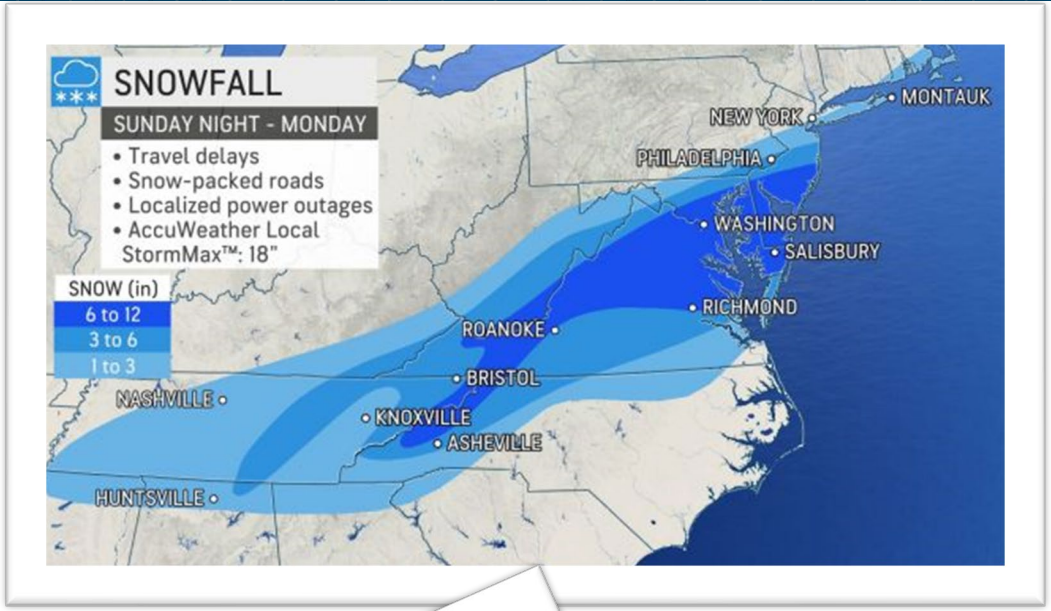
Extreme Weather/ HVAC Failure

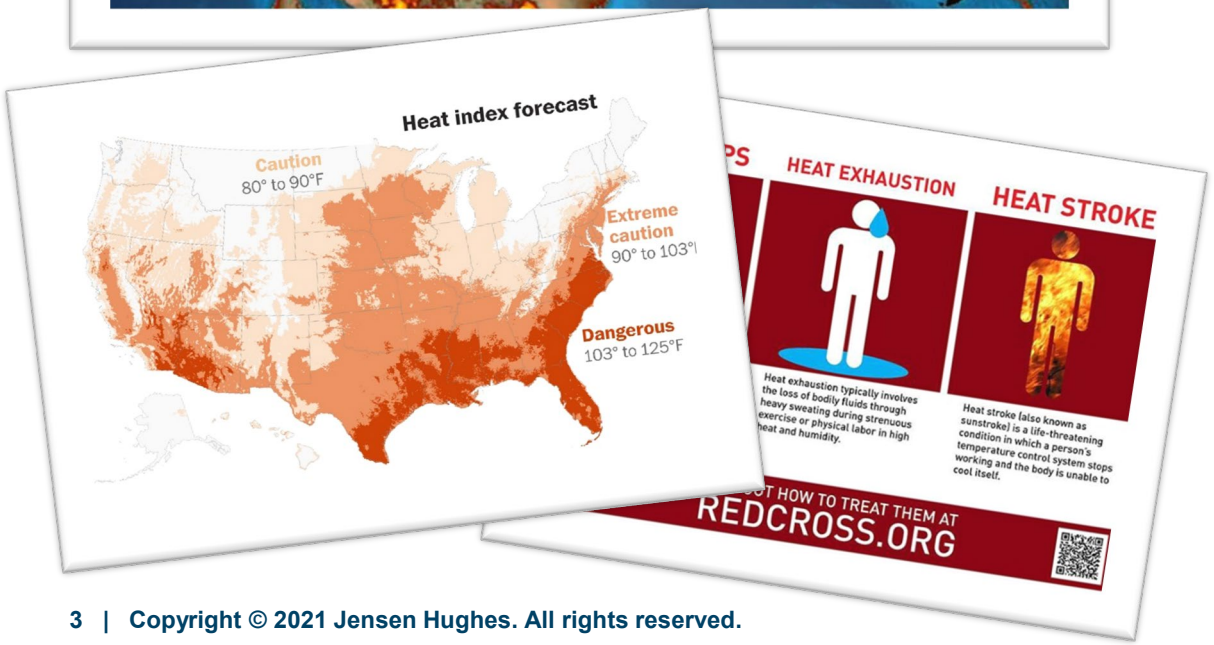
Presenter: Joseph Reppucci, MSEM, CEM, EMT-AC

OBJECTIVES

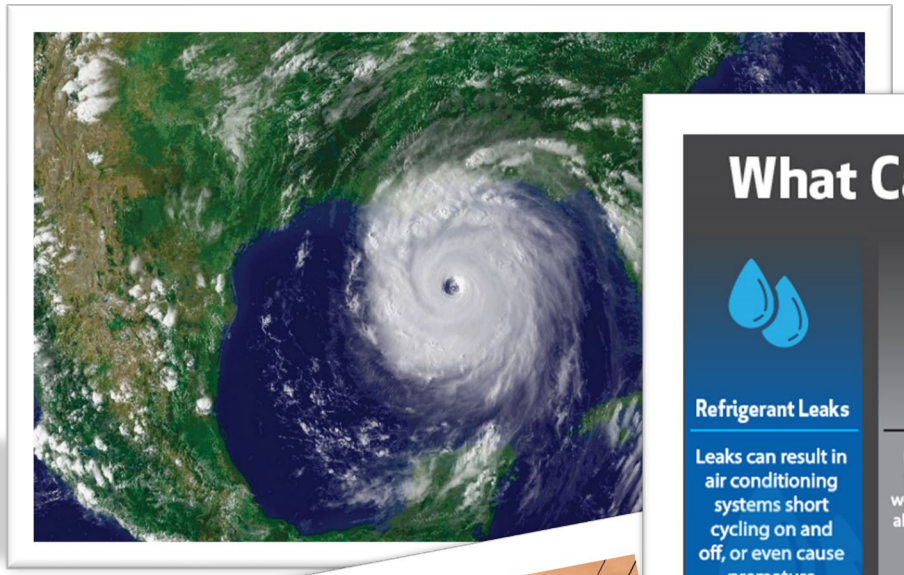
+ Understand trends in weather events and predicted changes impacting the Southeast.
+ Review HVAC regulatory requirements
+ Recognize the impacts incurred by residents, patients, staff, and others due to HVAC Failures
+ Discuss immediate actions when an HVAC failure happens

Two of our biggest Concerns





Causes of HVAC Failure



What Causes HVAC Systems to Fail?

Refrigerant Leaks

Leaks can result in air conditioning systems short cycling on and off, or even cause premature compressor failure.

Inadequate Maintenance

Filters clog, belts fail, and sheaves wear out, which can all result in lowered performance

Electrical Problems or Faulty Wiring

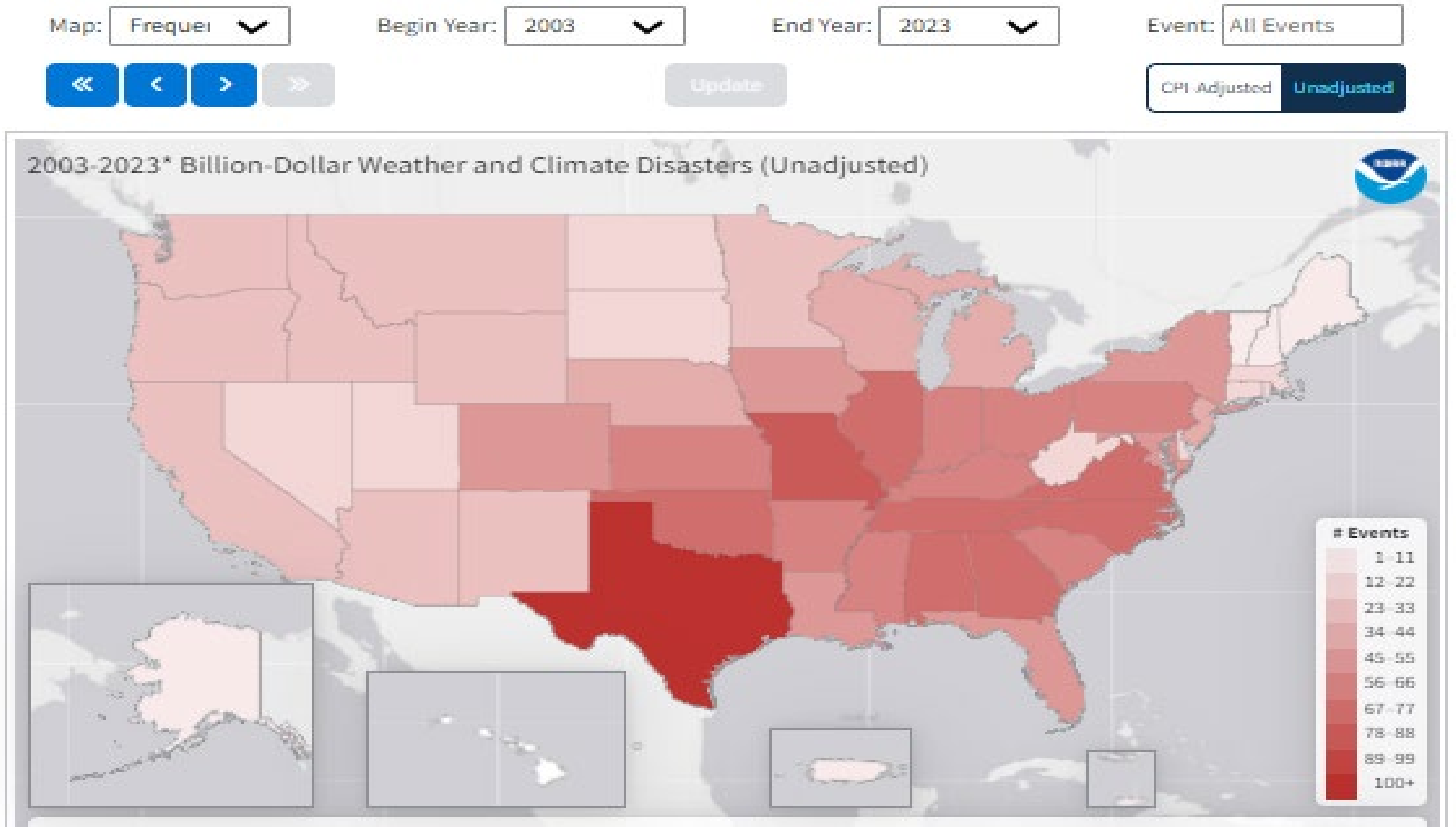
Wires become worn, may have loose connections, or other problems that can cause electric arcing or even become a fire hazard

Sensor Failure

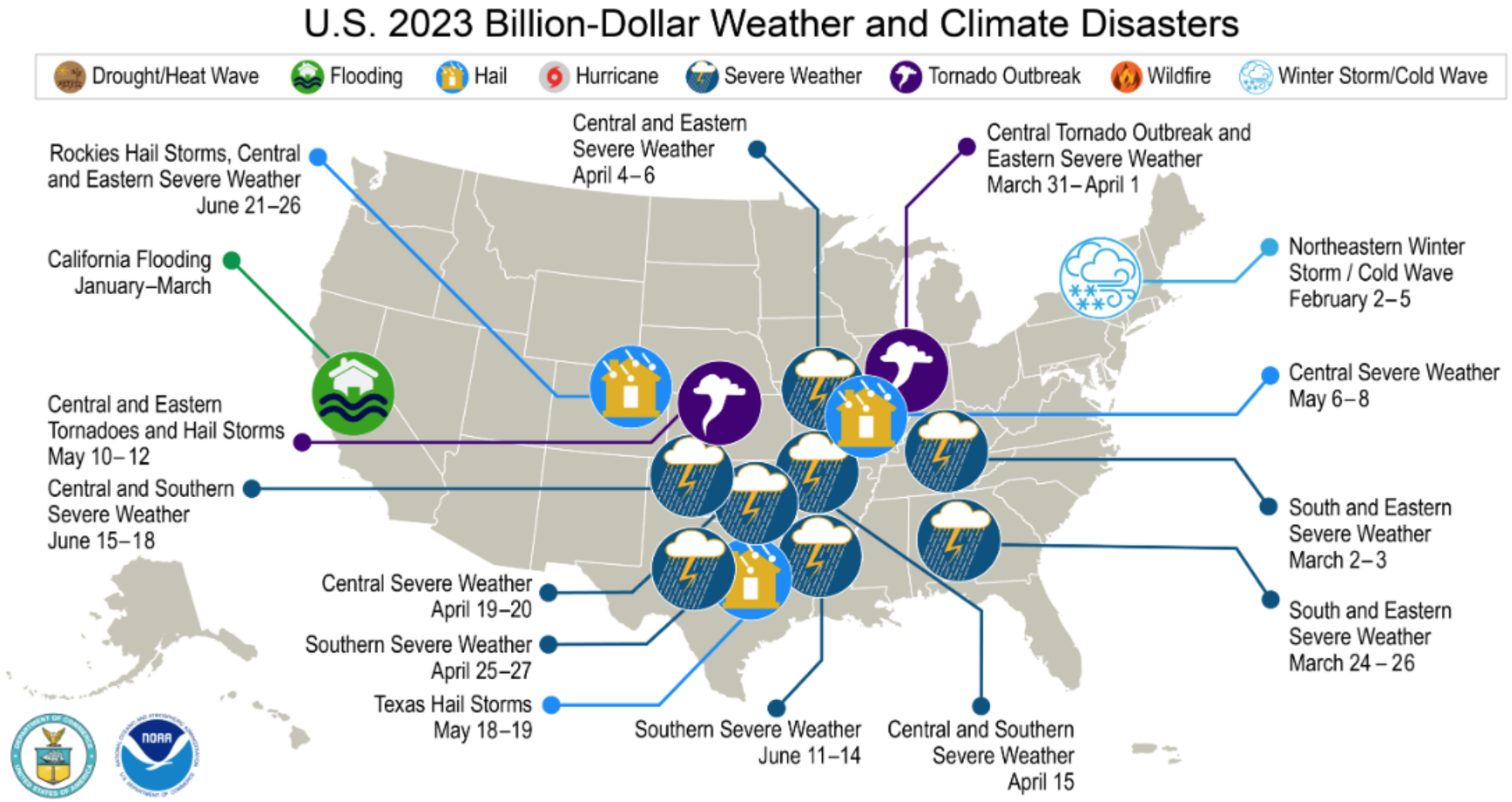
Systems can operate abnormally if their sensors or thermostats fail to read properly

Fan Failure

Whether it's failure of the indoor supply fan or the outdoor condenser fan, this problem prevents proper heat transfer, which results in mechanical cooling problems



Changing Weather Patterns



*This map denotes the approximate location for each of the **15 separate billion-dollar weather and climate disasters that impacted the United States through July 2023.***

Changing Weather Patterns

- Extreme weather events and long-term changes in climate are making hazards more frequent and/or intense, and physical hazards are compounded by existing stressors and inequities
- EPA 8/2022 – “Scientific studies indicate that extreme weather events such as heat waves and large storms are likely to become more frequent or more intense”

Why the U.S. is leading the world in extreme weather catastrophes

PBS News – 4/2023

+ The United States is Earth's punching bag for nasty weather.

+ If the United States as a whole has it bad, the South has it the worst, said University of Georgia meteorology professor Marshall Shepherd.

"*We drew the short straw (in the South) that we literally can experience every single type of extreme weather event," Shepherd said. "Including blizzard,. wildfires, tornadoes, floods, and hurricanes. Every single type. … There's no other place in the United States that can say that."*

Regulatory Requirements:

National Fire Protection Association (NFPA) Health Care Facilities Code (NFPA 99-2012).

- 12.5.3.3.6.5—Essential Utilities.
  - Prior to declaring any emergency, an organization must assess whether it has the infrastructure to support electricity and HVAC.

National Fire Protection Association (NFPA) Health Care Facilities Code (NFPA 99-2012).

- B.12.3.4—Activation of Emergency Utility Resources. Planning for a loss of utilities is essential. Organizations should evaluate their ability to be self-sufficient over a period of at least 96 hours, including the fuel they have on hand. An organization that has backup generators must establish how long it can operate on those generators if it loses electricity. *Besides the above requirements, organizations should consider guidance (not a regulation) from the Occupational Safety and Health Administration (OSHA). To optimize the comfort of building occupants,* ***OSHA's Standard 1910.1000 recommends temperature control settings in the range of 68°–76° F and relative humidity control settings in the range of 20%–60%.***

CMS Regulations for HVAC Failure:

- Physical Environment Requirements (42 CFR 483.70)
  - Facilities are required to provide a safe, clean, and comfortable environment that promotes the well-being of residents.
- Infection Control (42 CFR 483.80)
  - Facilities are expected to have infection control programs that address the prevention and control of infections within the facility, which could include proper HVAC system maintenance to reduce the spread of airborne contaminants.
- Emergency Preparedness (42 CFR 483.73)
  - While not directly addressing HVAC systems, this regulation requires facilities to have emergency preparedness plans in place. These plans should address various potential emergencies, which could include HVAC failures during extreme weather conditions.
- Quality of Care (42 CFR 483 Subpart B):
  - While not explicitly mentioning HVAC systems, these regulations emphasize the need for maintaining a safe and suitable environment for residents.

Virginia Administrative Code

Part IX. Emergency Preparedness - 22VAC40-73-950. Emergency preparedness and response plan.

https://law.lis.virginia.gov/admincodefull/title22/agency40/chapter73/partIX/

- Documentation of initial and **annual contact with the local emergency coordinator** to determine (i) local disaster risks, (ii) communitywide plans to address different disasters and emergency situations, and (iii) assistance, if any, that the local emergency management office will provide to the facility in an emergency.
- **Analysis of the facility's potential hazards**, including severe weather, biohazard events, fire, loss of utilities, flooding, workplace violence or terrorism, severe injuries, or other emergencies that would disrupt normal operation of the facility.
- **Written emergency management policies and procedures** (*Alerting & Notification & Communication, Access, Evac, SIP, Accounting for residents, Utility shutoffs, Equipment, Relocation*)
- **Written emergency response procedures** for assessing the situation; protecting residents, staff, volunteers, visitors, equipment, medications, and vital records; and restoring services.

Virginia Administrative Code

Part IX. Emergency Preparedness - 22VAC40-73-950. Emergency preparedness and response plan.

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- **Supporting documents** that would be needed in an emergency, including emergency call lists, building and site maps necessary to shut off utilities, memoranda of understanding with relocation sites, and list of major resources such as suppliers of emergency equipment.
- **Staff and volunteers shall be knowledgeable** in and prepared to implement the emergency preparedness plan in the event of an emergency.
- The facility shall develop and implement an **orientation and semi-annual review** on the **emergency preparedness and response plan for all staff, residents, and volunteers**, with emphasis placed on an individual's respective responsibilities. The review shall be documented by signing and dating.
- The facility shall **review the emergency preparedness plan annually or more often** as needed, document the review by signing and dating the plan, and make necessary plan revisions. Such revisions shall be communicated to staff, residents, and volunteers and incorporated into the orientation and semi-annual review for staff, residents, and volunteers.

Virginia Administrative Code

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+ In the event of a disaster, fire, emergency, or any other condition that may jeopardize the health, safety, and welfare of residents, the **facility shall take appropriate action to protect the health, safety, and welfare of the residents** and take appropriate actions to remedy the conditions as soon as possible.
+ After the disaster or emergency is stabilized, the facility shall:
  - Notify family members and legal representatives; and
  - Report the disaster or emergency to the regional licensing office by the **next day** as specified in 22VAC40-73-70.

Impacts of Events on People and Facilities

- Utility outages are likely to occur during significant weather events

- People may seek shelter in facilities and other air-conditioned public facilities with backup generators whether or not they are sick. This puts additional strain on healthcare facilities.

- PBS 4/2023 - “Safety can be bought, those that are well-to-do and who have resources can buy safety and will be the most resilient when disaster strikes. … Unfortunately, that isn’t all of us. Poverty makes it hard to prepare for and bounce back from disasters, especially in the South” - Northern Illinois meteorology professor Walker Ashley.

Consequences vs. Causes

Consequence management occurs through the consideration of the wider ramifications of an emergency event.

+ This approach moves the focus from a specific hazard to broader consequences affecting a facility, regardless of the hazard source.

Causes (Specific Hazard)

- Loss of HVAC

Consequences

- Loss of use of a building / area / unit
- Activation of alternative systems (Fans/AC Units..)
- Interim life safety measures (Portable Heating/cooling)
- Full building or partial facility evacuation

Mitigation Planning

What can be done to minimize the risk?

+ Infrastructure Improvement
+ Redundant Equipment Purchase
+ Planning on all hazards
+ Training staff, volunteers, patients and families on emergency procedures
+ Collaboration with other Partners (Town/City/County/State)

Immediate Support Actions for an HVAC Failure

Immediate Support Actions for an HVAC Failure and Extreme Heat

- Activate the EOP to support the response
- Work with Facility Services staff to identify the cause of the issue and work to mitigate and repair it.
- As much as possible, ensure the facility's continuity of operations. Pay particular attention to:
  - Patients – especially temperature sensitive patients
  - Staff – ensure that staff stay well hydrated, and get extra breaks
  - Equipment – critical equipment and computers are all particularly vulnerable to high heat
- Respond to the physical and emotional needs of staff and patients impacted by the heat.

Immediate Support Actions for an HVAC Failure

Immediate Support Actions for an HVAC Failure and Extreme Heat

- Open windows, open IT closet doors, and obtain fans (if needed).
- Secure the facility and implement a limited visitation policy.
- Ensure continuation of patient care and essential services and consider partial or complete evacuation of facility or relocation of patients and services within the facility.
- Keep the blinds down and closed to keep the heat out!
- Notify the municipal Emergency Manager and emergency services

For Information and Resources

Virginia Long Term Care Infrastructure Pilot Project

https://www.vhca.org/vlipp/

VHCA EMPrep emprep@vhca.org

Program: *(Other) – VA LTC Infrastructure Pilot Project (VLIPP)*

Trainer: *Joe R*

Thank you!

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