Preparing for Disasters

The Centers for Disease Control and Prevention (CDC) provides emergency preparedness resources for local and state health departments and dispatch experts to help when disasters strike. When natural disasters, diseases, accidents, or terrorism occurs, CDC responds to help improve the health of those affected, both at home and abroad.

Terms to Know

Bioterrorism	the use of biological agents for the purpose of terrorism (ex: anthrax, smallpox)
Carbon monoxide	an odorless, colorless gas that is produced any time a fossil fuel is burned; can cause sudden illness and death; its chemical formula is CO
Epidemiology	study of the distribution and control of health-related issues, including diseases
Evacuation	leaving an area to escape a potential disaster
Outbreak	an increase in the number of cases of a disease above what is normally expected in that population in that area
Public Health	the science of protecting and improving the health of people and their communities

Planning for Emergencies

Planning for how to maintain and protect your health in a disaster or emergency is an important but often overlooked part of the preparedness process. While 80 percent of respondents to FEMA's 2019 National Household Survey said they had gathered enough supplies to last three or more days, just 48 percent said they had an emergency action plan. Involve your entire family in planning and practicing how to stay healthy, informed, calm, and connected during an emergency.

Think About It

1. What kinds of natural or human-made disasters could happen in your area?
2. Have you ever experienced a disaster? What helped you stay healthy and survive? If you haven't experienced a disaster, what do you think would be helpful?
3. What diseases could cause a widespread **public health** emergency?

Emergencies and the Centers for Disease Control and Prevention (CDC)

The Office of Readiness and Response (ORR) is the branch of CDC responsible for coordinating personal health preparedness for **public health** emergencies. ORR helps communities prepare, respond, and recover from emergency situations like disease **outbreaks**, natural disasters, industrial accidents, and **bioterrorism** that threaten people's wellbeing.

In the United States, ORR offers a variety of resources for communities to help them prepare and respond to a health emergency. The Public Health Emergency Preparedness (PHEP) cooperative agreement provides funding for health departments to help them build and strengthen their abilities to respond to **public health** threats. CDC also has a framework to help local health departments plan and train for disasters. PHEP funds are even used for special events, such as preparing security plans, training first responders, tracking illnesses, and monitoring food safety for the 2019 Super Bowl in Atlanta. The agreement also funds The Division of State and Local Readiness (DSLR) who are deployed to the field to help with emergency preparedness and response operations.

Globally, CDC maintains a team of people who can deploy at a moment's notice to help manage **public health** emergencies. Between October 2015 and December 2020, a group of 554 team members spent a total of more than 61,000 days in the field. These teams provide long term staffing, train the emergency workforce, and coordinate local and global organizational response.

Disease

CDC responds to emerging disease **outbreaks** to protect **public health** on the local and global stages. During an **outbreak**, CDC makes recommendations to the public for measures they can take to protect themselves from disease, such as wearing masks and social distancing during the COVID-19 pandemic. When most people think of CDC, they think of diseases like flu and COVID-19. However, the list of monitored diseases is much longer and includes a range of conditions such as hepatitis A, measles, tuberculosis, and cholera. It also includes foodborne illnesses such as those caused by *E. coli*, *Salmonella*, and *Shigella*, which are all closely monitored in cooperation with the Food and Drug Administration. CDC responds to **outbreaks** at the global level, include notable ones, such as the 2014 Ebola **outbreak** in West Africa and the 2009 H1N1 influenza pandemic. CDC maintains a list of current **outbreaks**: https://www.cdc.gov/outbreaks/index.html

Natural Disasters

Thunderstorms, tornadoes, and flooding pose a variety of dangers. Flying and falling objects can cause injury or death. As little as six inches of moving water can cause a vehicle to lose control. Lightning is one of the leading causes of weather-related fatalities, averaging about 27 fatalities a year between 2010-2020. Earthquakes pose a threat in certain parts of the world, causing structural damage, falling objects, and subsequent fires. They can also trigger tsunamis in coastal regions that carry risks of drowning or traumatic injuries from colliding with objects after being swept up by the waves. Landslides and mudslides following heavy rains, drought, or earthquakes can quickly lead to danger. Wildfires increasingly threaten homes as people build homes in wildfire areas. Tracking fire spread, protecting yourself from smoke inhalation, and **evacuating** when necessary are important for safety. Winter weather carries risks for hypothermia and frostbite, particularly during power outages when heating systems aren't functional. The opposite, excessive heat, can be just as lethal, causing heat stroke or heat exhaustion. Because natural disasters often arise quickly, it is important to have a plan in place beforehand that includes supplies, shelter or **evacuation**, and ways to reconnect with family.

It is critically important that you have a plan and supplies for the aftermath of a disaster. The risk of injuries doesn't subside after a disaster, as fallen debris causes significant hazards. Injuries can also be difficult to get treatment for due to transportation difficulties or overwhelmed medical systems.

Unsanitary conditions after a storm can last weeks or months. Access to clean drinking water and safe food sources can be scarce, contributing to **outbreaks** of foodborne and diarrheal diseases. Disasters bring people in contact with dangerous insects and animals such as mosquitoes, rodents, snakes, and aggressive dogs. Long-term power outages result in increased cases of **carbon monoxide** poisoning due to misplaced generators or unsafe cooking practices. The mental health effects of stress, anxiety, and grief after a disaster should also be considered, particularly in people who were already suffering from mental health conditions.

Human-made Disasters

CDC also responds to human-made emergencies such as chemical releases, radiation emergencies, and acts of terrorism. Chemical spills can occur because of industrial accidents or through intentional release. In 1978, then-President Jimmy Carter declared a federal emergency when widespread chemical contamination was observed in the Love Canal neighborhood in Niagara Falls, NY. CDC provided physical examination of all residents of the former chemical dump and coordinated the federal response. This incident also led to the founding of the Agency for Toxic Substances and Disease Registry (ASTDR) that is now in charge of investigating the human effects of toxin exposure. CDC also has branches that help protect workers. After the 2010 Deepwater Horizon oil spill, investigators from the National Institute for Occupational Safety and Health (NIOSH) conducted a full health hazard investigation to protect workers from the oil rig.

Radiation emergencies include the intentional use of nuclear weapons, dirty bombs, or radiological exposure devices, as well as accidents from nuclear power plants, transportation, and manufacturing. In 1979, a nuclear power plant accident occurred at Three Mile Island Unit 2 in Middleton, Pennsylvania. CDC, along with many others, responded to evaluate the radiation exposure risks of all residents within 5 miles of the reactor. When a 2011 earthquake damaged a nuclear power plant in Fukushima, Japan, CDC and the Food and Drug Administration monitored the presence of radionucleotides in the environment and in food sources originating from Japan.

Three Mile Island nuclear power plant near Middleton, Pennsylvania

CDC also responds to acts of terrorism, including **bioterrorism**. NIOSH administers the World Trade Center Health Program, providing services to survivors and first responders affected by the 9/11 attacks in 2001. When deadly anthrax spores were mailed to many recipients in 2001, they investigated the 22 cases and 5 resulting deaths. CDC also maintains emergency response plans for various terrorist scenarios and activates its Emergency Operations Center when responding to attacks. Drills conducted by hospitals in Boston helped hospital workers prepare for the mass casualties that arrived after more than 260 were injured in the 2013 Boston marathon bombing.

Think About It

1. What are two things you found surprising in this reading?
2. Why do **outbreaks** of infectious diseases commonly occur after a natural disaster?
3. What are two ways that CDC works with local and state health departments to help communities prepare for disaster?

From the Experts:

An Emergency Operations Center (EOC) is a centralized location that makes handling a disaster more efficient and effective. EOCs use systems to coordinate the people and things needed to mitigate a disaster. Watch this video to learn more about how EOCs, both small and large, act quickly in the face of a disaster. https://youtu.be/RwtEp84tGYQ

CDC activated its EOC in 2014 to respond to an Ebola **outbreak** in West Africa. Watch the video below to learn more about how it was used to stop the spread and help other countries manage their own health care resources to stop future **outbreaks**.
https://www.youtube.com/watch?v=XDnyqgapbZM

Call to Action

In order to protect yourself and your loved ones, it is essential to plan ahead for disasters and emergencies. You can help people by following these three steps:

1. Develop a disaster plan. What will you do when faced with a disaster? Answer questions and make a thorough plan for a variety of emergencies with other members of your household.

2. Build a disaster kit. Using your emergency plan, decide what supplies will be needed to see your household through an emergency. Gather supplies to make an emergency kit that might save your life someday!

3. Share your findings. One of the ways CDC communicates information is through social media. Your demonstrations can help CDC communicate the work they have done and are doing to improve **public health** across the globe.

Why Participate? A Message from CDC

We live in a time where information and communication are both available at the touch of a button. During emergencies, power outages and telecommunication interruptions are very common. What would you do if you couldn't look up important survival information or contact your loved ones during an actual emergency? To avoid this situation, it is important to prepare before disaster strikes. By getting your family's plan together and practicing your emergency routines, you can ensure your health and safety.

Think About It

1. If you woke up to a fire and could save only 3 things, what would you grab? Why?
2. What do your 3 things tell you about your priorities in an emergency? How can you use this information to help you plan for future disasters?
3. How do you respond in an emergency: cool and calm or panicked and anxious? How will you incorporate your typical reaction style into your disaster plan?

Engineering Design Process Overview

The engineering design process allows engineers to develop and test solutions to problems. You can use the process to develop an emergency plan and kit for your household.

Define the problem	Describe the problem you are trying to solve. There are several questions you could use to guide your investigation: • How do I prepare for different types of emergencies? • How do I communicate my emergency plan to others?
Do background research	Find information about the problem. • Determine the common types of emergencies and where they are likely to occur. • Research supplies and survival techniques.
Specify requirements	Determine what your solution needs to have to succeed. • Decide what disasters your family should prepare for. • Think about any special needs your family has beyond the standard supplies that are required.
Brainstorm, choose and develop solutions	For each part of your design, do the following: • Make a household disaster plan. • Create a list of supplies you will need in an emergency.
Build a prototype	Design and build your model. • Design a disaster plan. • Build a disaster kit.
Test and redesign	Test the prototype you made. • Conduct drills using your emergency plan. • Evaluate the contents and portability of your disaster kit. • Make corrections or addition to the plan or kit as needed.
Communicate results	Sharing the information you collect is key! • Share your information using social media with the CDC accounts listed.

Develop a Disaster Plan

On January 13, 2018, a missile alert was issued through the Emergency Alert System to all cellphones in Hawaii. The message read: "**Emergency Alert** BALLISTIC MISSILE THREAT INBOUND TO HAWAII. SEEK IMMEDIATE SHELTER. THIS IS NOT A DRILL." Similar messages were also played on all televisions and radio stations in the state. People were unsure of what to do, so panic ensued as people tried to seek shelter. If you received this alert, what would you do?

In this case, the alert was a false alarm sent mistakenly by an employee who was later fired from his position. What if it had been real, though? Would you know what to do?

When emergencies happen, having a plan that is already in place dramatically increases your chances of survival and improves outcomes. This activity is designed to get you thinking about the types of emergencies you may face and how you would respond.

For What Types of Emergencies Should I Prepare?

The first step of emergency planning is to determine the types of emergencies for which you need to prepare. Someone who lives in Oklahoma doesn't need to prepare for hurricanes but does need to prepare for tornadoes. Do you live in an area that is prone to flooding? Is there a chemical plant or nuclear power plant within 5 miles of your house? Do you live in a wooded area that is subject to wildfires? Are you near an area that experiences earthquakes? CDC has information to help you prepare for these emergencies and more here: https://emergency.cdc.gov/hazards-specific.asp You may also want to check out the resources available from Ready.gov, a government-run site designed to help you prepare for all types of emergencies: https://www.ready.gov/

Make sure to consider the likelihood of the following emergency situations:

- Avalanches
- Bioterrorism
- Chemical emergencies
- Disease outbreaks
- Earthquakes
- Extreme heat
- Floods
- Gas leaks/explosions
- House fires
- Hurricanes
- Landslides/mudslides
- Lightning
- Radiation emergencies
- Tornadoes
- Tsunamis
- Volcanoes
- Wildfires
- Winter weather

How Do I Develop a Plan?

Once you've identified the types of emergencies for which you need to plan, it's time to start putting together the details. This process can seem very overwhelming at first, but you can break it down by starting small. For most disasters, you will either need to shelter in place or **evacuate** to safety. You just need to figure out the details of how that's going to work in different scenarios. You also need to think about important names and phone numbers of people you may need to contact, such as doctors or veterinarians, as well as policy numbers for insurance, and banking information to access accounts. Remember, you might not have access to online information after a disaster.

Here are a few questions for you to discuss with other members of your household:

- How will you receive emergency alerts and warnings?
- What is your shelter plan?
- What is your **evacuation** plan?
- What is your household's communication plan?

Go to https://www.ready.gov/plan for more details and resources related to each of these questions. This site even has printable plans that you can fill out together.

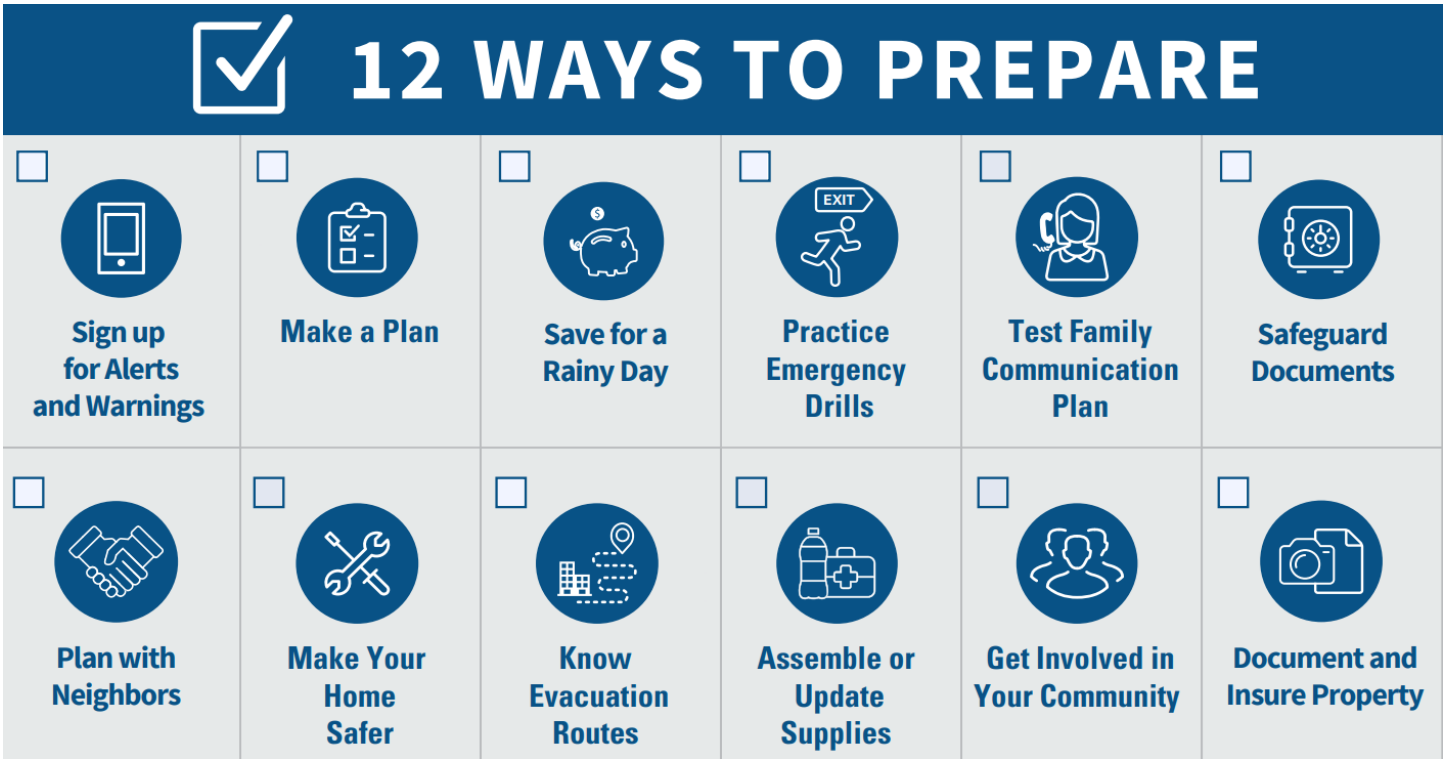
As you develop your plan, make sure to consider the following factors to better match the plan to your household's needs:

- Different ages of members within your household
- Responsibilities for assisting others
- Locations frequented
- Dietary needs
- Medical needs, including prescriptions and equipment
- Disabilities or access and functional needs, including devices and equipment
- Languages spoken
- Cultural and religious considerations
- Pets or service animals
- Households with school-aged children

What Do I Do with My Plan?

Once you have written down your emergency plan, make sure you have access to it. Keep copies in places where you may need access: home, work, school, and vehicles. Keep a secure digital copy as a backup, but don't rely on it solely in case of power outages. Make sure that all family members, even children, know how to access the plan in case the family is separated.

Once the plan is written, practice it! The first time you do something, there's always room for improvement. Work with your household to rehearse the plan, making sure that each person knows their role in the plan. This can be tricky or even scary for younger children, so make sure to check out the resources available at https://www.ready.gov/kids to make the process easier.



Source: Federal Emergency Management Agency (FEMA)

Build a Disaster Kit

Now that you have an idea of what to do, it's time to think about what you'll need. For natural disasters like hurricanes, you may go for weeks without power or access to fresh food and water. After Hurricane Maria hit Puerto Rico, it took 11 months to restore power to all areas! For disasters like wildfires or landslides, it is possible that you will temporarily move into an emergency shelter only to return to a home that is no longer there. It is important to be ready to survive whatever comes your way. In this activity, you will gather the resources needed and create an emergency disaster survival kit.

Basic Supply List

- ☐ Water (one gallon per person per day for several days, for drinking and sanitation)
- ☐ Food (at least a three-day supply of non-perishable food)
- ☐ Battery-powered or hand crank radio and a NOAA Weather Radio with tone alert
- ☐ Flashlight
- ☐ First aid kit
- ☐ Extra batteries
- ☐ Whistle (to signal for help)
- ☐ Dust mask (to help filter contaminated air)
- ☐ Plastic sheeting and duct tape (to shelter in place)
- ☐ Moist towelettes, garbage bags and plastic ties (for personal sanitation)
- ☐ Wrench or pliers (to turn off utilities)
- ☐ Manual can opener (for food)
- ☐ Local maps
- ☐ Cell phone with chargers and a backup battery

Additional Supplies You May Need

- ☐ masks for everyone aged 2 and above, soap, hand sanitizer, disinfecting wipes for surfaces
- ☐ Prescription medications
- ☐ Non-prescription medications such as pain relievers, anti-diarrhea medication, antacids, or laxatives
- ☐ Prescription eyeglasses and contact lens solution
- ☐ Infant formula, bottles, diapers, wipes, and diaper rash cream
- ☐ Pet food and extra water for your pet
- ☐ Cash or traveler's checks
- ☐ Important family documents, such as copies of insurance policies, identification and bank account records saved electronically or in a waterproof, portable container
- ☐ Sleeping bag or warm blanket for each person
- ☐ Complete change of clothing appropriate for your climate and sturdy shoes
- ☐ Fire extinguisher
- ☐ Matches in a waterproof container
- ☐ Feminine supplies and personal hygiene items
- ☐ Mess kits, paper cups, plates, paper towels and plastic utensils
- ☐ Paper and pencil
- ☐ Books, games, puzzles, or other activities for children

Pack Your Kit

This kit can be used for sheltering in place or **evacuation**, so it is important that it be semi-portable. A large plastic storage bin is a good choice for weatherproofing supplies. You might also use or include smaller bags or backpacks to make carrying the supplies easier in case of **evacuation**. Consider making more than one kit so that you have access to emergency supplies no matter where you are (home, car, work). Include a printed copy of your disaster plan in all kits. Be careful about storing too much personal information in your car due to the potential for break-ins and risk of identity theft.

Share Your Findings

The David J. Sencer CDC Museum uses award-winning exhibits and innovative programming to educate visitors about the value of **public health** and presents the rich heritage and vast accomplishments of CDC. Your plan could be a valuable contribution! Share your demonstration with the CDC Museum on Instagram using **@CDCmuseum**.

Name: _____

Reflections

Now that you have finished your preparations, think about what you learned. Answer the questions below.

1. Why is it important to prepare before disasters occur?

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2. What are 3 ways that CDC helps keep people safe before, during, and after disasters?

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3. Student A says that disasters are a part of life, some things are meant to be, and there's no need to worry for no reason. Student B says that we should have a plan and supplies in place in case of disaster and should regularly update them. Whom do you agree with? Why?

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4. Mental health effects after a disaster are often overlooked. What kind of support should be provided for people who experience trauma after a disaster?

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5. Health disparities occur when a particular type of difference in health outcomes is closely linked with economic, social, or environmental disadvantage. How do you think this relates to natural disasters? Consider the effects of disparities before, during, and after the event.

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6. Climate change is accelerating the rate and severity of natural disasters. What are some ways that **public health** will be affected? How can we prepare?

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