National Institute of Environmental Health Sciences

Safety Awareness for Disaster Researchers

A Practical Guide to Disaster Researchers' Health and Safety

WORKER TRAINING PROGRAM

September 2022

Preface

The aftermath of natural, technological or intentional disasters, such as hurricanes, information technology outages, or terrorist acts, raises important questions about their impacts to human health and the environment. These events create unique opportunities for scientists to gather important information and help identify ways to mitigate short- and long-term health effects of disasters and prepare communities for future disasters.

This training tool was developed by the National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP) as a health and safety resource for researchers conducting field work following disasters. This tool will help researchers understand the fundamentals of how to identify and control hazards at disaster sites and protect their health and safety.

Additional information on the NIEHS Disaster Research Response (DR2) Program is available at *https://www.niehs.nih.gov/research/programs/disaster/index.cfm*, and information for other disaster preparedness and response training tools is available at: *https://tools.niehs.nih.gov/wetp/index.cfm?id=556*.

NOTE

- This training tool DOES NOT replace your organization's policies, guidance, protocols or any written law or regulations.
- We encourage users to visit their organizations' occupational safety and health office to obtain its official worker safety and health protocol for deployment / field work and seek guidance.
- Always keep in mind that when in doubt about the safety of an activity, STOP what you are doing. Be sure you are safe BEFORE continuing.

Goal and Learning Objectives

Goal: Increase disaster researcher health and safety awareness when deploying to conduct field research.

Learning objectives: After attending, participants will be able to:

- Identify safety and health risks in disaster sites.
- Define protective measures to mitigate the health and safety risks.
- Understand disaster researchers' rights to a safe and healthy workplace.
- Review strategies for protecting mental health prior to, during, and after deployment.

Before Deployment

- During the planning process, researchers must decide to deploy in alignment with their individual values and organizational policies.
- Researchers must consider their personal safety, acceptable risk levels, trust in their organization's training and equipment, and safety of the affected community when deciding to deploy.
- NIEHS WTP created the NIEHS Emergency Support Activation Plan and Researcher Deployment Guide to help researchers and their families prepare for deployment: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11006

Pre-Deployment Questions

- How long will my deployment be?
- How will I travel?
  - From home to and from the disaster site?
  - Locally between sleeping quarters and the disaster site?
- What will my research work involve?
- What emergency services are available near the disaster site? (e.g., police, fire, EMS, hospitals)
- Who do I report to?
  - What is their name, title, and contact information?
- What will I eat and drink?
- What is the average weather?

Situational Sensitivities of Disaster Sites

- Disaster sites are often the locations of life-changing events for those impacted.
- While disaster research is vital work, it is imperative that disaster researchers remain highly sensitive to the many changes that disaster victims experience.
- Disaster researchers must employ high levels of self-awareness, patience, compassion, and empathy to ensure that at no time does their work create unnecessary burdens on impacted communities.
- Before deploying, disaster researchers should familiarize themselves with the core cultural aspects of the communities they will work with to help build relationships and trust.

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MODULE 1:

Understanding Disaster Sites

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National Incident Management System (NIMS)

- Released in 2004, NIMS provides a framework for incident management.
- “One mission, one team...”
- Applies to ALL-HAZARDS incident types (e.g., natural, technological, or intentional.)
- Establishes a uniform set of structures and processes for use by all emergency responders, across all levels of government, to organize and conduct incident operations.

Core Elements of NIMS

- Incident Command System (ICS)
- Preparedness (planning, training, exercises, qualifications and certifications of all personnel involved in incidents)
- Communications and Management
- Joint Information System
- NIMS Integration Center (NIC)

Incident Command System (ICS)

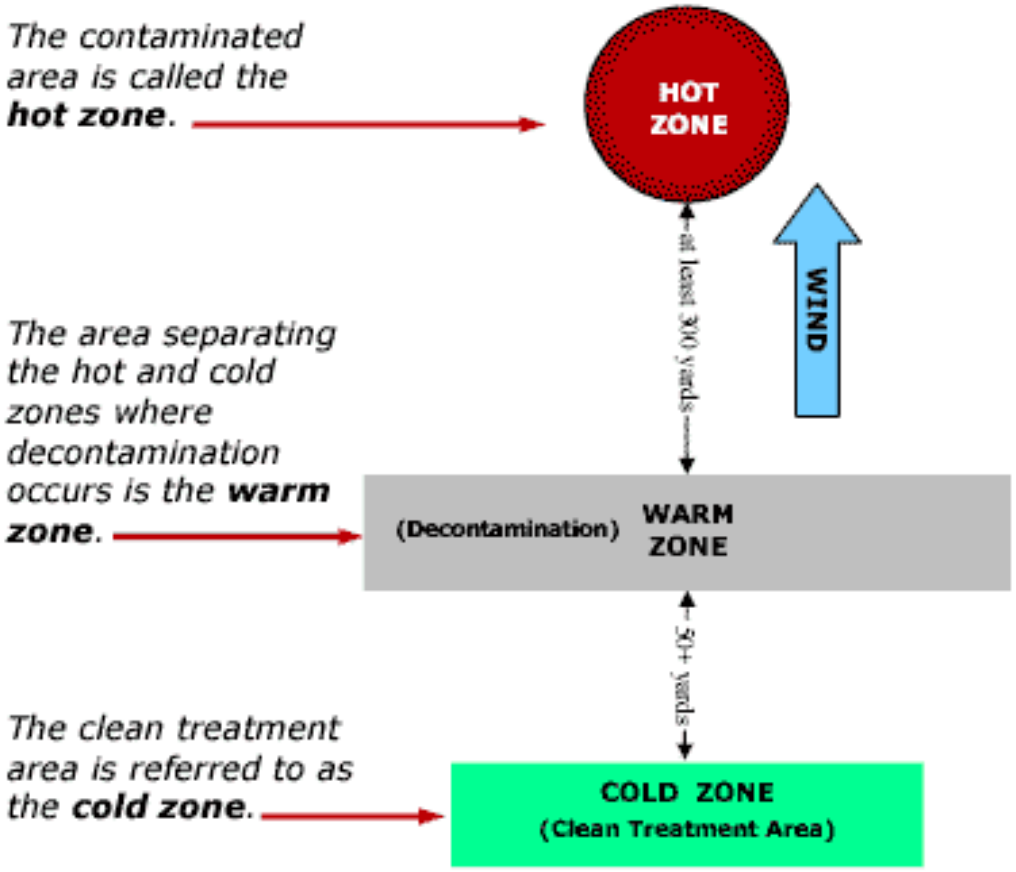
- ICS provides structures and processes that promote communication, coordination, and collaboration among emergency responders that can transcend jurisdictional boundaries.
- Comprises 5 organizational functions:
  - Command
  - Operations
  - Planning
  - Logistics
  - Finance and Administration
- Uses common language to improve understanding

Incident Command System (ICS)

Field Emergencies

- Ask what medical support is available and be sure you understand how to access it.
- If the disaster hit a densely populated area, understand how that may affect responders requiring medical attention.
- For minor injuries or health concerns seek:
  - First Aid, EMT, or nurse station
  - Local hospitals or clinics
- For serious emergencies, call 911.
  - Know your exact location
  - Note that while 911 may be operable, other emergencies and priorities may impact response time
- Notify your supervisor about all injuries, illnesses, and emergencies.

Disaster Site Control



Six components of disaster site control:

1. Control zones
2. Health and Safety Plan (HASP)
3. Communications plans and tools
4. Emergency plan
5. Site map
6. Buddy system

Disaster Site Driving Hazards and Safety

- Disaster sites present driving hazards such as standing or moving water, downed electrical wires and debris
- Road closures, damaged or missing signage and electric traffic control devices, are common in and around disaster sites
- Access to routine vehicle services such as gasoline, EV charging and maintenance such as engine oil, transmission fluid and tire air, may be unavailable or inadequate in and near disaster sites
- To ensure your safety, always
  - Avoid driving when fatigued
  - Drive with another licensed adult (e.g., buddy system)
  - Plan your trip in advance including identifying alternate routes
  - Always use your safety belt
  - Drive at a speed safe for road and weather conditions
  - Treat all intersections as a four-way stop
  - Be alert for unsafe conditions, and avoid them when possible

Reminders

- While immediate response and rescue operations may pause or cease during your deployment, **ALWAYS** maintain high levels of situational awareness of your surroundings to mitigate and manage safety and health hazards.
- **IMMEDIATELY** notify your supervisor or emergency personnel of safety and health hazards.
- **NEVER** interfere with response and rescue efforts!
- To ensure personal safety and that of the impacted community, **ALWAYS** consult your organization's health and safety office to identify and access necessary health and safety trainings.

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MODULE 2

Assessing Hazard Exposures at Disaster Sites

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Disaster Site Hazards

- Hazards may vary depending on the type of disaster.
  - Physical environment (e.g., rusty nails, unstable ground, mold)
  - Infectious diseases (e.g., vector-borne, water-borne)
  - Interacting with affected communities (e.g., upset, and / or hostile individuals)
  - Psychological stress (e.g., stress, Post-Traumatic Stress Disorder)
  - **ALWAYS** take the necessary safety precautions when deployed.
  - **NEVER** put yourself in harm's way. If the situation appears unsafe, **DO NOT** enter.

Austere Environments of Disaster Sites

- Disaster researchers should prepare to function in austere environments that negatively impact activities of daily living, including:
  - Sleeping on cots or in sleeping bags in tents
  - Limitations on the ability to maintain personal hygiene (e.g., restrooms, bathing, and / or brushing teeth using running water)
  - Inoperable or insufficient electricity, cell service, and internet connectivity

Health and Safety Plan (HASP)

Guide for employers and workers to help prevent human injury, and death.

- Familiarize yourself with the HASP.
- Follow your organization's health and safety policies and procedures during your deployment.
- If you have any questions regarding the plan, contact your supervisor and / or your organization's health and safety office.
- Review your HASP **BEFORE** you start work!

Medical Preparedness

- Medical checkups may be recommended for deploying researchers.
- All deployed researchers should be able to perform the functions of their job in the field.
- Ensure that all necessary vaccinations are up-to-date.
  - Tetanus and Hepatitis B vaccines may be necessary if there is possibility for bloodborne exposure or exposure to other potentially infectious materials.
- The Centers for Disease Control and Prevention (CDC) keeps lists of recommended vaccinations people should have prior to deployment.

Health care Checklist

- Physical and mental medical clearance from health care provider
  - Dental and vision checkup
- Forced Expiratory Volume (FEV1) testing
- Vaccinations
- 30-day supply of prescription and over-the-counter medications
- Additional pairs of prescription glasses
- Contact information of health care providers and pharmacies in deployment area

Protect Yourself: Personal Safety Kit

- Adhesive bandages
- Alcohol-based hand sanitizer
- Field-durable snacks (e.g., granola bars)
- Insect repellent
- Prescription glasses (NOT contact lenses)
- Sunscreen
- Sunglasses
- Topical antibiotic ointments

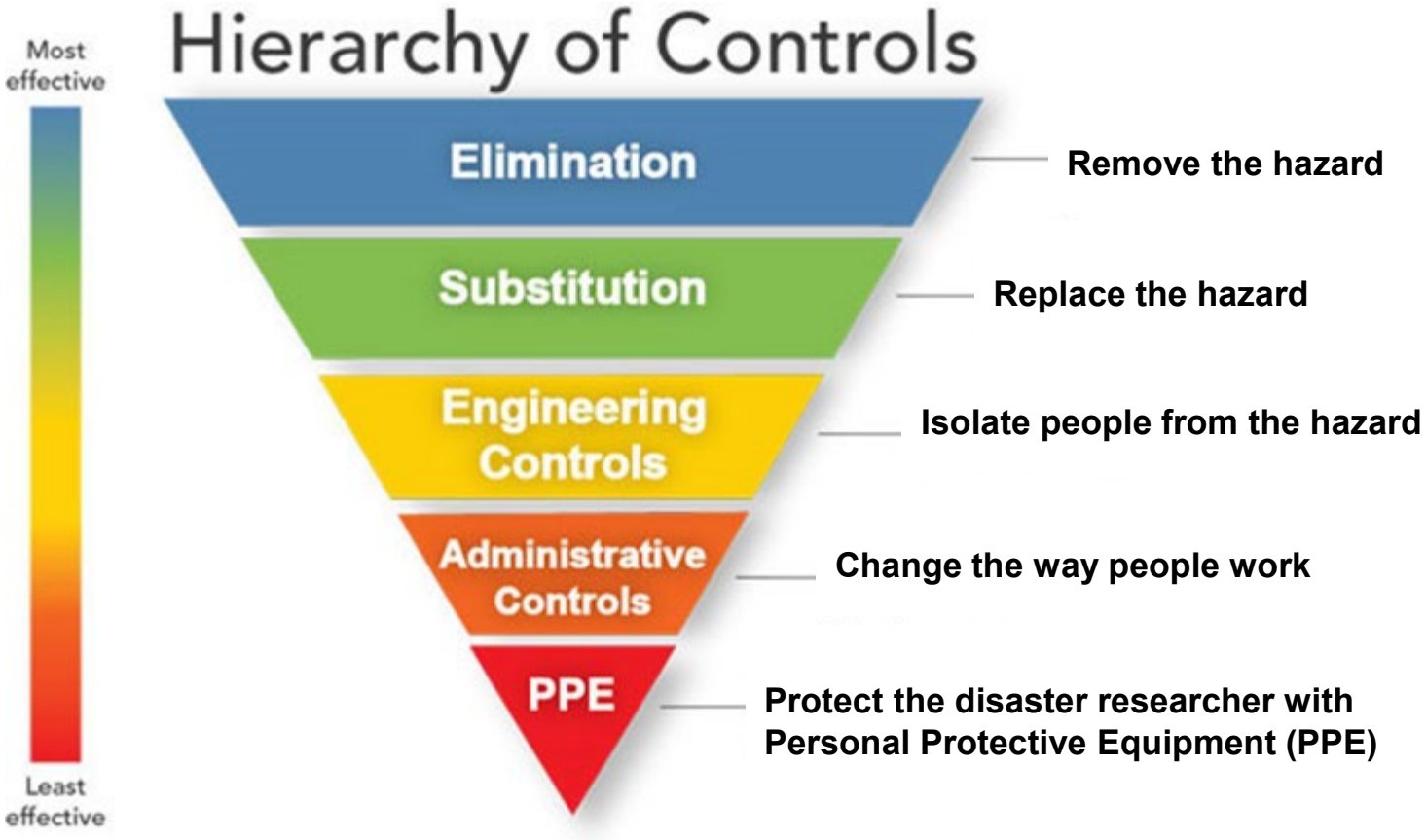
Protect Yourself

- Be mindful that protective gear may not be immediately available, if at all, for disaster researchers.
  - When possible, deploy with your own fitted gear, in individual packs, to guarantee availability.
- Be careful walking over and handling debris covered with water due to increased risk of slips, trips, and falls.
- Consider wearing durable footwear, such as hiking boots.
- Use hearing protection for noisy environments.
- Know your medicines, allergies, and blood type.
- Bring ruggedized laptops, tablets, and electronics.
- Stow your own electronics chargers.

If you have questions, contact your supervisor!

Protect Yourself

Start with the most effective method to protect disaster researchers.



General Safety Tips

- **ALWAYS** follow your HASP.
- Walking/working surfaces may be wet, slippery, and unstable.
- Spread sand and wear slip-resistant footwear to reduce slips and falls.

General Safety Tips (continued)

- Walking over and handling debris that is unstable can cause cuts, scrapes, bruises, sprains, etc.
- Avoid contact with stagnant water.
  - If exposed, **IMMEDIATELY** wash and decontaminate yourself and contaminated equipment.

Buddy System: Operating as a Unit

- Pairing individuals prevents the other from becoming ill or injured.
- Individuals serve as a mutual resource for one another during a crisis.
- It can be an essential and lifesaving practice.
- “Buddy” pairs often consist of one member with more experience and one with less experience.
  - Never go anywhere alone; there is safety in numbers.

Buddy System: Operating as a Unit (continued)

- Pairing helps both members' confidence, stress levels, and safe practices.
- **ALWAYS** actively look for signs and symptoms of physical or mental distress in fellow disaster researchers and **IMMEDIATELY** address them.
- The buddy unit improves individual and team mutual accountability.
  - Conduct morning and evening check-ins.
  - Consider collectively reviewing and sharing travel plans for team awareness.
  - The same number of disaster researchers who deploy, **MUST** safely return home.

Heat Related Illness Signs and Symptoms

Heat Rash	Heat Cramps/Fainting	Heat Exhaustion	Heat Stroke
• Red cluster of pimples or small blisters, usually on neck, upper chest, groin, under breasts, in elbow creases • Extensive areas of skin that do not sweat on heat exposure, but present gooseflesh appearance that subsides with cool environments	• Muscle cramps, pain, or spasms in the abdomen, arms, or legs • Fainting, dizziness, or light-headedness after standing or suddenly rising from a sitting/lying position	• Headache • Nausea • Dizziness, weakness • Irritability • Thirst, heavy sweating • Elevated body temperature • Decreased urine output	• MEDICAL EMERGENCY • REQUIRES IMMEDIATE MEDICAL INTERVENTION AT HOSPITAL • Confusion, altered mental state, slurred speech, loss of consciousness • Hot, dry skin or profuse sweating • Seizures • Very high body temperatures • Fatal if treatment delayed

Nutrition and Hydration are Critical!

- Eat small, light meals frequently
- Drink plenty of fluids **BEFORE** you're thirsty
- For short-term hydration, potable water is sufficient
- For long-term hydration, especially in hot, humid, and physically taxing conditions, drink caffeine-free sports drinks or other electrolyte solutions, such as Pedialyte

Hazard: Sunburn

- Prevent overexposing skin
- Sunglasses, if used, must be ANSI approved for use as safety glasses
- Use sunscreen and lip balm
- Use protective eyewear
- Limit exposure

Sunburn reduces responder readiness and increases the likelihood of skin cancer.

Hazard: Cold Stress

- When the body is unable to warm itself, serious cold related illnesses and injuries may occur, and permanent tissue damage and death may result.
- **Hypothermia** can occur when ***land temperatures*** are above freezing, or ***water temperatures*** are below 98.6° F/ 37° C.
- Cold related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.

Hazard: Cold Stress (continued)

- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help.
- Select proper clothing for cold, wet, and windy conditions.
- Layer clothing to adjust to changing environmental temperatures.
- Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Take frequent short breaks in warm, dry shelters.
- Perform work during the warmest part of the day.
- Avoid getting to the point of fatigue or exhaustion; muscles need energy to keep warm.
- Use the buddy system (work in pairs).
- Drink warm, sweet beverages (sugar water, electrolyte solutions, (e.g., Pedialyte).
- Avoid drinks with caffeine (coffee, tea, or hot chocolate) or alcohol.

Hazard: Animals, Insects, and Plants

- **To protect yourself from mosquitoes and bees:**
  - Be mindful that vacant structures, trees and vegetation are often where mosquitoes lay eggs and bees develop hives
  - Use screens on dwellings
  - To protect yourself from bites and stings, wear long pants, socks, and long-sleeved shirts
  - Use insect repellents that contain DEET or Picaridin
- **Beware of wild or stray animals:**
  - Avoid displaced wildlife or stray animals, including loose pets; call local authorities to handle animals
  - Wear and clean proper protective clothing when handling carcasses
  - Beware of rodents in structures and confined spaces

Animal, Insects and Plants (continued)

- Be alert for snakes, especially in unusual places.
- Protect your skin!
- Be vigilant! If you see a hazard, say something!
- If you are bitten:
  - Seek **IMMEDIATE** medical attention
  - Attempt to describe or identify the snake to assist with determining appropriate treatment
  - **DO NOT** cut the wound or attempt to remove venom out

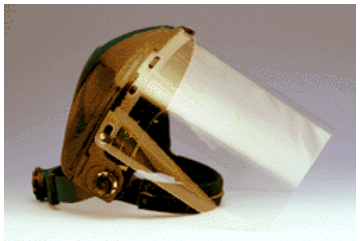
Personal Protective Equipment (PPE) Precautions

- While PPE is a critical component of the hierarchy of controls, donning, doffing and using PPE entails hazards, such as significant heat related stress when wearing fully-encapsulating ensembles.
- It is imperative that before using PPE, disaster researchers receive thorough training in all aspects of its use by demonstrating applicable competencies.
- **NEVER** enter nor operate at a disaster site that requires PPE until you complete all necessary training.

Examples of PPE

Safety Glasses

Safety Goggles



Face Shield

Level C PPE with Tyvek splash suit and APR respirators

Example of Leather Gloves

Example of Nitrile Gloves

N-95 respirator

Half face APR

Full face APR

PAPR

Decontamination (Decon)

Depending on your role as a disaster researcher, you may encounter hazardous materials that will require decontamination (decon).

- Removing, destroying, or reducing the activity of materials, such as ash, asbestos, or toxic chemicals.
- Decon prevents spreading contamination to other locations (e.g., your vehicle or home).

Decontamination (Decon)

After contact with hazardous materials:

- Wash your hands thoroughly with soap and warm water
- Bathe
- Remove **ALL** clothing that has been in contact with the materials
- Keep and wash contaminated clothes separately

Prevent the spread of contamination to your family and home

- Bringing home contaminated work clothes or equipment may contaminate your home and place your family at risk.
- Bring a clean change of clothes to the worksite.
- Wash work clothes separately.

Handling Biological Specimens

- Handling biological specimens requires specific training for safe handling and processing.
- Follow your organization's health and safety plan (HASP) and approved Institutional Review Board (IRB) protocols.

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MODULE 3

Resilience: Protecting Mental Health

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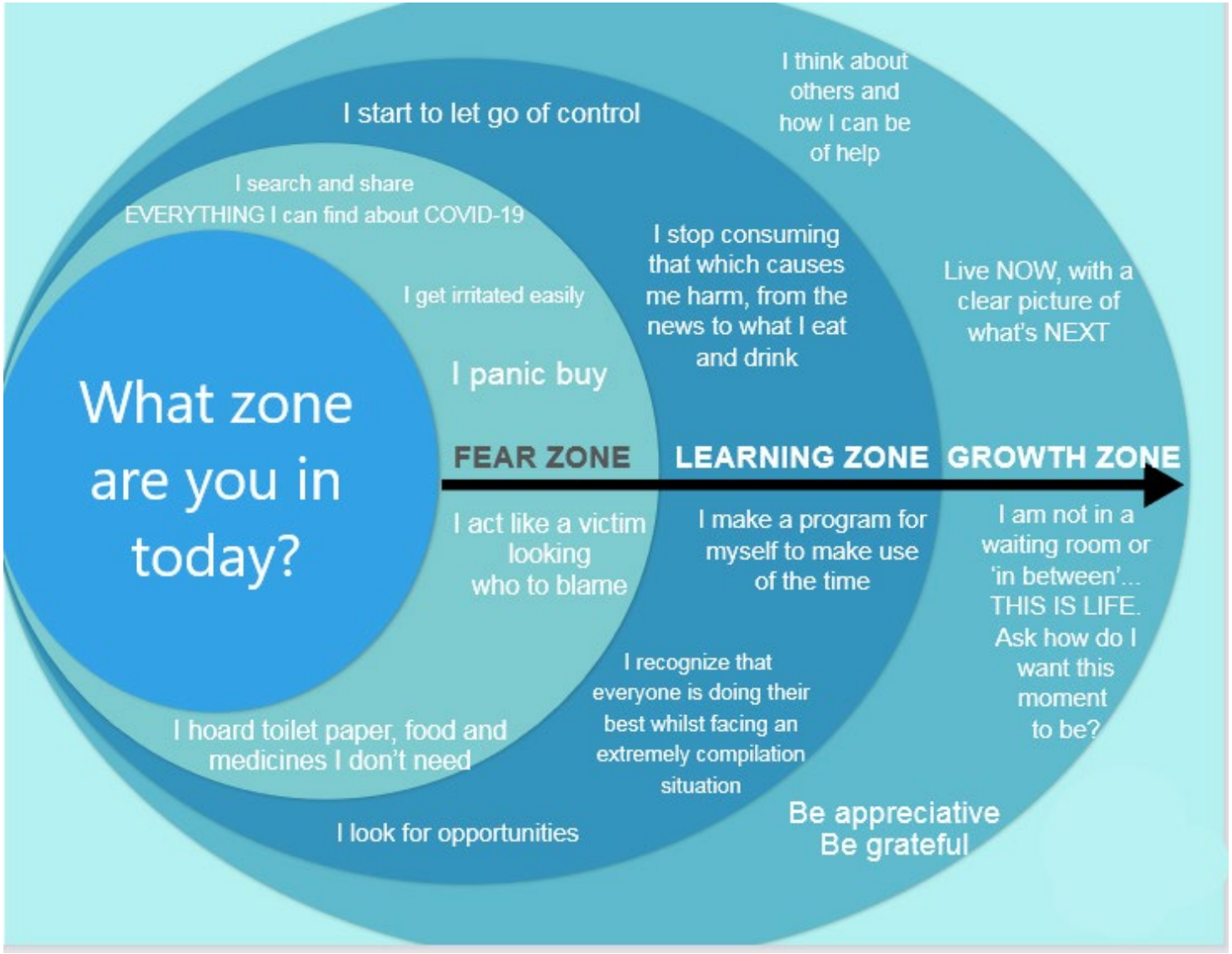

What zone are you in today?
I start to let go of control
I think about others and how I can be of help
I search and share EVERYTHING I can find about COVID-19
I get irritated easily
I stop consuming that which causes me harm, from the news to what I eat and drink
Live NOW, with a clear picture of what's NEXT
I panic buy
FEAR ZONE
LEARNING ZONE
GROWTH ZONE
I act like a victim looking who to blame
I make a program for myself to make use of the time
I am not in a waiting room or 'in between'... THIS IS LIFE. Ask how do I want this moment to be?
I recognize that everyone is doing their best whilst facing an extremely compilation situation
I hoard toilet paper, food and medicines I don't need
I look for opportunities
Be appreciative
Be grateful

Mental Health and Stress

Consider the following:

- **Use your smart phone** to stay connected to family and friends. Shift from texting to voice or video calling to feel more connected.
- **Keep comfortable.** Do more of the things you enjoy doing at home.
- **Practice stress relief** whenever you feel anxiety building – do some deep breathing, exercise, read, dig in the garden; whatever works for you.
- **Avoid unhealthy behavior** such as excess drinking, which will increase your anxiety.
- **Keep looking forward.** Make plans for six months from now.

Self-Care and Stress Management

- Actions individual researchers can take to increase resiliency
  - Healthy habits
  - Connecting with others
  - Giving and receiving social support

Reaching Out to Co-Workers

A fundamental step in protecting the mental health of disaster researchers is simply reaching out to one another.

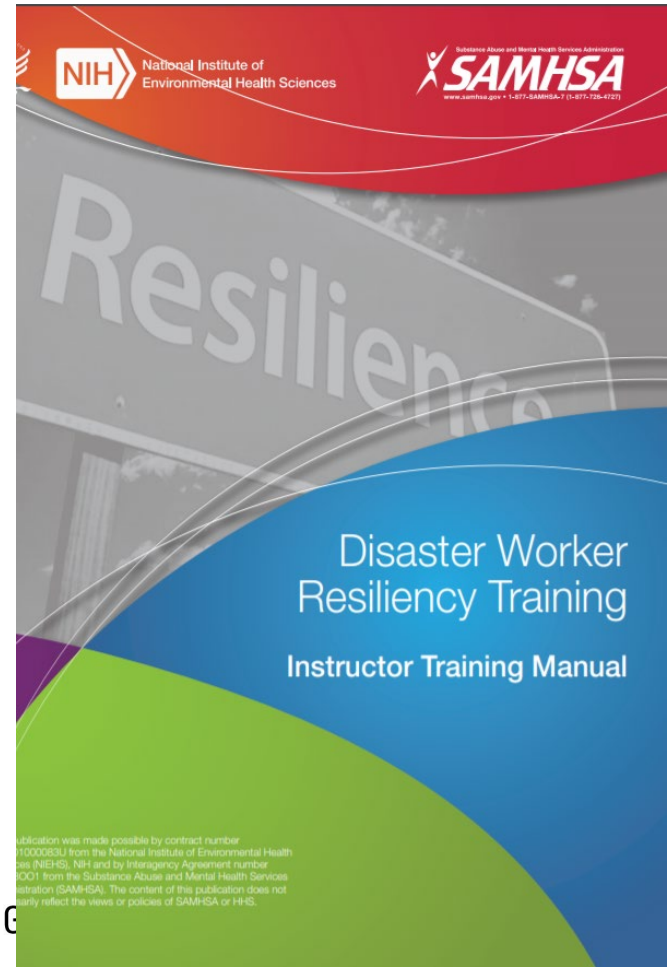
- Ask co-workers how they are doing.
- Engage in active listening by giving the person your full attention.
- Choose the appropriate time and place.
- DO NOT pressure anyone to talk if they are not ready.

Post-Deployment Mental and Physical Health

- Mental and physical health affects can occur for months following exposures to hazards you encounter at disaster sites and include
  - Mental: Difficulty concentrating, sleeping; Intrusive, repetitive negative thoughts and feelings
  - Physical: Delayed respiratory symptoms, such as cough or difficulty breathing, and non-healing or recurrently wounds
  - Always immediately seek professional help and inform your organization's occupational safety and health office of all post-deployment mental and physical health concerns

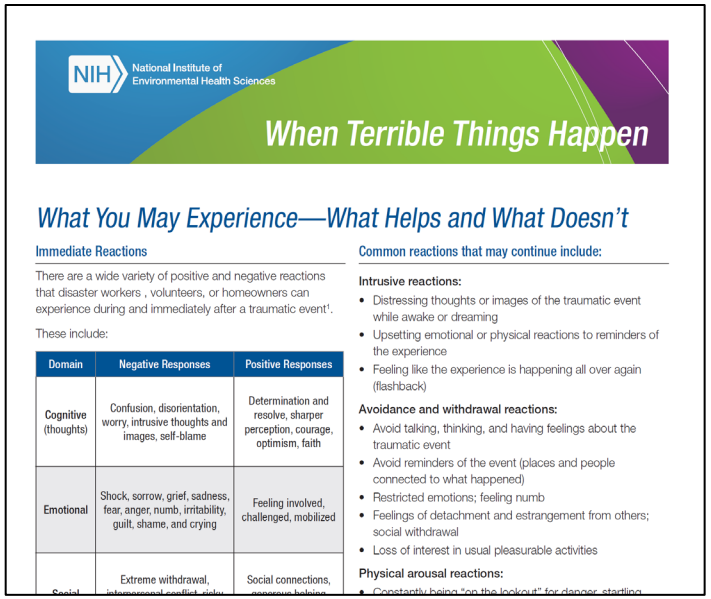
Check out NIEHS Disaster Worker Resiliency Training

- 4-hour interactive training course
- Prepares disaster workers to recognize and address work-related psychological stress and trauma.
- https://tools.niehs.nih.gov/wetp/index.cfm?id=2528



4 Fact Sheets Are Available

1. When Terrible Things Happen: What You May Experience – What Helps and What Doesn't
2. Connecting with Others: Giving and Receiving Social Support
3. Information for Families: When a Family Member is Traumatized at Work
4. Caring for Yourself in the Face of Difficult Work



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When Terrible Things Happen

What You May Experience—What Helps and What Doesn't

Immediate Reactions

There are a wide variety of positive and negative reactions that disaster workers , volunteers, or homeowners can experience during and immediately after a traumatic event[1].

These include:

Domain	Negative Responses	Positive Responses
Cognitive (thoughts)	Confusion, disorientation, worry, intrusive thoughts and images, self-blame	Determination and resolve, sharper perception, courage, optimism, faith
Emotional	Shock, sorrow, grief, sadness, fear, anger, numb, irritability, guilt, shame, and crying	Feeling involved, challenged, mobilized
Social	Extreme withdrawal,	Social connections,

Common reactions that may continue include:

Intrusive reactions:

- Distressing thoughts or images of the traumatic event while awake or dreaming
- Upsetting emotional or physical reactions to reminders of the experience
- Feeling like the experience is happening all over again (flashback)

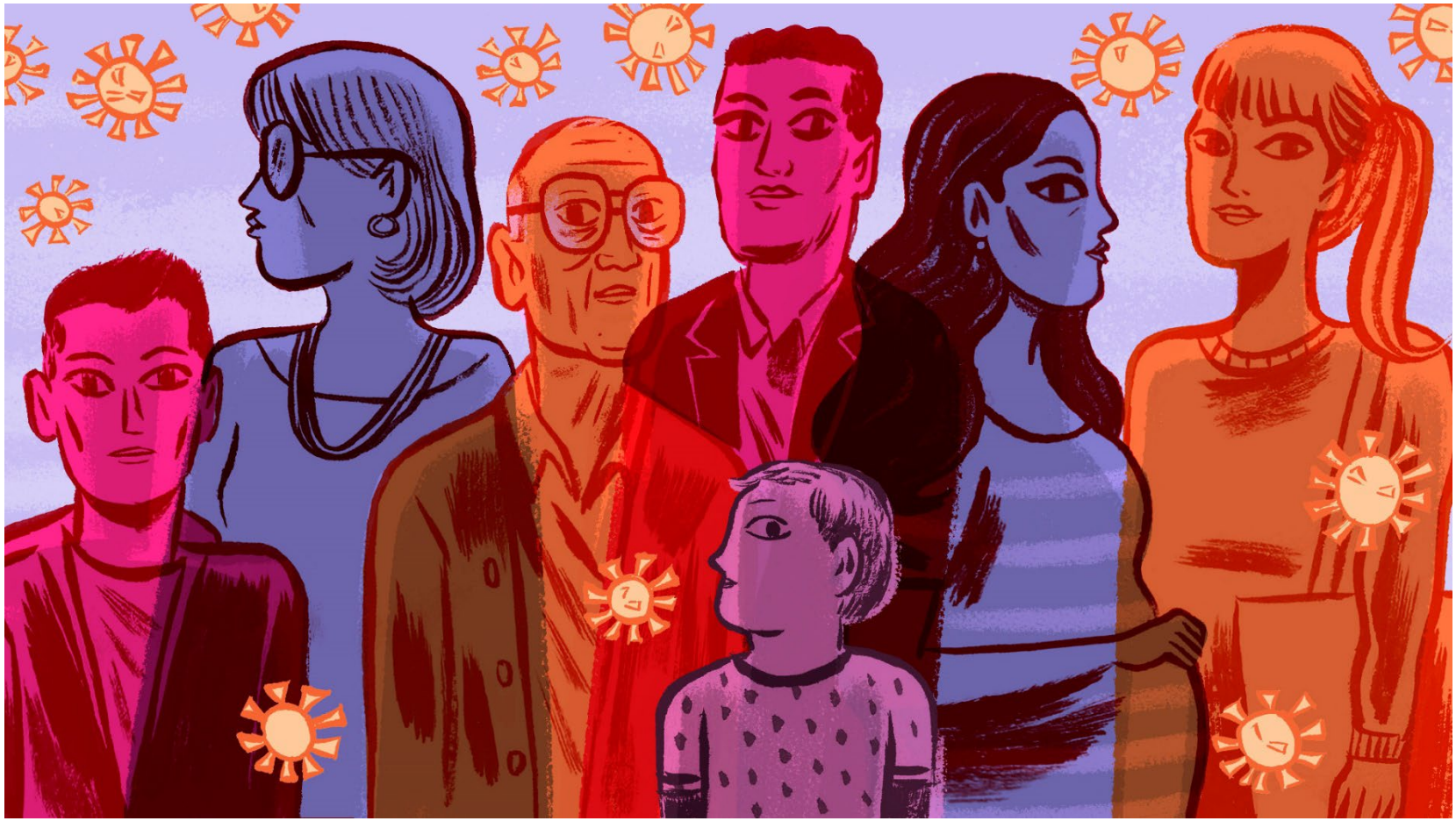
Avoidance and withdrawal reactions:

- Avoid talking, thinking, and having feelings about the traumatic event
- Avoid reminders of the event (places and people connected to what happened)
- Restricted emotions; feeling numb
- Feelings of detachment and estrangement from others; social withdrawal
- Loss of interest in usual pleasurable activities

Physical arousal reactions:

https://tools.niehs.nih.gov/wetp/index.cfm?id=2528
in English and Spanish

Remember: Disaster researchers' work can also impact their families' health and safety



SAMHSA Disaster App

Substance Abuse and Mental Health Services Administration (SAMHSA) Disaster App features:

- Resources and a comprehensive directory of behavioral health service providers.
- Ability to download information on phones in cases of limited Internet connectivity.
- Send information to colleagues.

http://store.samhsa.gov/product/samhsa-disaster

Additional Resources

- Centers for Disease Control and Prevention (CDC) http://www.cdc.gov
- Occupational Safety and Health Administration (OSHA) http://www.osha.gov
- NIEHS Worker Training Program https://tools.niehs.nih.gov/wetp/index.cfm?id=2554
- NIEHS Disaster Research Response (DR2) Program https://www.niehs.nih.gov/research/programs/disaster/index.cfm
- NIEHS Emergency Support Activation Plan: Researcher Deployment Guide: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=11006

Why this training tool was created

This training tool was created by the National Institute of Environmental Health Sciences (NIEHS) National Clearinghouse for Worker Safety and Health Training under contract number 75N96021D00008 from the Worker Training Program (WTP).

WTP has trained more than 4 million emergency responders and hazardous waste workers since 1987 to do their jobs safely. WTP is a part of the U.S. Department of Health and Human Services, which is a cooperating agency under the Worker Safety and Health Support Annex of the National Response Plan. As part of the coordinated effort, the National Clearinghouse works with NIEHS, WTP, and DR2 to protect researchers' health and safety as they deploy to disaster sites.