



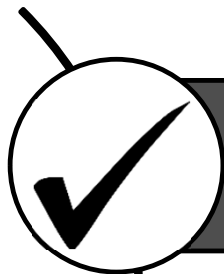
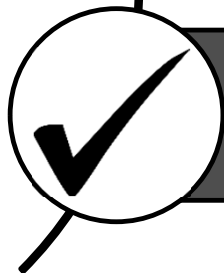
# Environmental Health in Emergency Response and Food Preparedness

An Overview of Emergency Preparedness and Response  
for Environmental Health Professionals

January 31, 2024

## Objectives

---

-  Understand emergency preparedness and response capabilities as they relate to EH
-  Explain emergency food preparedness concepts to implement for a disaster



# Module 1

All-Hazards Emergency Preparedness



## What's In It For Me?

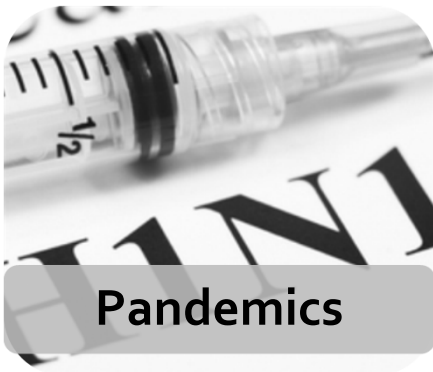
What kind of emergencies do you think we prepare for here in the National Capital Region?

Why do you think it's important that we prepare for emergencies?

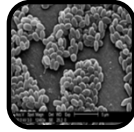
After this module, you will leave with an understanding of which types of emergencies local health departments respond to and factors to consider when planning and preparing for emergencies.



## Why do we prepare?

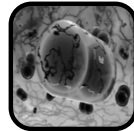


## Category A Priority Pathogens



**Anthrax**

**Plague**



**Smallpox**

**Tularemia**

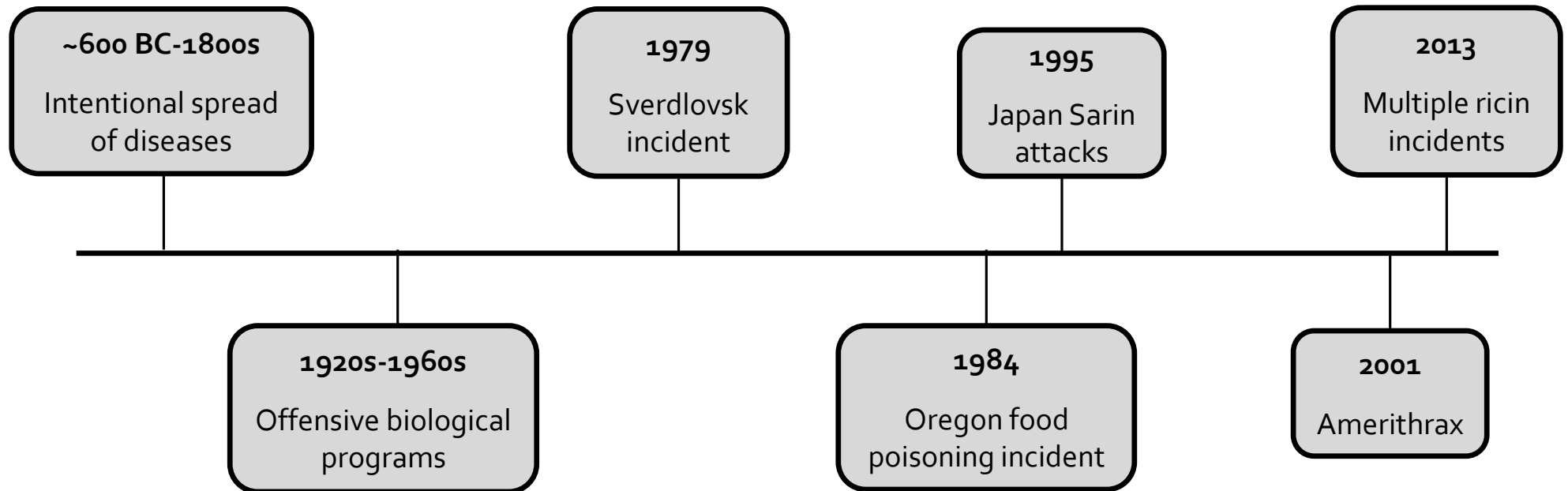


**Viral hemorrhagic fevers**

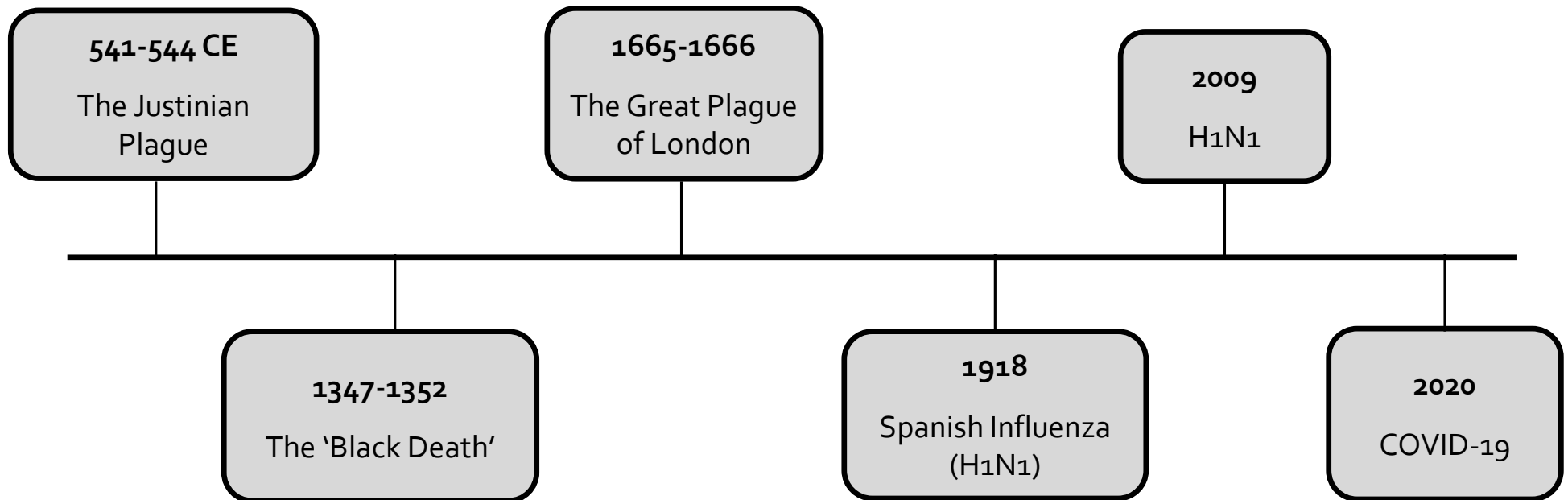
**Botulism**



# Bioterrorism throughout History



## Naturally Occurring Events



# Public Health Emergencies



## Lead Role

Outbreaks & Pandemics

Bioterrorism

Fatality Management

Environmental Incidents



## Supporting Role

Severe Weather

Mass Care

Radiological

Chemical

# Phases of Emergency Management



Graphic: Fairfax County Office of Emergency Management



# Rebuilding Caribbean Environmental Health Post-Crisis Programs: A Preliminary Study for Virtual Mentorship

**Abstract** After the hurricanes in 2017 in the U.S. Caribbean, it was essential to rebuild, strengthen, and sustain essential environmental health (EH) services and systems. The National Environmental Health Association, in partnership with the Centers for Disease Control and Prevention, developed an online mentorship program for newly hired and existing EH staff and health department leadership in Caribbean health departments. Participants were provided with both practical and didactic learning and were allowed to evaluate the program. Both mentors and mentees were highly satisfied with the knowledge and skills acquired, and mentees expressed it was relevant to their daily work. Based on the findings, we recommend both an online and a hybrid mentorship program for leadership- and inspection-level workforces in EH and potentially in other fields.

**Keywords:** environmental health, mentorship program, Caribbean, emergency preparedness, emergency response and recovery

## Introduction

In 2017, two Category 5 hurricanes struck the U.S. Virgin Islands (USVI) and Puerto Rico. Hurricanes Irma and Maria devastated these U.S. territories, leaving many island residents without power, running water, or access to necessary resources. These hurricanes also devastated the governmental environmental health (EH) infrastructure. Vital EH services (e.g., retail food inspections) were halted due to a lack of capacity within the health departments as priorities shifted to response and recovery. Many people migrated from the islands to seek safety or employment. This migration resulted in the USVI Department of Health and the Puerto

Rico Department of Health having depleted resources and fewer trained staff members to conduct EH inspections.

Ironically, the 2017 hurricanes created conditions where a sufficiently resourced and skilled EH workforce would have greatly benefited the health, safety, and economic security of the affected communities. Therefore, if health department EH programs had been maintained, then a sufficient and skilled workforce of EH professionals would have been available in the most affected areas.

According to the Office for Coastal Management within the National Oceanic and Atmospheric Administration (2023), "Of the

238 U.S. weather disasters since 1980, hurricanes have caused the most damage: \$943.9 billion total, with an average cost of almost \$21.5 billion per event. They are also responsible for the largest number of deaths: 6,393 between 1980 and 2020." Climate change has a demonstrated impact on the frequency and intensity of hazardous events for coastal and island communities. Since 1979, the frequency of Category 3, 4, and 5 tropical cyclones has increased by 9% per decade (Kossin et al., 2020). With hurricanes projected to increase in severity and frequency, a trained and prepared workforce will be essential for hurricane recovery efforts and to ensure preparedness for response to future emergencies (Ross, 2023).

Puerto Rico and the USVI faced challenges before the 2017 hurricanes, a reality that underscores the need for EH preparedness and recovery plans. These challenges included environmental hazards such as water and air quality, wastewater management, structural risks, vectorborne diseases, chronic illness, and healthcare access. EH plays a crucial role in safeguarding the health and safety of affected communities. Furthermore, EH professionals are vital in aiding in the recovery from public health threats to

Open Access

Roseann DeVito, MPH, PMP  
Elizabeth Landeen  
David Dyack, DrPH, CIH  
Rebecca Labbo, MA  
Gagandeep Gill, DrPH  
National Environmental Health Association  
CAPT Justin Garding, DHA  
LCDR Martin A. Kalis, MA  
Scott Daly, MPH, REHS  
Raymond Lopez  
Centers for Disease Control and Prevention  
Chintan Somaiya, MBA, MS, AFM  
Sukhdeep Chera  
National Environmental Health Association  
Christine Vanover, MPH, REHS  
Centers for Disease Control and Prevention  
Lindsay Fahnestock, DrPH  
Manjit Randhawa, MPH, MD  
National Environmental Health Association

TABLE 1

## Webinar Topics

Webinar Title	Description	Length of Time (hr)
Outbreak Investigation	Approach and steps for outbreak investigation (including in a COVID-19 environment) and using social media as a tool in outbreak investigations	1
Food Safety	Handling, preparing, and storing food in a way that best reduces the risk of individuals becoming sick from foodborne illnesses	1
Permitting and Licensing Processes	Types of permits and licenses available and the process to apply, review, and grant permits and licenses	1
Vector/Pest Control	Methods to limit or eradicate mammals, birds, insects, or other arthropods that transmit disease pathogens	1
Interpersonal Skills, Professional Behavior, and Human Relations	Verbal and nonverbal communications	2
Professional Written Communication	Professional reports, conference presentations, and formal communications	2

address drinking water quality, wastewater management, healthy homes, food safety, and vectors—all of which are impacted by hurricanes. Maintaining a skilled workforce through extensive training is crucial in these areas of expertise (Brooks et al., 2019; Chandra et al., 2021).

After the hurricanes, the National Environmental Health Association (NEHA) received funding through a Centers for Disease Control and Prevention (CDC) cooperative agreement to support USVI and Puerto Rico in rebuilding and strengthening their EH program capacity. The goal was to rebuild and strengthen EH services and systems after the hurricanes. The project aimed to train and provide hands-on experience to EH staff through mentorship, which builds a foundation of knowledge, skills, and field experience for these professionals to conduct inspections, assess hazards, and enhance their skills. The mentorship program supported existing and newly hired EH staff in gaining or expanding technical and management skills.

## Mentorship Program Description

The mentorship program incorporated training and hands-on experience for inspectors and leadership in the EH workforce in the USVI and Puerto Rico. Mentees

gained knowledge and skills in EH topics, while the leadership cohort focused on programmatic skills. Initially in person, the program pivoted to virtual due to travel restrictions in 2020 during the COVID-19 pandemic. The virtual format was essential for these isolated communities, and NEHA collaborated with CDC, the USVI Division of Environmental Health, and the Puerto Rico Department of Health to ensure relevant content. The program used a learning management system (LMS) and launched in March 2021.

## Methods

### Participant Characteristics

A total of 21 mentees participated in the virtual program: 9 from USVI and 12 from Puerto Rico. Among the USVI participants, 6 were at the inspector level and 3 were at the leadership level. Among the Puerto Rico participants, 6 were at the inspector level and 6 were at the leadership level. Of the participating mentees, 33% held a degree in EH, while 11% had a certificate in EH. Some mentioned on-the-job experience and taking Food and Drug Administration and Food Code courses. The majority (61%) had >10 years of experience in EH, while 33% had <3 years of experience.

## People-Centered Approach to Mentorship

A structured approach was implemented and comprised two main components: didactic group training and practical mentorship. The 12-week program used expert instructional designers in the EH training field. Before the mentorship program launch, NEHA conducted several in-person trainings on EH and provided inspection kits to the jurisdictions. These activities were foundational to the capacity-building efforts of the USVI and Puerto Rico.

The didactic group training included six EH webinars and two quality improvement check-ins. The webinars were either 1- or 2-hr long and provided information and data on the chosen webinar topics (Table 1). This component provided a foundation of knowledge for mentees to then be able to conduct EH work.

The practical component included the use of the NEHA LMS platform based on the needs of each program. The LMS housed all webinars, recordings, assignments, group message boards, private message boards, resources, and materials. Participants could communicate with their mentors and with other mentees, read and comment on materials and assignments, and watch webinars. The practical component of this mentorship program was intended to apply knowledge learned in the training webinars to enhance practical skills in place of a hands-on shadowing experience.

NEHA leveraged its vast network of subject matter experts to aid in the design of the program and to serve as mentors. Program staff secured four mentors with a wide range of expertise in all areas of EH. Two levels of mentors were secured: 1) retired EH leaders and 2) EH specialists who routinely conduct inspections. Retired leaders mentored the leadership-level cohort and current EH specialists mentored the inspection-level cohort.

Mentors provided one-on-one mentoring to mentees through assignments, resources, and check-ins twice a month. Mentors also supported cohort engagement within the LMS, each conducting at least one training webinar for the entire cohort.

Of the 21 mentees, four groups were formed, each assigned to one mentor. All groups included a mix of both USVI and





## Division of Emergency Preparedness and Response

Agency Emergency  
Operations Plan  
(EOP)

Emergency  
equipment and  
supplies

Training and  
exercises

Governmental and  
non-governmental  
coordination

Medical Reserve  
Corps (MRC)

Emergency  
preparedness  
grants

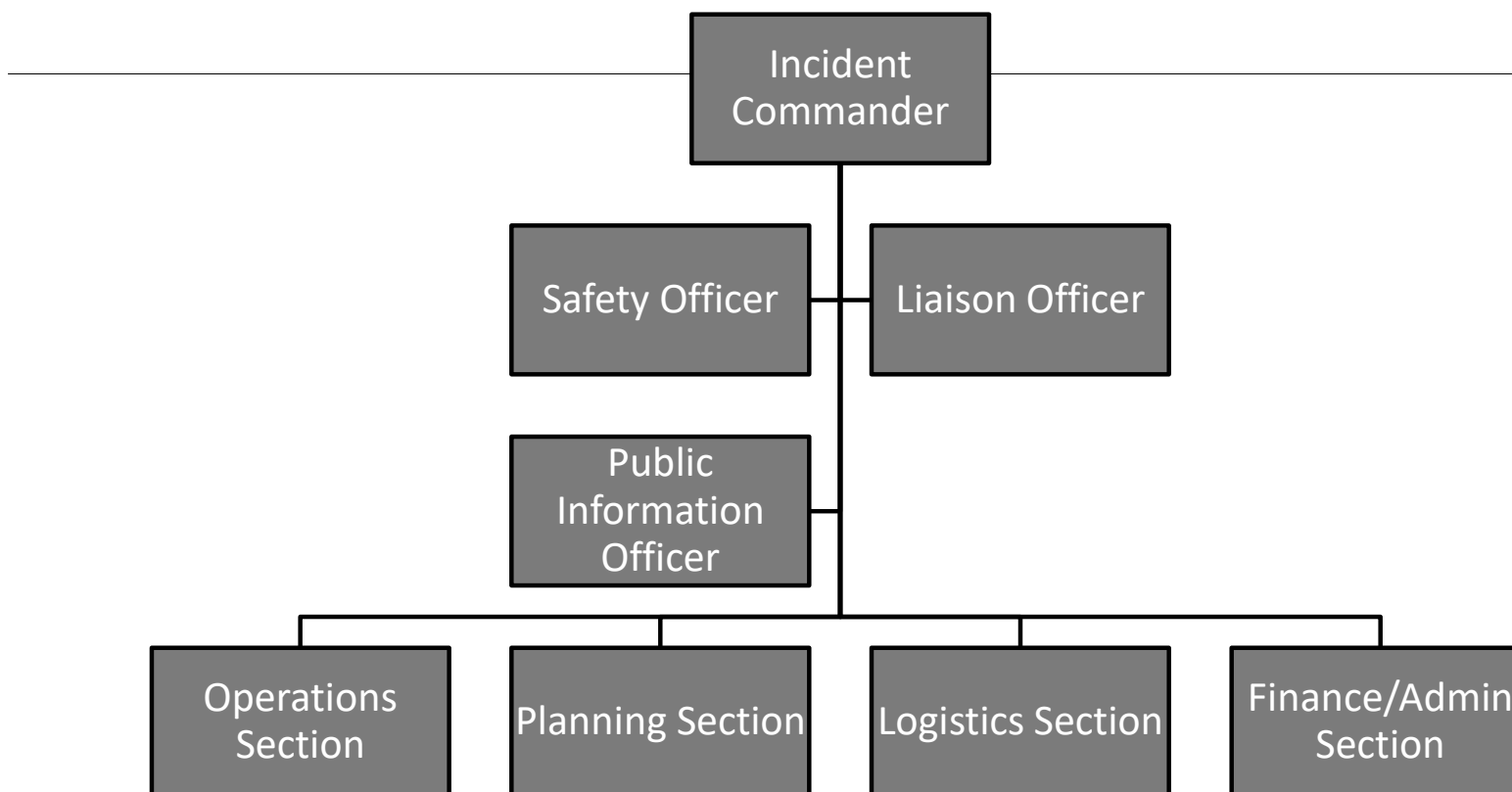
Emergency on-call



## What is the Incident Command System?

- ICS is a standardized approach to incident management
- Used for all kinds of incidents by all types of organizations and at all levels of government
- Small incidents and large/complex ones
- Can be used not only for emergencies, but also for planned events
- Enables coordinated response among jurisdictions, agencies, programs





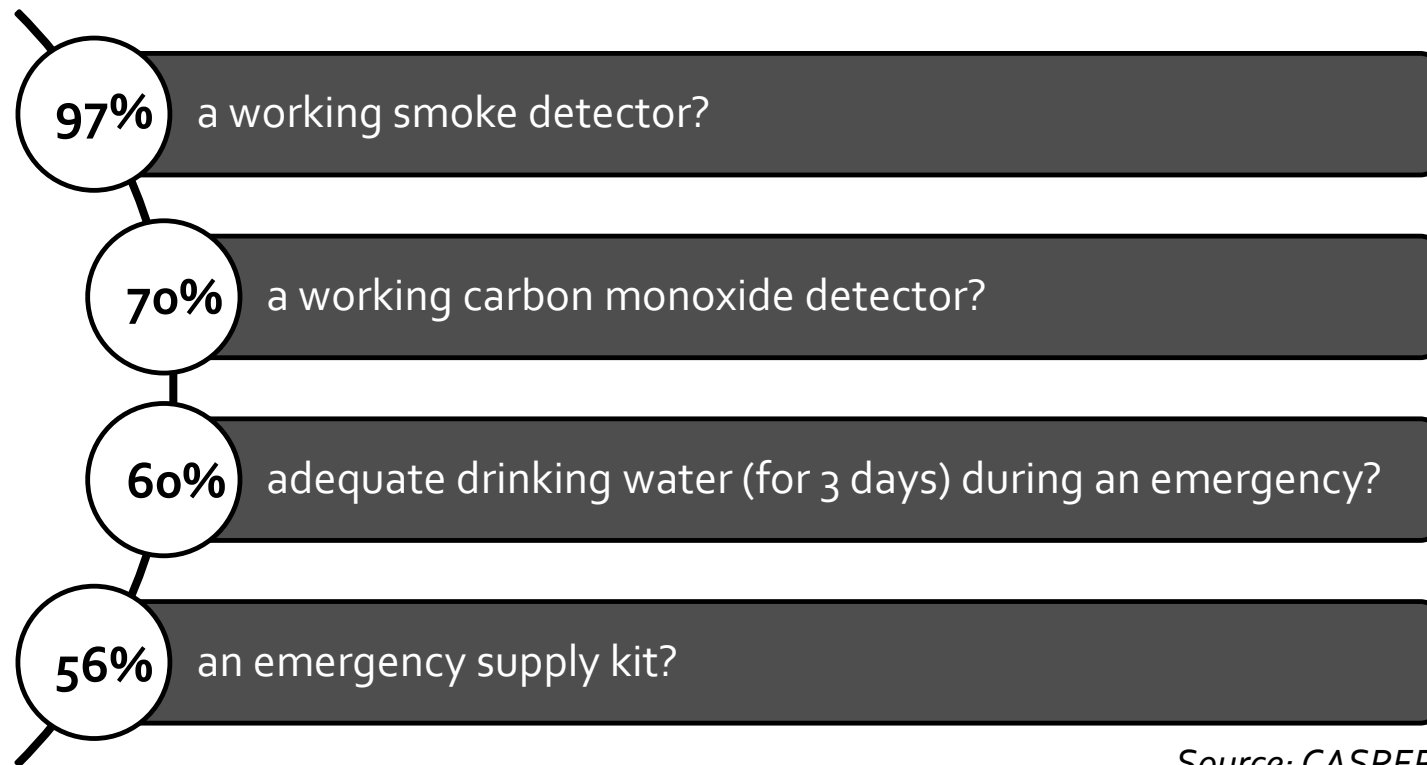


# Module 2

Food Safety in a Disaster or Emergency



## What Percentage of Fairfax County Households have...



Source: CASPER

## Build a Kit - Home



Non-perishable  
food



Water



First Aid Kit



Important  
documents



Warm blankets  
and bedding



Chlorine bleach



Baby items



Pet supplies

## Before a Disaster or Emergency

**BEFORE**  
PLAN AHEAD (IF YOU CAN) ...



Freeze **containers of water** and **gel packs** to help keep food cold if the power goes out.

Put **appliance thermometers** in your refrigerator and freezer.

Keep **freezer** **0°F** or below

**Refrigerator** **40°F** or below

Freeze refrigerated items such as leftovers, milk, and fresh meat and poultry that you do not need immediately.

**Group foods together** in the freezer to help food stay colder longer.

If you think power will be out for more than 4 hours, consider moving food to a cooler with ice. If available, buy dry or block ice to keep the refrigerator or freezer cold.

Store non-perishable foods on higher shelves to avoid flood water.

## Suggested Emergency Food Supplies

---

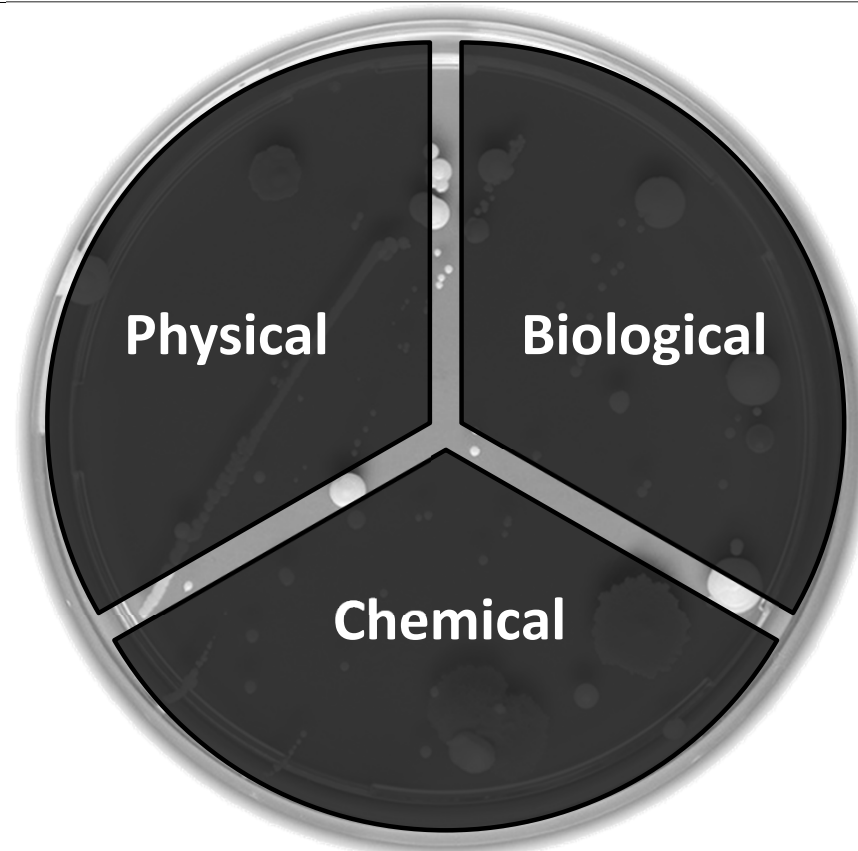
- Ready-to-eat canned meats, fruits, vegetables (and a can opener)
- Protein or fruit bars
- Dry cereal or granola
- Peanut butter
- Dried fruit
- Canned juices
- Non-perishable pasteurized milk
- High-energy foods
- Food for infants
- Comfort/stress foods





## Three main categories of food contaminants

---



# How To Store an Emergency Food Supply

Protect your food supply from the following factors:



Heat



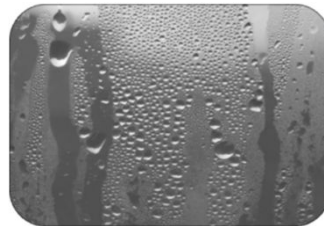
Light



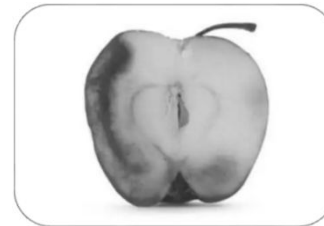
Pests



Chemicals



Humidity



Oxygen

## Storing Emergency Food Supply



Buckets



Mylar Bags



Totes



Cool Storage



Closets

## Prepare an Emergency Water Supply

---

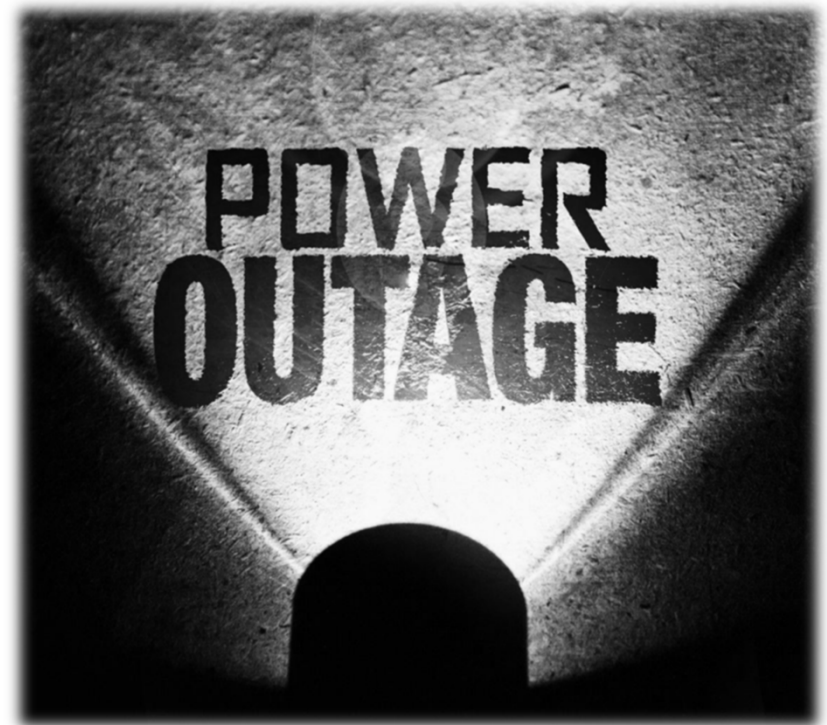
- Store at least a 3-day supply of water
  - 1 gallon of water per day (for each person and pet)
  - Additional water for hot climates, pregnant women, or sick individuals
- Replace water as needed
  - Store-bought water: by expiration date
  - Other stored water: every 6 months
  - Dispose/replace bottled water that has an odor



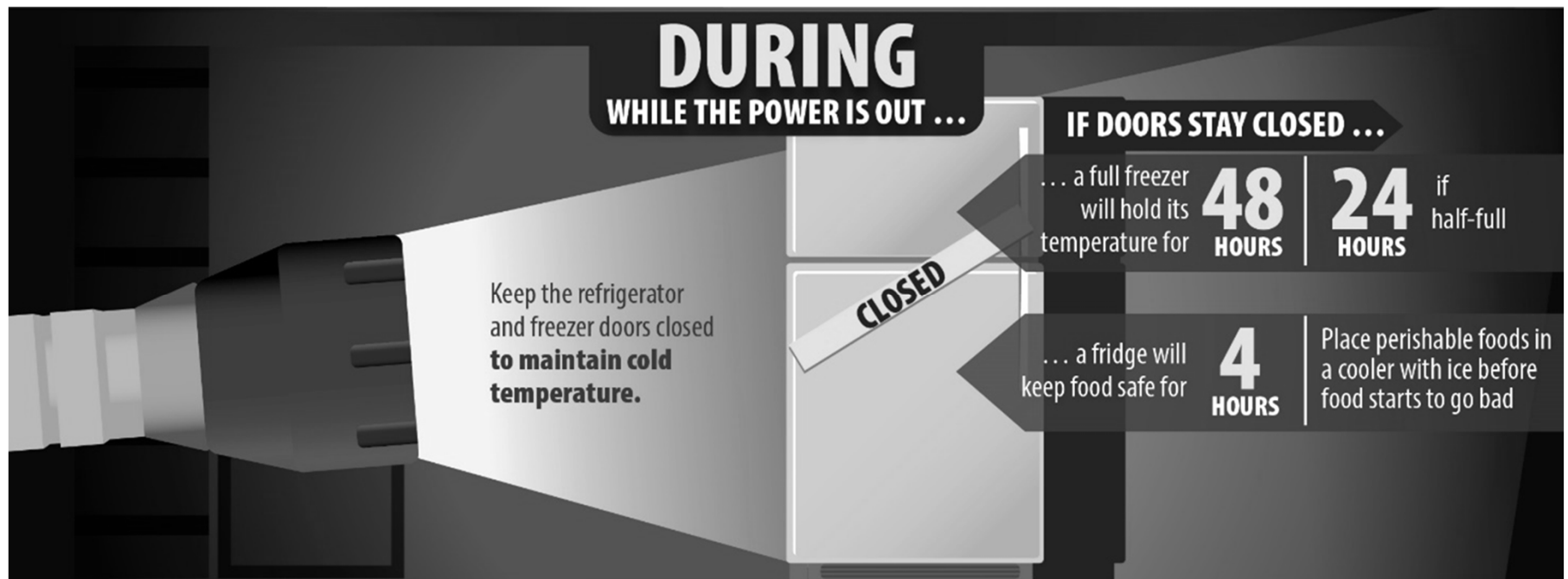
## Preparing for a Power Outage

---

- Check appliance temperatures
  - Refrigerator: at or below 40° F
  - Freezer: at or below 0° F
- Use ice or gel packs to maintain temperature
- Freeze foods not needed immediately
- Group frozen foods together
- Know where to obtain dry ice




## During a Disaster or Emergency




# After a Disaster or Emergency

## AFTER

ONCE THE POWER IS BACK ON ...

















**Check the temperature** inside your refrigerator and freezer. If they're still at safe temperatures, your food should be fine. Discard perishable foods that have been at an unsafe temperature.











Never taste food to **determine its safety!**

### WHAT CAN I KEEP?

						
Hard cheeses (Cheddar, Colby, Swiss, Parmesan, Provolone, Romano)	Grated Parmesan, Romano, or combination (in can or jar)	Butter or margarine	Opened fruit juices	Opened canned fruits	Jelly, relish, taco sauce, mustard, ketchup, olives, pickles	Worcestershire, soy, barbecue, and Hoisin sauces
						
Peanut butter	Opened vinegar-based dressings	Bread, rolls, cakes, muffins, quick breads, tortillas	Breakfast foods (waffles, pancakes, bagels)	Fruit pies	Fresh mushrooms, herbs, and spices	Uncut raw vegetables and fruit

### WHAT SHOULD I THROW OUT?

		
Raw meat, poultry or seafood products	Soft cheeses and shredded cheeses	Milk, cream, yogurt, and other dairy products
		
Opened baby formula	Eggs and egg products	
		
Dough, cooked pasta	Leftovers	Cooked or cut produce

## WHEN IN DOUBT, THROW IT OUT!

## After a Power Outage

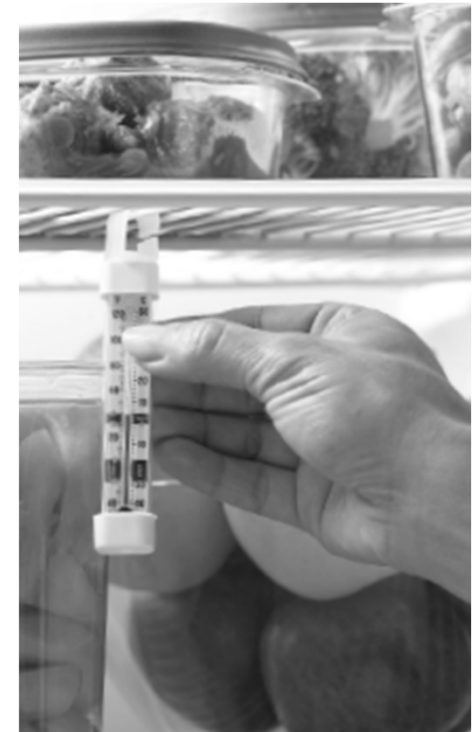
---

Determine the safety of your food:

- Ensure freezer thermometer reads 40° F or below

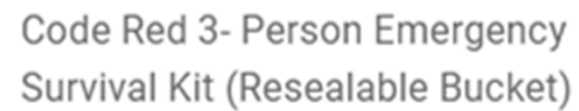
Discard the following perishable foods:

- Refrigerated above 40° F for two hours or more
- Refrigerated and power was out for four hours or more
- In freezer, but thawed out due to high temperature





## What is wrong with this phrase?



**\$199.00**

## Special Considerations



School-aged children



Elderly



Toddlers and babies



Pets



## Quick Check

---

How many days  
should you  
prepare for?

How often should  
you revisit your  
kit?

Why is it better to  
build a kit rather  
than buying a kit?

## Final Thought: Be Aware Of Threats That May Impact You



Bioterrorism



Cyber Security



Drought



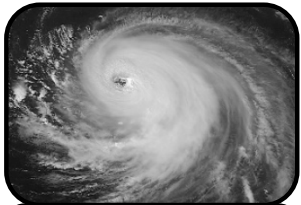
Earthquakes



Floods



Fires



Hurricanes



Landslides &  
Debris Flow



Pandemics



Snowstorms &  
Extreme Cold



Thunderstorms  
& Lightning



Tornadoes



Additional questions? Email EP&R's Training and Exercise Program at  
[hdepr-training@fairfaxcounty.gov](mailto:hdepr-training@fairfaxcounty.gov)