due to lack of scientific knowledge about a toxin versus uncertainty about the environmental extent and impact of possible exposure.

Clear unbiased communication about uncertainties in risk assessments is one step to increase a community's trust and decrease their alienation and cynicism.

# Other Obstacles to Clearly Defining and Remediating Health Risks

- **New exposures to unknown chemicals are discovered or new unexpected exposures to well known chemicals occur**
- **Resource limitations and short staffing make quick, timely response to a crisis difficult**
- **Endemic public health problems such as lead poisoning present long-term challenges to public health systems**

## Slide 28

New chemicals may become objects of public worry and there may be little scientific data on health effects or normative population levels. Chronic hard to remediate public health problems such as lead in old pipes and aging housing stock presents enormous challenges in terms of understanding the scope of the problem and the resources needed to solve the problem. These issues are systemic and beyond the ability of the health assessors or the community to control.

# WHAT TO DO TO HELP COMMUNITIES

**Alleviating Stress in Communities Affected by Hazardous Substances**





Slide 29

Besides working to explain scientific uncertainties and the limits of health risk assessments to the public, what other ways can health assessors help mitigate stress in communities affected by environmental contamination? [Picture above is from Anniston, Al cleanup]

# Key Principles for Working with Communities “Stressed Out” By Effects from Hazardous Substances.

Slide 30

We'd like to start a discussion with you by presenting some key principles that we have found useful in the past when dealing with communities affected psychosocial stress from the effects of hazardous substances.

# Principle One

*Psychosocial stress in communities affected by potential chemical exposure is a **NORMAL** reaction to an **ABNORMAL** situation*



## Slide 31

Distress in the face of a deadly threat such as a chemical spill or an uncertain threat such as a low level of contaminants in the environment as we have discussed is a normal reaction to an abnormal situation. The community member's responses such as anger, grief, anxiety, information seeking, and challenging public health authorities are all normal responses and not an indication of any mental health problems.

Most people affected by environmental contamination are showing normal emotions but if their concerns do not decrease with time, they can become chronically stressed.

# Principle Two

*Acknowledging that stress and worry are normal responses to potential chemical exposures is key to validating resident's experiences and may be the first step in gaining or regaining a person's or community's trust.*

## Slide 32

It is important to make valid and genuine emotional contact with community members about their concerns. This can be hard especially if people are upset and angry but a good relationship between public health practitioners and community is vital to the success of public health efforts and everyone's peace of mind.

# Principle Three

*Work in partnership with the community.*

*Finding ways to empower the community is one of the most important functions that a responder can perform in chemically affected communities.*



### Slide 33

So, how do you do this? We already collect community concerns and work with community assistance panels. So, we know what the community concerns are. One way we found helpful and you may have found this also is to work in partnership with communities to help them collectively define and solve problems related to the hazardous waste sites. As an example, one of the concerns at Libby and other sites has been economic re-development of the community after clean-up. Obviously, this is not in our agency's mandate but helping the communities to find state, national economic redevelopment resources can be.

# Principle Four

*Use a disaster relief approach; avoid a mental health approach.*

*Or, if it looks like a disaster, it probably is a disaster.*

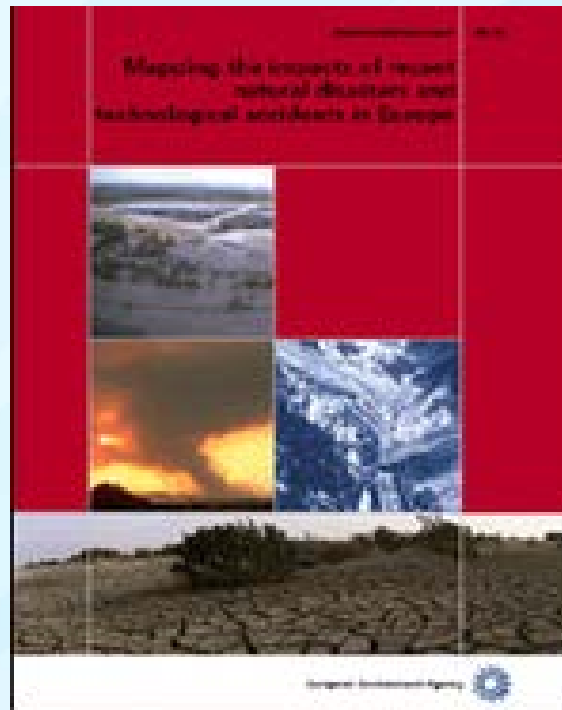
## Slide 34

Again, here we are restating that the overwhelming majority of psychosocial reactions seen in affected communities are normal. This requires an equal helping response from public health personnel and not a mental health approach. Toxicological disasters, unless they are extreme and cause deaths and visible injuries such as Bhopal, do not usually cause disaster related mental health outcomes. In cases where a serious toxicological disaster such as Graniteville, North Carolina has caused deaths and injuries in the community then a disaster relief mental health is required and the appropriate state and national agencies such as the local emergency response personnel, state disaster relief chapters of the American Psychological Association and American Psychiatric Association, and the Red Cross are the appropriate agencies to contact to response to the psychological effects of a acute, serious disaster with casualties. .

In most of our sites involving chronic low level exposures, many community members may be suffering from chronic stress and its resultant emotional and physical health effects. Again, this is a normal response and a mental health approach is not what is required.

# Principle Five

*Provide practical assistance*



## Slide 35

After natural disasters, it is routine to restore safety to a community by rescuing survivors, and provide food, water and shelter to those displaced by the disaster. This does not usually happen in technological disasters since worried communities are left in place. However, in some recent technological disasters such as Flint, Michigan water was supplied to the whole city in order to stop the exposure to the lead in drinking water. Providing concerned communities with good information and health education is another way of providing practical assistance. Recently, DCHI has been exploring a fact sheet that talks about community stress due to toxic exposures as a new way of providing assistance.

# Principle Six

*Help the person/community be prepared for the long-term nature of the situation*

Slide 36

As we are all too aware, the lifecycle of a Superfund sites is measured in years and sometimes, decades. There are rarely any fast or easy solutions to environmental contamination.

# Principle Seven

*Understand how the uncertainty, invisibility, fear, and loss of control associated with chemical contamination can affect residents, i.e., by taxing people's coping abilities leading to chronic stress*



## Slide 37

Psychosocial stress is a two way street. In our work, it is our interactions with communities that can cause us stress and some of the stress communities face comes from our response. Besides our roles as public health responders, understanding the psychological and psychological toll that stress can take on community members as well as ourselves, can provide a basis for understanding the at times baffling responses of communities dealing with environmental contamination. When I first started working at sites, I was confused by the fact that a no public health hazard often made some people mad and that declaring a public health hazard could lead to some people being relieved. Then, when I realized that bad news psychologically is better than unclear news, the reason for those reactions became clear. Anything we can do to make visible the exposures (maps, diagrams, videos), ease the fear (health education) and restore control to these communities, the less stress they will suffer.

# Principle Eight

*Recognize community  
diversity and individuality*

## Slide 38

This is an issue of getting to know how unique each community is and what kind of social variables affect community responses. Let me give just a few examples. Regional differences can be stark. How a town in the West will respond may differ significantly from a city in the Northeast. Socioeconomic status can affect what priority and urgency communities place on environmental contamination. An impoverished working class community may be bitterly divided by the fact that the company may go out of business due to the cleanup and vital jobs may be lost. For a very wealthy community, the impact of possible health effects and diminished quality of life and diminished property may take prominence. Unique cultures such as Native Americans, may suffer cultural and subsistence diet changes due to pollution and other communities may be concerned about environmental equity of the pollution as a sign of institutional racism.

# **Case Study:**

## **A Community Affected by Uncertainty Regarding Causality**

## Slide 39

Fallon case study. In 2000-2001, a small agricultural community in Nevada, Fallon was discovered to have a significantly significant number of children with Acute Lymphocytic Leukemia and Acute Myelocytic Leukemia. By the end of 2001, 15 children in Churchill county, Nevada had been diagnosed with either ALL or AML and there was one death. ATSDR's community stress team was contacted by the Nevada State DOH. They had received a \$25,000 grant to relieve the psychosocial distress related to the cancer cluster and they asked the team to consult with them. SAMSHA disaster relief needs assessment unit was also involved. Our team coordinated with SAMSHA to conduct a needs assessment of the psychosocial needs of this community. A visit from one of our team members collected the stresses that the community expressed -

1. There was deep concern for the well being of the families whose children were suffering from leukemia. The nearest cancer treatment facility was in California and these families had to drive many miles to go to doctor's appointment and for treatment sessions. These families were under a severe financial, emotional, and physical strain and their neighbors were very concerned about them.
2. There was a great deal of publicity about the cluster and the town was overwhelmed with news crews, local and national.
3. There was a toxic stigma on the agricultural produce of the area since they had been labelled as a "toxic town" and farmers were suffering economic losses.
4. People whose children were well were concerned that their children had been exposed to something that would lead them to develop leukemia.
5. The community was very concerned about the cause of the cancers, that it be found and the cancers stopped. One of their main concerns regarding the cause was the jet fuel dumped in the desert by jets coming into the Naval Air Station in Fallon. After initial collection of community concerns, SAMSHA, ATSDR, Nevada DOH collaborated in a community meeting to develop a plan of action to tackle the psychosocial concerns. That community meeting was held on September 10, 2011. It was facilitated by a SAMSHA disaster relief coordinator. A representative group of community members including families with ill children attended. The community action plan for the use of the grant money consisted of three things:

1. Hiring a social worker to aid the families affected by the cancer cluster
2. Forming a community advisory panel to help coordinate with the state
3. media training for community spokespeople so the toxic stigma could be addressed.
4. Meeting with the Navy's community liaison to discuss the community's concerns.

This psychosocial relief plan was implemented by the state. Health assessments revealed high arsenic and tungsten levels in the local water. These were not thought to be the cause of the cancers. However, upgrades to community water were addressed so the MCL for arsenic could be meet. The cluster did not continue and dissipated. To date, no cause was found.

# Implementing Stress-Relief Strategies in Communities Affected by Uncertainty

- Support strategies
- Technical assistance strategies
- DTHHS Community Stress Team



#### Slide 40

This concludes the formal part of my presentation. We are here for the agency and help provide advice and assistance in helping ATSDR staff address psychosocial stress in the communities they serve. Dr. Coles will next address how you as a community responder can help yourself with the stress that this type of work can cause.

# **Guidelines for Addressing Stress-Related Issues in Health Assessors**



# Recognizing Signs of Overwhelming Stress in a Health Assessor

- **Physical Signs/Symptoms:**
  - Severe chest pains with shortness of breath
  - Signs of shock
  - Signs of mental confusion
  - Dilated pupils
- **Psychological/Behavioral Signs:**
  - Being overworked
  - Facing a Hostile Audience (With Angry Outbursts)
  - Inability to respond to commands

## Slide 42

One of the most important things for a manager is to know when to pull someone whose performance is compromising the effort.

### Physical signs:

Physical signs can be evidenced by severe chest pains accompanied by shortness of breath or the signs of a stroke, including rapid light breathing, a quick pulse, shivering, feeling chills, getting nauseated, having moist, clammy skin, or suffering from mental confusion.

### Psychological signs:

The psychological signs are rarer than the physical signs but can include “freezing up” at a disaster scene, being dazed and unaware of one’s environment. Psychological signs can also include a severe panic attack.

Supervisors need to closely monitor the inexperienced responder and emphasize adequate rest and relaxation for the entire staff.

# Timelines for Disaster Responses

- **Response Recommendations:**
  - On a disaster site, team members should not have more than a 12-hour shift, and
  - Rotating team members is crucial.
- **Team members need time away from a disaster site so:**
  - Team members are strongly encouraged to not volunteer their time to a disaster response when off-shift.

Slide 43

It doesn't always work out this way, but the recommendation is for a shift at a disaster site to be 12-hours in duration with at least two days off.

The rotation of team members is crucial.

Highly dedicated staff will want to help as much as they can. Team members should be strongly encouraged not to volunteer their time at a disaster response.

# Coping After a Community Response

- **General Tips:**
  - Return to normal eating and sleeping;
  - Within 24 to 48 hours post-event, exercise is important.
  - Refrain from using alcohol for a few days during recovery from field duty:
    - Alcohol interferes with normal sleep patterns and
    - Alcohol can inhibit judgment and impair behavior.

#### Slide 44

Responders should be encouraged to return to healthy eating and sleeping as soon as possible. Managers should make responders know that it may be difficult to relax right after their shift is over. Dreams and nightmares are common immediately after a disaster event.

Exercise is important to help reduce the effects of stress. Outside hobbies should be strongly encouraged as well. Many managers also stress the importance of volunteer activities outside of the job and spending quality time with family and friends.

Managers should also recommend that responders refrain from junk food and highly caffeinated drinks which can interfere with relaxation.

Managers should also stress that responders should not drink alcohol for a few days after an event. The reasons for not drinking are listed above but another reason is that for someone who may already be depressed, alcohol can make that person more depressed.

# Resources

- **Stress and Resilience Information**

[www.nimh.nih.gov](http://www.nimh.nih.gov)

- **You Tube videos:**

**Fight or flight response.** **Bozeman Science**

**Managing Stress.** **Brainsmart-BBC**

**How stress affects your brain.** **TED-ED**

# References

- Baum A, Gatchel RJ, Schaeffer MA. 1983. Emotional, behavioral, and physiologic effects of chronic stress at Three Mile Island. *J Consult Clin Psychol* 54(4): 565-72.
- Couch SR, Kroll-Smith JS, editors. *Communities at risk: Collective responses to technological hazards*. New York: Peter Land, 1991.
- Edelstein M. 2003. *Contaminated Communities: Coping with Residential Toxic Exposure*, Second edition. Westview Press.
- Frewer L. 2004. The public and risk communication. *Toxicology Letters* 149: 391-397.
- McEwen B. 2000. The neurobiology of stress: from serendipity to clinical relevance. *Brain Research* 886(1-2): 172-189.
- McEwen B and Tucker, P. 2011. *Critical Biological Pathways for Chronic Psychosocial Stress and Research Opportunities to Advance the Consideration of Stress in Chemical Risk Assessment*. *American Journal of Public Health*.
- Tohen M, Bromet E, Murphy J, Tsuang M. 2000. *Psychiatric Epidemiology*. *Harvard Review of Psychiatry*, Vol 8 (3): 111-125.
- Vynner HM. *Invisible trauma: psychosocial effects of invisible environmental contaminants*. Lexington, MA: D.C. Heath, 1988.



# Closing

Thank you for your participation in this session.

Are there any questions?

**For more information please contact Agency for Toxic Substances and Disease Registry**

4770 Buford Hwy, NE Chamblee, GA 30341

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

Visit: [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov) | Contact CDC at: 1-800-CDC-INFO or [www.cdc.gov/info](http://www.cdc.gov/info)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.