

# CDC Environmental Health Nexus



**Hurricane Safety and Preparedness Webinar  
will begin at 1 p.m. ET**

National Center for Environmental Health  
Agency for Toxic Substances and Disease Registry



# Health Impacts of Hurricanes

## More Than Just Property Damage

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June 2, 2021

# 2021 Hurricane Season Forecasts

- **Activity for 2021 is predicted to be slightly higher in intensity compared to 2020.**
- **A total of 17 named storms, eight hurricanes, and four major hurricanes are expected this season per the Colorado State University prediction center.**
- **Do not count on the weather getting the memo.**
- **Prepare for the worst, then you will only have GOOD surprises.**

## Preparedness for 2021 Season

- **Preparing self/family will enable you to prepare for your job.**
- **A direct storm impact is not required to have personal and professional impacts from a hurricane.**
- **Some of the worst historical damage is from slow moving or stalled tropical storms, not hurricanes.**
- **The storms will not read the warning models!**

# Medical Services Compromised

- **Dialysis clinics**
- **Oxygen concentrators**
- **Home IV therapy**
- **Power loss at medical service companies**
- **Hospitals have limited fuel storage for generators**
- **Extremely limited radio communications backup at medical facilities**
- **Loss of medical refrigeration starts clock ticking on medication shelf life at home, pharmacy, hospital, and clinics**
- **Loss of security systems and lighting will require most facilities/stores to close**

## Direct Citizen Impacts

- **Loss of home lighting and refrigeration**
- **Loss of news sources (radio, TV, internet)**
- **Outages will eventually impact landlines**
- **Loss of cell phone charging capability**
- **Loss of thermostability due to heating/air conditioning failure**
- **Many hotel companies have a policy to force evacuation if power is not available to limit liability.**

# Risk of Electric Shock

- **Fallen power lines**

- Stay clear of fallen power lines. Call the electric company to report them.
- Watch out for power lines overhead.

- **Flooded homes**

- Turn off power to the home if you can stand in a dry place to do it.
- Otherwise, have an electrician turn off power to the home.
- Never turn power on or off, or use an electric tool or appliance, while standing in water.

- **Water-damaged power tools**

- Never use an electrical device if it got wet.
- If it's still plugged in, turn off the power at the main breaker.
- Wait for an electrician to check the device before using it.

# Spoiled or Contaminated Food

- **Spoiled or contaminated food and water can make people sick.**
- **If they get sick, they may have limited access to medical care.**
- **Encourage people to do the following:**
  - Stockpile canned food ahead of time.
  - Keep food fresh.
  - Throw out spoiled food.
  - Clean off canned food. Storing canned goods in gallon zip bags buys time.
  - Use bottled water, if possible, or boiled water, if necessary, especially for infant formula. Only use treated water (disinfected or purified) if bottled and boiled water are not available.



# Carbon Monoxide Poisoning: Advice for the Public

- **Never use gas or coal-burning equipment inside your home, basement, or garage. Keep it outside and at least 20 feet from any window, door, or vent.**
- **Use a battery-operated or battery backup CO detector any time you use a generator or anything else that burns fuel.**
- **Never run a car or truck inside a garage attached to your home, even with the garage door open.**
- **Never heat your home with a gas oven.**
- **If you have a carbon monoxide detector and it starts beeping, leave your home right away and call 911.**

## Other Health Risks

- **Driving through flood waters**
- **Animals and pests**
- **Psychological harm**
- **Injuries during cleanup**
- **Mold**
- **Hyperthermia and hypothermia**

# At-Risk Populations and Hurricane Preparedness

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Epidemiologist, CDC

June 2, 2021

# Federal Legislation

- **Pandemic and All-Hazards Preparedness Act (2006)**
  - Passed by Congress following Hurricane Katrina to drive federal disaster support for every American community
  - Defined “at-risk populations” as children, pregnant women, senior citizens, and others who have special needs in a public health emergency and requires that governments plan for the needs of at-risk populations in emergencies
- Two subsequent administrations reauthorized PAHPA
  - **Pandemic and All-Hazards Preparedness Reauthorization Act (2013)**
  - **Pandemic and All-Hazards Preparedness and Advancing Innovation Act (2019)**
    - Includes “access and functional needs” language to bring HHS into consistency with the Department of Homeland Security

# What is an At-Risk Population?

- “At-risk individuals” are people with access and functional needs (AFN) (temporary or permanent) that may interfere with their ability to access or receive medical care before, during, or after a disaster or public health emergency.



# What are Access and Functional Needs?

- **Access-based needs** include information and resources needed to maintain health before, during, and after an emergency.
  - Social services, information, transportation, medications
- **Function-based needs** make a person require assistance before, during, and after an emergency.
  - Children & adults who depend on caretakers, persons who use mobility equipment
- **C-MIST Framework**
  - Framework adapted by FEMA for use in emergency planning



# What are Access and Functional Needs? (cont.)

- Transcend a specific diagnosis, status, or label
- Include a wide range of individuals who may need additional support
- People can have multiple access and functional needs
- Populations likely to have individuals with access and functional needs
  - Infants and children
  - Pregnant women
  - Older adults
  - Persons with disabilities
  - Persons belonging to racial & ethnic minority groups
  - Persons with limited English proficiency
  - Economically disadvantaged persons

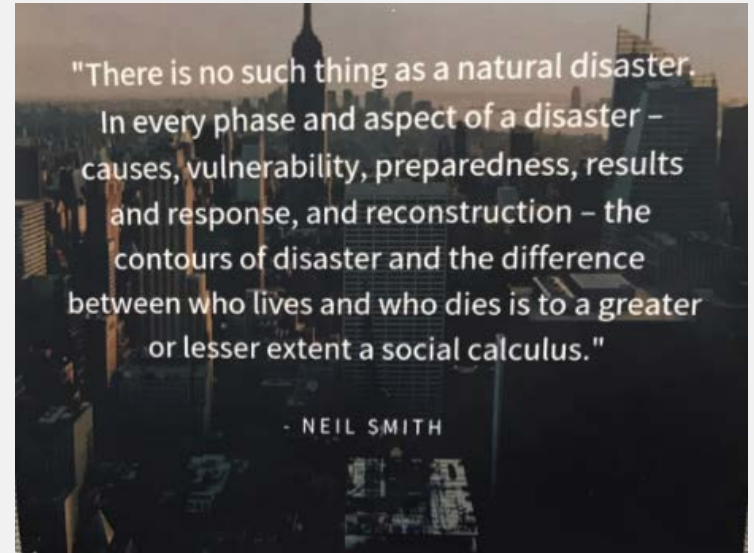
# Functional vs. Population Approach in Emergency Planning

- The five C-MIST categories define the type of services needed but they do not specify how responders might locate vulnerable populations who have those needs.
- Populations can be defined by health conditions or by geographic, demographic, cultural, or socioeconomic characteristics, allowing responders to locate and enumerate sub-populations expected to have greater needs.
- The approaches are complementary, and both should be considered in emergency planning based on the context and purpose.



# Hurricanes: Un-Natural Disasters

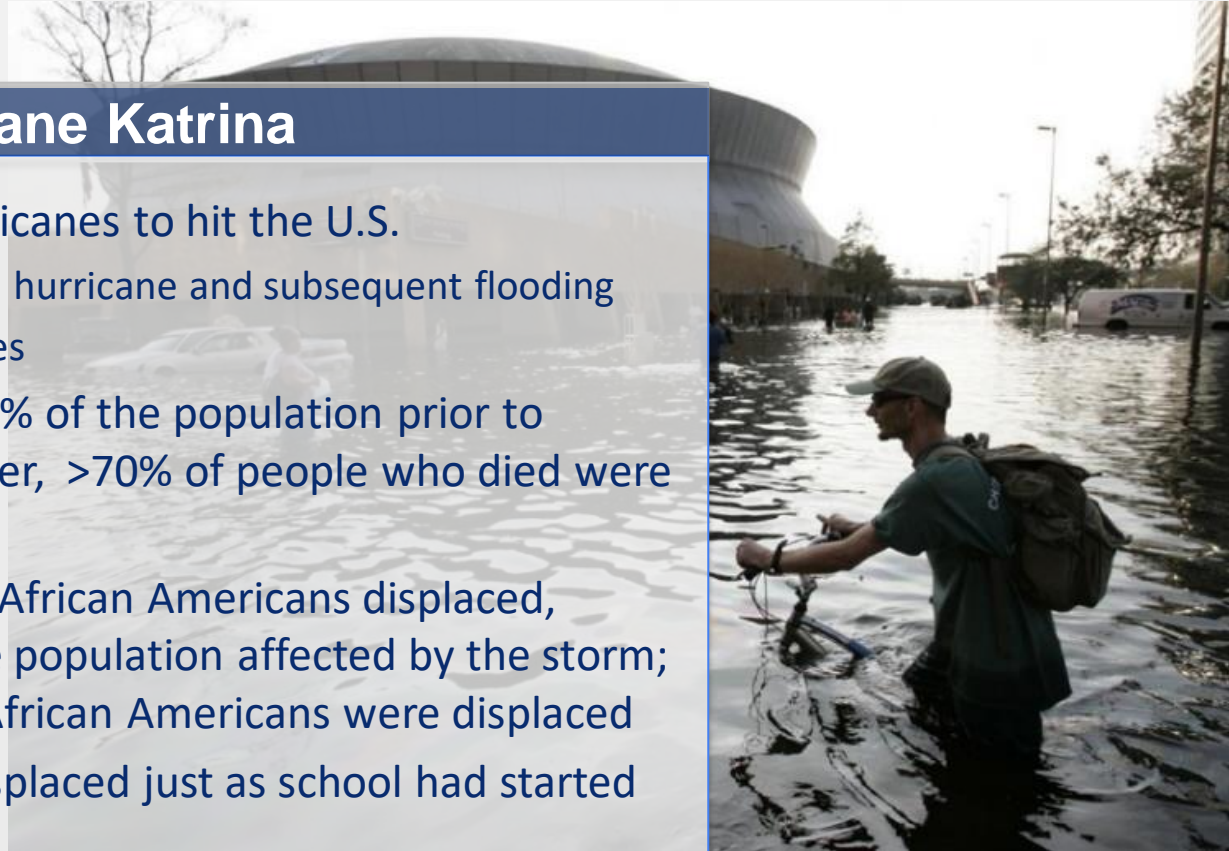
- Disasters—including hurricanes—tend to harm segments of the population that were already disadvantaged before a disaster.
- There is **differential vulnerability** for people by where they live, work, and play.



# Un-Natural Disasters: Hurricane Katrina (2005)

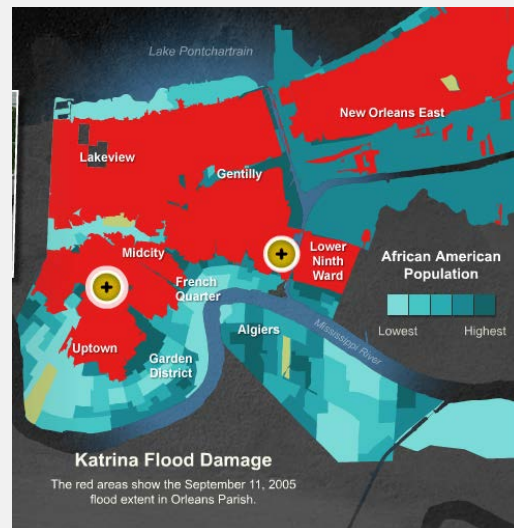
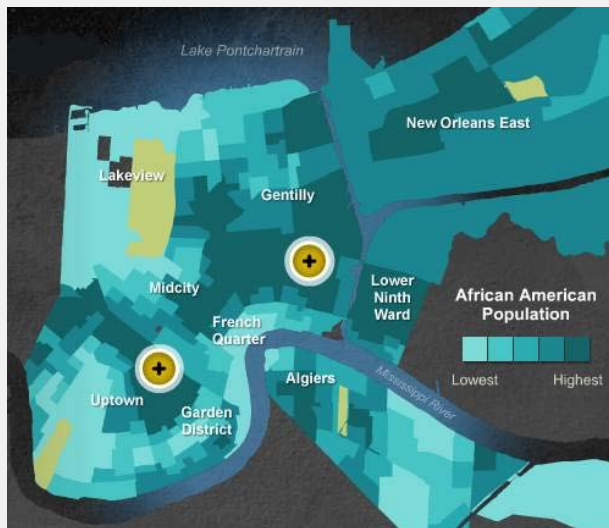
## Hurricane Katrina

- Among the deadliest hurricanes to hit the U.S.
  - Estimated 1,833 died in hurricane and subsequent flooding
  - >\$108 billion in damages
- People  $\geq 60$  years were 15% of the population prior to Hurricane Katrina; however, >70% of people who died were elderly
- Orleans Parish: ~272,000 African Americans displaced, accounting for 73% of the population affected by the storm; in contrast 101,000 non-African Americans were displaced
- 183,000 children were displaced just as school had started



# Hurricane Katrina: Root Causes of Differential Impact

- Half of New Orleans is below sea level; aging infrastructure
- Black communities with high concentrations of poverty live in low-lying areas, while more affluent white communities occupy higher ground in outlying areas



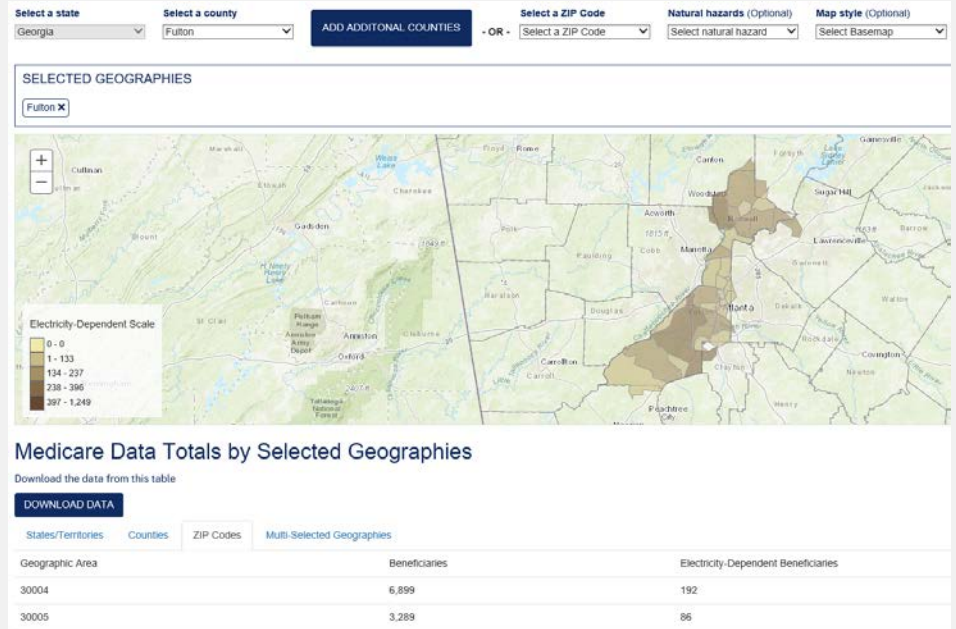
# Incorporating At-Risk Populations in Preparedness Planning

- Ensure plans include at-risk populations.
  - Create a cross-walk (see table)
- Include representatives from at-risk groups in planning.
- Planning must be **intentional and specifically address** at-risk communities.
- Exercise the plans and include at-risk population scenarios.

Functional Need	Population
Communication	Children Older Adults Limited English Proficiency Racial/Ethnic Minorities
Medical Care	Individuals with Chronic Medical Conditions
Independence	Individuals with Disabilities
Supervision	Children Older Adults
Transportation	Older Adults Individuals with Disabilities

# Tools for Identifying At-Risk Populations: HHS emPOWER Map

- The HHS emPOWER Map provides the total number of electricity-dependent Medicare beneficiaries in a geographic area for emergency planning purposes.
- Severe weather from hurricanes can cause prolonged power outages, which can be life-threatening for individuals who rely on durable medical and assistive equipment and devices that run on electricity, such as ventilators.



<https://empowermap.hhs.gov/>

# How Does CDC Work on Behalf of At-Risk Populations in Hurricanes?

- The At-Risk Task Force (ARTF) is a dedicated Task Force in CDC's Emergency Operations Center.
- ARTF includes at-risk population subject matter experts from across CDC.
- ARTF participates year-round in preparedness planning for hurricanes and other public health threats.

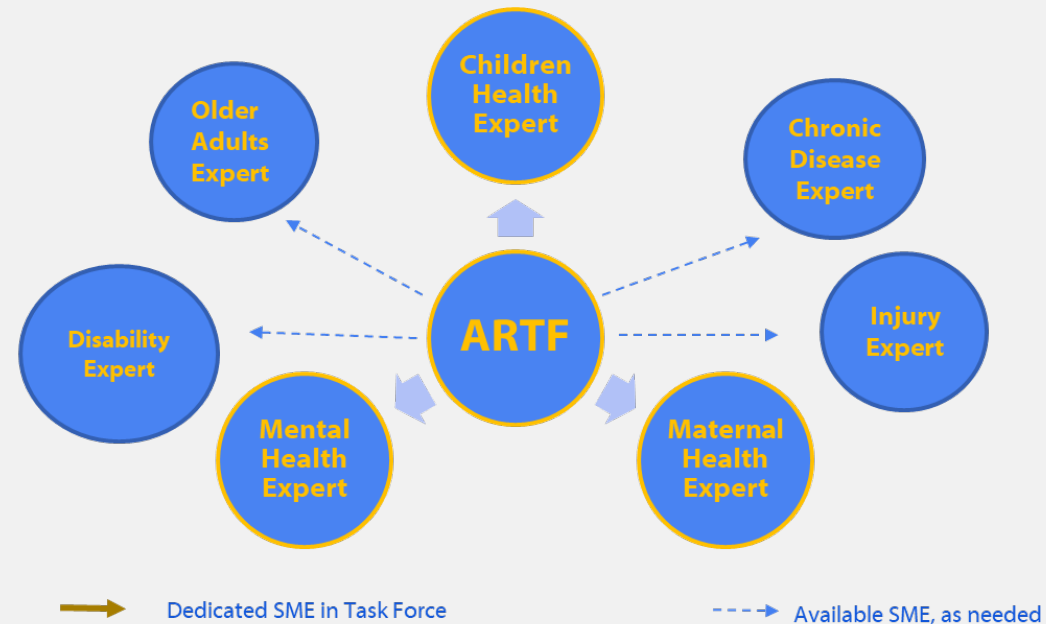


Figure: ARTF Structure for 2017 Hurricanes Response

# Hurricane Messaging and Educational Material

**Vivi Siegel, M.P.H.**

**Crisis and Emergency Risk Communication Lead, CDC**

**June 2, 2021**



# Amending Messages for COVID-19: Mental Health

## Acknowledge in words the difficulty of dealing with multiple disasters.



- Planning for hurricane season and other potential disasters can be stressful, and during the [COVID-19 pandemic](#), it may be especially so.
- Taking care of emotional health helps people think clearly, react to urgent needs.
  - Provide resources for the community such as the SAMHSA Disaster Distress Helpline and CDC materials on stress and coping.
  - Provide parents resources for supporting children.
  - Responders may experience secondary traumatic stress.

[CDC: Coping with a Disaster or Traumatic Event](#)

[CDC: COVID-19: Stress and Coping](#)

[SAMHSA Disaster Distress Helpline](#): 1-800-985-5990 or text “TalkWithUs” (for English) or “Hablanos” (for Spanish) to 66746.



# Amending Messages for COVID-19: Before a Hurricane



- Give yourself more time than usual to [prepare your emergency food, water, and medicine supplies](#).
- Take steps to protect your and others' health when [running essential errands](#) and when filling [prescriptions](#).
- Pay attention to local guidance about updated plans for evacuations and shelters, including [potential shelters for your pets](#).
- Include items such as soap, hand sanitizer, [masks](#) in evacuation "go kits."
- Follow [distancing](#) recommendations when checking on neighbors and friends.

[CDC: Preparing for Hurricanes During the COVID-19 Pandemic](#)

# Amending Messages for COVID-19: After a Hurricane

Help people take COVID-19 precautions in addition to following regular safety guidance about power outages, food and water safety, and avoiding injuries.



- Continue to use [preventive actions](#) like washing your hands, wearing a **mask** in public if you are not yet vaccinated, and distancing during clean up or when returning home.
- It may take longer than usual to restore power and water if they are out.
- If you are injured or ill, contact your medical provider. Keep wounds clean to prevent infection. Accessing medical care may be more difficult than usual.
- It is natural to feel anxiety, grief, and worry. [Coping with these feelings and getting help](#) when you need it will help you, your family, and your community recover.

[CDC: Preparing for Hurricanes During the COVID-19 Pandemic](#)

# Amending Messages for COVID-19: Shelters


Help people understand how to prevent infection if they need to go to a public shelter.



- Check with local officials to see if your shelter location is different this year, including for pets.
- Bring items to help you stay protected: soap, hand sanitizer, and [masks](#) for people 2 years and older.
- Practice [distancing](#) in the shelter and help children do the same. Stay at least 6 feet away from people outside of your household.
- Follow disaster shelter policies and procedures designed to protect everyone in the shelter.
- [If you feel sick](#) when you arrive at the shelter or start to feel sick while sheltering, tell shelter staff immediately.


# Hurricane Educational materials – by Topic and Language

Children may not say **how they are feeling** during a crisis.



Talk to them. Answer questions. **Make sure they feel loved.**

Call SAMHSA's Disaster Counseling Helpline at 1-800-985-5900  
Text "TalkWithUs" for English or "Hablamos" for Spanish to 66746



## Cómo desinfectar el agua

Después de un desastre natural, es posible que el agua no sea apta para el consumo. Escuche los anuncios de las autoridades locales para saber si puede utilizar el agua.

Con un poco de cloro se puede hacer que el agua se pueda utilizar en forma segura.

**Si el agua de la llave es clara:**

- Utilice cloro que no tenga otros olores (como limón).
- Si utiliza cloro líquido de uso doméstico al 5-6 %, agregue un poco menos de 1/8 de cucharadita (8 gotas o alrededor de 0.5 mililitros) a un galón (16 tazas) de agua.
- Si utiliza cloro líquido de uso doméstico al 8-25 %, agregue un poco menos de 1/8 de cucharadita (8 gotas o alrededor de 0.5 mililitros) a un galón (16 tazas) de agua.
- Mezcle bien y espere al menos 30 minutos o más antes de usar el agua.

**Si el agua de la llave es turbia:**

- Utilice cloro que no tenga otros olores (como limón).
- Si utiliza cloro líquido de uso doméstico al 5-6 %, agregue un poco menos de 1/4 de cucharadita (16 gotas o alrededor de 1 mililitro) a un galón (16 tazas) de agua.
- Si utiliza cloro líquido de uso doméstico al 8-25 %, agregue 12 gotas (o alrededor de 1 mililitro) a cada galón (16 tazas) de agua.
- Mezcle bien y espere al menos 30 minutos o más antes de usar el agua.

**Recuerde que puede ser necesario desinfectar los recipientes antes de utilizarlos para guardar el agua limpia:**

1. Utilice cloro que no tenga otros olores (como limón).
2. Agregue 1 cucharadita (y 8 gotas o 5 mililitros) de cloro líquido de uso doméstico en 1 cuarto de galón (25 onzas, 4 tazas o alrededor de 1 litro) de agua.
3. Vierta esta solución en un recipiente limpio para almacenar y agite bien para asegurarse de que el líquido cubra todo el interior del recipiente.
4. Deje reposar al menos 30 segundos y luego vacíe el recipiente.
5. Deje secar al aire o enjuague con agua clara que ya ha sido desinfectada, si la hay.

■ Nunca mezcle cloro con amoníaco ni con otros productos de limpieza.  
■ Cuando utilice cloro, abra puertas y ventanas para que el lugar se ventile.

Para obtener más información sobre cómo hacer que el agua sea segura después de un desastre natural, visite [www.cdc.gov/healthywater/emergency/drinking/boiling-water-safe.html](http://www.cdc.gov/healthywater/emergency/drinking/boiling-water-safe.html)



## WHAT TO WEAR BEFORE ENTERING A HOME OR BUILDING WITH MOLD DAMAGE



**CAUTION!**

If you have a breathing problem like asthma, do not enter a building with mold damage. Mold can make asthma symptoms worse.

If you have a weakened immune system (such as from cancer treatment or medicines that suppress the immune system), do not enter a building with mold damage. People with a weakened immune system are more likely to get a serious illness from mold.

Children should also not enter buildings with mold damage.

**MORE INFORMATION ON REMOVING MOLD:**  
[www.cdc.gov/mold/learnsguide.html](http://www.cdc.gov/mold/learnsguide.html)

**MORE INFORMATION ON WEARING RESPIRATORS:**  
[www.cdc.gov/disasters/disease/respiratory.html](http://www.cdc.gov/disasters/disease/respiratory.html)




## DANGER!

**POISON GAS - POISON GAS - POISON GAS**  
**CARBON MONOXIDE HAZARD**

Using a generator indoors **WILL KILL YOU IN MINUTES.**  
Exhaust contains carbon monoxide, a poison gas you can not see or smell.



**NEVER use a generator indoors, in garages, or carports.**



**ONLY use outdoors and far from open windows, doors, and vents.**

<https://www.cdc.gov/disasters/hurricanes/educationalmaterials.html>

# Coping After a Natural Disaster: Adolescents



## Teens on edge

TEENS ON EDGE  
**TEXAS**

**ROCKPORT, TEXAS** – Before Hurricane Harvey struck his hometown on the Gulf Coast, Ethan Dreyer was a promising 17-year-old offensive lineman entering his junior year of high school.

But then on Aug. 26, Rockport experienced six hours of 131 mph winds, with gusts topping out at 151 mph. Around 80 percent of the structures in Aransas County were damaged, and approximately 35 percent were destroyed.

## Puerto Rican Students Displaced by Storm Adjust to Mainland Schools



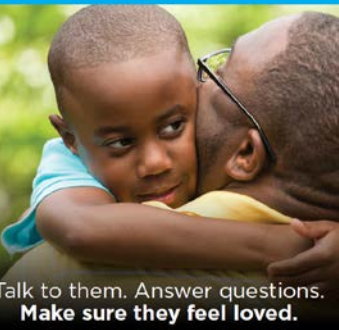
Diego Ignacio Cordero Sanchez, 16, left, and Lorenzo Alberto Cordero Sanchez, 15, with their dad Giovanni Cordero in Homestead, Fla. The boys came to Florida after Hurricane Maria to attend school.  
—Photograph by Josh Ritchie for Education Week

By Denisa R. Superville  
February 12, 2018



# CDC Materials for Kids on Coping with Natural Disasters

Children may not say how they are feeling during a crisis.



Talk to them. Answer questions. Make sure they feel loved.

Call SAMHSA's Disaster Counseling Helpline at 1-800-985-5900  
Text "TalkWithUs" for English or "Hablaos" for Spanish to 66746



## COPING AFTER A DISASTER



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

### WORD SCRAMBLE

Use this workbook to help you feel better whenever you need it. Talk with your parents about how you feel. And always remember, what happened is not your fault!



Can you unscramble the words below?

EBHRTAE \_\_\_\_\_ INSG \_\_\_\_\_  
 OROLC \_\_\_\_\_ LISME \_\_\_\_\_  
 CDANE \_\_\_\_\_ AKLT \_\_\_\_\_  
 RADW \_\_\_\_\_  
 IFENLSEG \_\_\_\_\_  
 PIHE \_\_\_\_\_  
 SGHU \_\_\_\_\_  
 SLEIN \_\_\_\_\_  
 PYAL \_\_\_\_\_  
 EDAR \_\_\_\_\_  
 SERT \_\_\_\_\_



Use these tips to help you feel better. Read every other page often. Remember, what happened is not your fault.

### HOW THE HURRICANE MADE ME FEEL

Sometimes bad things happen. It's okay if you feel sad, mad, or scared. Grown-ups sometimes feel this way, too.



How do you feel, right now? Circle the face that matches how you're feeling. If none of those are right, fill in the blank face to show how you're feeling instead.



### Helping Children Cope During and After a Disaster

A Resource for Parents and Caregivers

The amount of damage caused from a disaster can be overwhelming. The destruction of homes and separation from school, family, and friends can create a great amount of stress and anxiety for children. They may not fully understand what is going on. A child's reaction and signs of stress may vary depending on age and personal experience and typical coping behavior with stress.

#### What You Can Do to Help Children Cope with a Disaster

Set a good example by managing your own stress through healthy lifestyle choices, such as eating healthy, exercising regularly, getting plenty of sleep, and avoiding drugs and alcohol. When you are prepared, relaxed, and resilient, you can respond better to unexpected events and can make decisions in the best interest of your loved ones.

The following tips can help reduce stress before, during, and after a disaster or traumatic event.

- Before**
- Assure your children that you are prepared to keep them safe.
  - Review safety plans before a disaster or emergency happens. Having a plan will increase your children's confidence and help give them a sense of control.



- During**
- Stay calm and reassure your children.
  - Talk to your children about what is happening in a way that they can understand. Know if simple and appropriate for each child's age.



**After**

- Give your children opportunities to talk about what they don't think. Encourage them to share concerns and ask questions.

- Encourage your children to take action directly related to the disaster so they feel a sense of control. For example, children can help others after a disaster, such as volunteer to help community or family members in a safe environment. Children should NOT participate in disaster cleanup activities for health and safety reasons.

- Encourage parents, teachers, and other adults to see children in difficult situations. It is important for them to work together to share information about how each child is coping after a traumatic event.
- Help your children to have a sense of direction, which can make them feel more at ease or provide a sense of control. Once children and child care centers again, help them return to their regular activities.



# Finding a New Normal: Life After a Natural Disaster



Finding a new normal:  
Life after a natural disaster



## Videos

Watch Abby, Alexis, Jaylon, and Mariana tell their stories.



## Social Media

Share graphics on Snapchat, Instagram, Twitter, and Facebook.



## Posters

Print posters to display in your community.

[www.cdc.gov/disasters/teens](http://www.cdc.gov/disasters/teens)

# Finding a New Normal: Life After a Natural Disaster (cont.)

In the months after a wildfire damaged her neighborhood, Alexis found joy in her favorite sports.

“What helps me the most when I’m stressed and overwhelmed is swimming. I play water polo, I surf, and I’m on the swim team, so being in the water really helps me.”



If you’ve been through a natural disaster, it’s totally normal to feel overwhelmed. Getting active and doing things you love can help you feel better. Watch Alexis’s story and learn more ways to cope at [www.cdc.gov/disasters/teens](http://www.cdc.gov/disasters/teens).



Need to talk to someone? Call the SAMHSA Disaster Distress Helpline at 1-800-985-5990 or text “TalkWithUs” to 66746.



Centers for Disease Control and Prevention  
National Center for Environmental Health

“Reaching out and helping people in the neighborhood made me feel good. Being able to help the older generation made me happy.”



Learn ways to feel better at [www.cdc.gov/disasters/teens](http://www.cdc.gov/disasters/teens)



Centers for Disease Control and Prevention  
National Center for Environmental Health

[www.cdc.gov/disasters/teens](http://www.cdc.gov/disasters/teens)



# For More Information, Please Visit Our Website

<https://www.cdc.gov/disasters/hurricanes/>

For more information, contact NCEH/ATSDR  
1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348      www.atsdr.cdc.gov      www.cdc.gov

Follow us on Twitter @CDCEnvironment

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 and the Agency for Toxic Substances and Disease Registry.

