

Health Impacts of Hurricanes

More Than Just Property Damage

Bill Rich, CEM, PHA, AAS, EMT-P®
CDC/NCEH/DEHSP/EMRC/PEMS

2019 Hurricane Season Forecasts

- **Activity for 2019 is predicted to be slightly less in intensity compared to 2018.**
- **A total of 13 named storms, five hurricanes and two 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 2019 Season

- **Do not rely on 120 hour warning model!**
- **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.**

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, clinics**
- **Loss of security systems and lighting will require most facilities/stores to close**

Discussion

How have past hurricanes affected access to medical services for your clients?

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. (Really people?)

▪ **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.

Discussion

Electric shock is also a risk for response workers. Please describe the advice you would give your employees and volunteers to avoid electrocution during post-hurricane response work.

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, 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

- **Carbon monoxide (CO) is an odorless, colorless gas that can cause sudden illness and death if inhaled.**
- **People might use generators and other power sources if their electricity is out.**
- **The use of alternative sources of fuel or electricity for heating or cooking can cause CO to build up in a home, garage, or camper and to poison the people and animals inside.**

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**

CDC Hurricane Resources

- <https://www.cdc.gov/disasters/hurricanes/>
- <https://www.nhc.noaa.gov/prepare/ready.php>
- <https://www.ready.gov/hurricanes>
- <http://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/hurricane>
- <http://spaghettimodels.com/>



Health Impacts of Hurricanes

Vivi Siegel, MPH

Senior Health Communications Specialist

National Center for Environmental Health

Division of Environmental Health Science and Practice

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

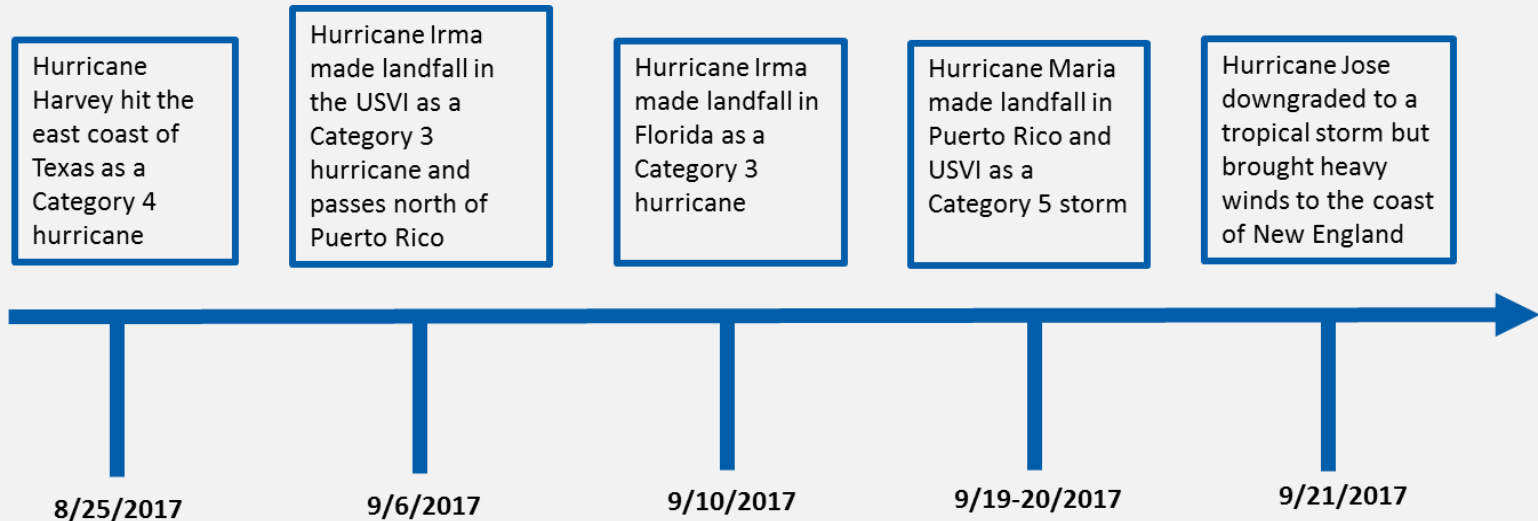


COMMUNICATING ABOUT HURRICANES – EXAMPLES FROM 2017 AND 2018 SEASONS

2017 Hurricane Season At-A-Glance

- **Unusually active hurricane season**

- Frequency and intensity of storms have been greater than usual
- 7 of the 13 named storms in 2017 developed into hurricanes
- Just two more storms by end of 2017 would have put this year in the top 15 since 1851



2018 Hurricane Season At-A-Glance

- **Another active hurricane season**

- 8 of the 15 named storms in 2018 developed into hurricanes
- Two storms became major hurricanes (category 3, 4, or 5)
- For the 4th consecutive year, named storm activity began before the official start of the season on June 1
- Hurricane Florence made landfall in North Carolina on September 14
 - Reduced from category 4 to category 1 by landfall
 - 22 direct deaths and 30 indirect deaths
- Hurricane Michael made landfall in Florida on October 10
 - Made landfall as a category 5 hurricane
 - Produced tropical force winds (or higher) in Georgia, South Carolina, and North Carolina
 - 16 direct deaths

2017 and 2018 Hurricane Seasons – Major Impacts

- Drowning
- Carbon monoxide poisoning
- Displaced persons
- Power loss
- Contaminated drinking water
- Damaged/destroyed infrastructure
- Non-functional clinics and hospitals
- Affected medical and public health staff
- Mold in homes and buildings



U.S. Virgin Islands after Hurricane Maria landfall



Communication Channels

**How do you get messages out
with no internet and no power?**



A scene of damage in St. Croix in October, 2017. The island suffered 100 percent power outages and extensive infrastructure damage due to back-to-back hurricanes Irma and Maria. Photo by Myron Douglas/CDC

Direct Mail

PROTECT YOURSELF AND YOUR FAMILY AFTER HURRICANES

The USVI Department of Health and Centers for Disease Control and Prevention (CDC) offer these steps you can take to stay safe during this difficult time.



Use bottled water for drinking, cooking, and brushing teeth.

- If you do not have bottled water, boil or disinfect your water.
 - How to boil:** Heat water to a rolling boil for at least a minute.
 - How to disinfect:** Add 8 drops of household bleach to 1 gallon of clear water or 16 drops to cloudy water. Wait 30 minutes before drinking.
- Boil or disinfect cistern water a gallon or less at a time.
- Throw away food and drinks touched by storm water. When in doubt, throw it out.



Be safe while cleaning up.

- Never touch a power line.
- To prevent carbon monoxide poisoning, keep generators at least 20 feet from buildings and use a carbon monoxide detector.
- If using a chainsaw, follow the manufacturer's safety instructions and make sure others stand back.
- When cleaning mold, wear goggles, gloves, boots, and a NIOSH-approved N95 respirator (available at hardware stores).



Protect yourself from mosquitoes.

- Use EPA-approved repellent that contains oil of lemon eucalyptus, Picaridin, IR3535, or DEET.
- Cover or dump out standing water where mosquitoes could lay eggs.
- Keep doors closed and repair window screens.
- If you could be exposed to mosquitoes while sleeping, wear repellent and/or use a mosquito net.
- Wear long-sleeved shirts and long pants.



Keep your hands clean to prevent the spread of germs.

- Wash your hands with soap and clean water often (always before meals and after using the bathroom). If you do not have soap and clean water, use an alcohol-based hand sanitizer.



This is a challenging time. Take care of yourself and your family.

- It is normal to feel fear, grief, and depression after a traumatic event.
- If you feel anxiety or stress, call SAMHSA's Disaster Counseling Helpline at 1-800-985-5990 (press "2" for Spanish) or text "TalkWithUs" for English or "Háblanos" for Spanish to 66746.

More information: www.cdc.gov/disasters/hurricanes
doh.vi.gov | facebook.com/virginislandsdoh



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



PROTÉJASE Y PROTEJA A SU FAMILIA DESPUÉS DE UN HURACÁN

El Departamento de Salud de las Islas Vírgenes de los Estados Unidos y los Centros para el control y la Prevención de Enfermedades (CDC) ofrecen estas medidas que puede tomar para mantenerse seguro durante estos momentos difíciles.




Use agua embotellada para beber, cocinar y cepillarse los dientes.

- Si no tiene agua embotellada, hierva o desinfecte el agua:
 - CÓMO HERVIRLA:** Caliente el agua hasta que hierva por al menos un minuto.
 - CÓMO DESINFECTARLA:** Agregue 8 gotas de cloro de uso doméstico a un galón de agua clara, o 16 gotas si el agua está turbia. Espere 30 minutos antes de beber el agua.
- Hierva o desinfecte el agua de cisterna en cantidades de un galón o menos por vez.
- Bote los alimentos o bebidas que hayan entrado en contacto con el agua de la tormenta. Si tiene dudas, bótelos.



Manténgase seguro durante la limpieza.

- No toque nunca los cables del tendido eléctrico.
- Para prevenir la intoxicación por monóxido de carbono, mantenga los generadores (plantas eléctricas) a al menos 20 pies de distancia de los edificios y use un detector de monóxido de carbono.
- Si usa una motosierra, siga las instrucciones de seguridad del fabricante y asegúrese de que nadie se acerque.
- Cuando limpie moho (hongos), use gafas de protección, guantes, botas y una máscara N95 aprobada por NIOSH (se pueden comprar en las ferreterías).



Protéjase de los mosquitos.

- Use un repelente de insectos aprobado por la EPA que contenga aceite de eucalipto de limón, picaridina, IR3535 o DEET.
- Tape o bote el agua acumulada donde los mosquitos pueden poner huevos.
- Mantenga las puertas cerradas y arregle los cristales de las ventanas.
- Si podría exponerse a mosquitos mientras duerme, use repelente o un mosquitero.
- Use camisas de manga larga y pantalones largos.



Mantenga las manos limpias para prevenir la propagación de gérmenes.

- Lávese las manos con agua limpia y jabón frecuentemente (siempre antes de comer y después de usar el baño). Si no tiene agua limpia y jabón, use un desinfectante para manos a base de alcohol.



Estos son momentos difíciles. Cuidese y cuide a su familia.

- Es normal sentir temor, angustia o depresión después de un evento traumático. Si siente ansiedad o estrés, llame a la línea de ayuda de SAMHSA para obtener consejos para enfrentar desastres al 1-800-985-5990 (marque "2" para español), o envíe un mensaje de texto con la palabra "TalkWithUs" o "Háblanos" al 66746.

More information: www.cdc.gov/disasters/hurricanes
doh.vi.gov | facebook.com/virginislandsdoh



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



CDC and USVI DOH collaborated to create a one-page flyer with priority health and safety information. With assistance of CDC Foundation, Office Max, USPS, and USPIS, the flyer was distributed to all 51,000 households and PO boxes in the territory.

Radio



Former USVI DOH Communications Director Nykole Tyson, right, shares health messages on Straight Talk with Redfield radio show, WVI 93.5. Photo by Myron Douglas/CDC.

Health Fairs



Communication team member Myron Douglas, right, with USVI DOH epidemiologist Monifa Corillo with table of health information materials at Plessen Health Fair, St. Croix, USVI, Oct. 14, 2017. Photo by Vivi Siegel/CDC

Displays



Home improvement store mold cleanup display. These materials show people the equipment and supplies they need to safely clean mold.

Friends and Family



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™

SEARCH



CDC A-Z INDEX ▾

Natural Disasters and Severe Weather

Natural Disasters and Severe Weather

Earthquakes +

Extreme Heat +

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Lightning +

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Disaster Resources +

Health and Safety Concerns for All Disasters +

Are You Prepared?

Information for Specific Groups

Disaster Evacuation Centers +

[Natural Disasters and Severe Weather](#)

Hurricane Maria: How to Help Loved Ones in Puerto Rico and the US Virgin Islands



Language: English (US) ▾



If you have friends, family, or other loved ones in Puerto Rico, the US Virgin Islands, or other hurricane-affected areas, you can help ensure they stay safe by sending them health and safety information. This toolkit offers different messages in both English and Spanish you can send via text message, email, or social media. Even if you do not personally know anyone in the affected areas, you can still help spread these important messages.

On This Page:

- [Post on social media](#)
- [Share an image](#)
- [Send a text message](#)
- [Send an email](#)
- [Make a phone call](#)
- [Take care of yourself](#)
- [Helpful Links](#)

Post on social media

Post these messages on Twitter or Facebook and tag your friends and family in Puerto Rico, the US Virgin Islands, or other areas affected by hurricanes

EDUCATIONAL MATERIALS BY TOPIC

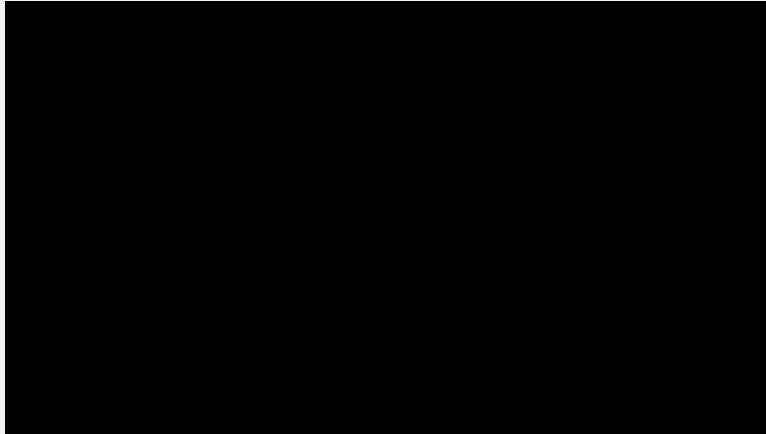
Mold

8 TIPS TO CLEAN UP MOLD

Painting or caulking over mold will not prevent mold from growing. Fix the water problem completely and clean up all the mold before you paint or caulk.

 **Don't cover it, remove it**

<http://www.cdc.gov/mold/cleanup.htm> 



<https://www.youtube.com/watch?v=siaHy9yBuEA>

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



N-95 respirator or one that provides even more protection (check packaging for "N-95")

Goggles or eye protection

Long-sleeved shirt

Protective gloves

Long pants

Waterproof boots

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.

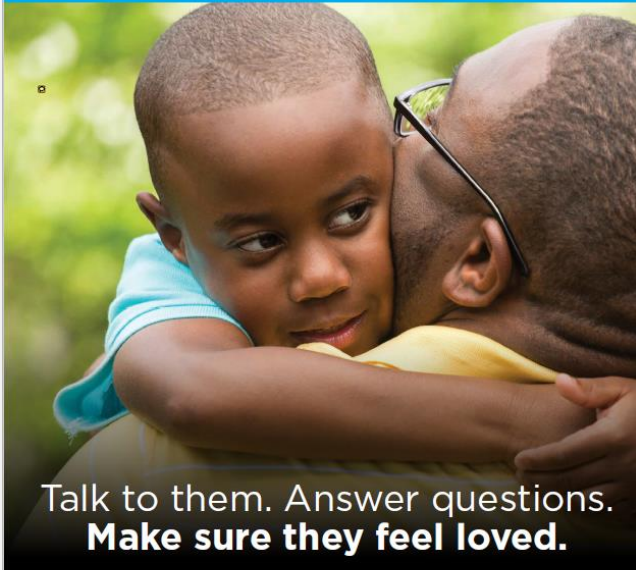
MORE INFORMATION ON REMOVING MOLD:
www.cdc.gov/mold/cleanup-guide.html

MORE INFORMATION ON WEARING RESPIRATORS:
www.cdc.gov/disasters/disease/respiratory.html



Mental Health

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 1-800-985-5990
Text "TalkWithUs" for English or "Hablamos" for Spanish to 66746



Water



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 (6 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 (6 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 ¼ 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 (64 gotas o 5 mililitros) de cloro líquido de uso doméstico en 1 cuarto de galón (32 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.**

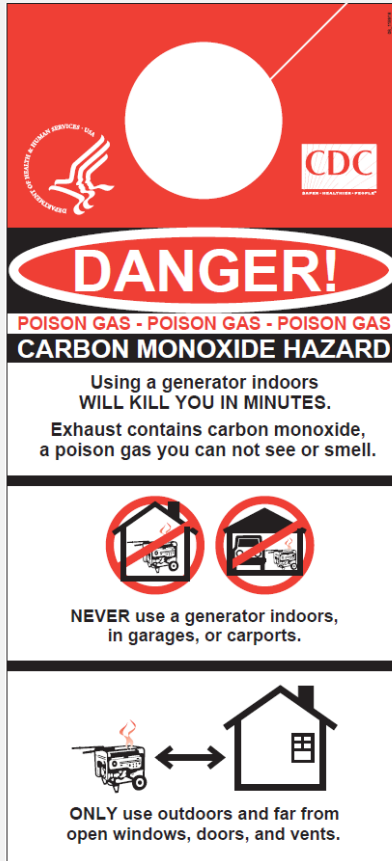
■ **Cuando utilice cloro, abra puertas y ventanas para que el lugar se ventile.**

Para obtener más información sobre cómo hacer que el agua sea segura después de un desastre natural, visite www.cdc.gov/healthywater/emergency/drinking/making-water-safe.html



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

Carbon Monoxide



DEPARTMENT OF HEALTH & HUMAN SERVICES

CDC
SAFER • HEALTHIER • PEOPLE

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.



Portable back-up generators produce the poison gas carbon monoxide (CO), an odorless, colorless gas that kills without warning. Keep your family safe by following these steps:

- Never use a generator inside your home or garage, even if doors and windows are open.
- Only use generators outside, more than 20 feet away from your home, doors, and windows.
- Install battery-operated CO detectors near every sleeping area in your home.
- Check CO detectors regularly to be sure they are functioning properly.

CARBON MONOXIDE (CO) POISONING



Drowning



Stress

SAMHSA's Disaster Distress

Hotline:

1-800-985-5990 or text

"TalkWithUs" (for English) or

"Hablanos" (for Spanish) to

66746.

After a disaster, it is important to take care of your emotional health. Pay attention to how you and your family members are feeling and acting.

Taking care of your emotional health will help you think clearly and react to urgent needs to protect yourself and your loved ones.

Coping with Disaster:

https://emergency.cdc.gov/coping/pdf/Coping_with_Disaster.pdf

Coping with Disaster (Spanish):

https://emergency.cdc.gov/es/coping/pdf/Coping_with_Disaster_ESP.pdf

COORDINATING MESSAGING

Phase-Based Messaging

- Developed during response to Hurricane Katrina and used since
- Messages are planned in advance to anticipate and meet needs at different stages of a response
- Uses risk communication principles
- Adaptable as needed



Phase-Based Messages for a Hurricane

Phase 1 Immediately preceding landfall – 24 hrs post-storm	Readiness and preparation <ul style="list-style-type: none">• Evacuation guidance• Flood safety• Power outage risks
Phase 2 1-3 days post-storm	Returning home <ul style="list-style-type: none">• Power outage risks• Carbon Monoxide Safety• Safe water and food• Worker safety
Phase 3 3-7 days post-storm	Environmental hazards <ul style="list-style-type: none">• Vector control• Preventing injury• Cleaning and sanitation• Medication storage guidance
Phase 4 2-4 weeks post-storm	Short-term recovery <ul style="list-style-type: none">• Coping with trauma• Mold remediation• Protect from chemicals
Phase 5 1 month post-storm, later	Long-term recovery and resilience <ul style="list-style-type: none">• Coping with trauma• Mold

- **Clear and share in advance with all relevant organizations**
- **Allow suggestions and comments – iron out any disagreements**
- **Decide who leads on each type of message**
- **During the response, stay in sync through constant contact**

CDC Disaster Communications Resources

- Hurricanes and Other Tropical Storms: <https://www.cdc.gov/disasters/hurricanes/index.html>
 - Before a Hurricane: <https://www.cdc.gov/disasters/hurricanes/before.html>
 - After a Hurricane: <https://www.cdc.gov/disasters/hurricanes/after.html>
- Food and Water Safety: <https://www.cdc.gov/disasters/foodwater/index.html>
- Power Outage Safety: <https://www.cdc.gov/disasters/poweroutage/index.html>
- Clean Up Safely: <https://www.cdc.gov/disasters/cleanup/facts.html>
- Mold: <https://www.cdc.gov/disasters/mold/index.html>
- Coping with a Disaster: <https://emergency.cdc.gov/coping/index.asp>
- Information for Professionals and Response Workers: <https://www.cdc.gov/disasters/hurricanes/info-hcp-workers.html>
- How to help loved ones: https://www.cdc.gov/disasters/hurricanes/diaspora_toolkit.html
- Information for Specific Vulnerable Groups: <https://emergency.cdc.gov/groups.asp>
- Printable Educational Materials: <https://www.cdc.gov/disasters/hurricanes/educationalmaterials.html>
- Social Media: <https://emergency.cdc.gov/socialmedia/index.asp>
- Public Service Announcements: <https://www.cdc.gov/disasters/hurricanes/psa.html>

Questions?



For more information, contact NCEH/ATSDR

1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348

www.atsdr.cdc.gov

www.cdc.gov

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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.

