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Disclosures

Bisni Narayanan has no real or potential conflicts of interest or financial disclosures related to the subject matter in this presentation.

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Bhopal Gas tragedy (1984)

- Union Carbide Corporation's chemical plant in Bhopal
- 40 tons of methyl isocyanate gas
- Estimates of deaths range from 3800-16,000, with >600,000 exposed
- The average compensation to families of the dead was \$2,200
- The plant continues to leak several toxic chemicals and heavy metals into local aquifers

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Broughton E. The Bhopal disaster and its aftermath: a review. *EnvironHealth*. 2005;14(3):4.

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Learning Objectives - Pharmacists

1

Review the pulmonary effects of natural disasters

2

Discuss secondary surge for chronic respiratory diseases following natural disasters

3

Describe preventive clinical management strategies for common respiratory diseases during disasters

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Learning Objectives - Pharmacy Technicians

1

Review the pulmonary effects of natural disasters

2

Discuss secondary surge for chronic respiratory diseases following natural disasters

3

Describe the technician's role in triage during disasters that may exacerbate respiratory illness

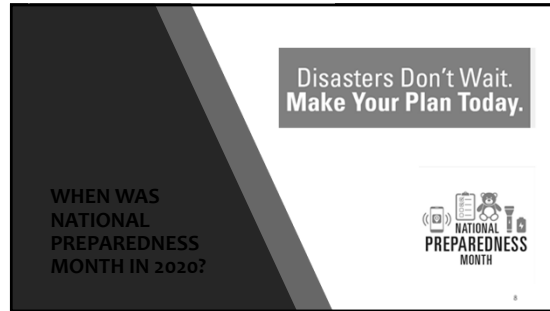
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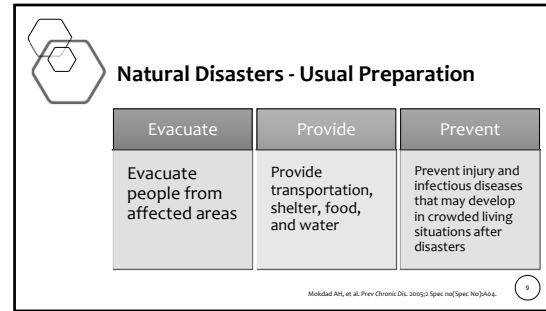
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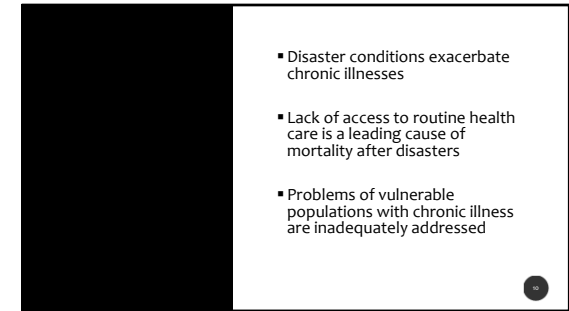
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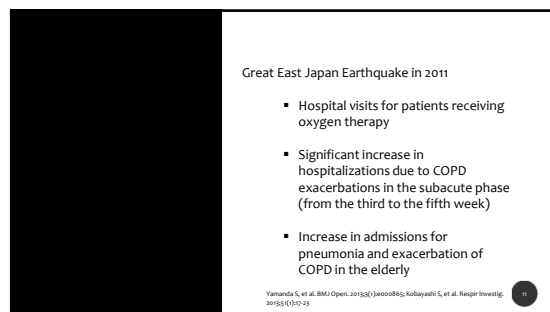
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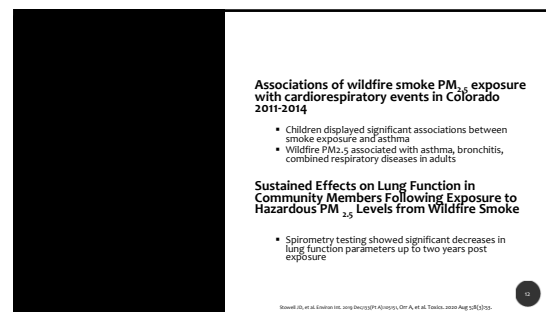
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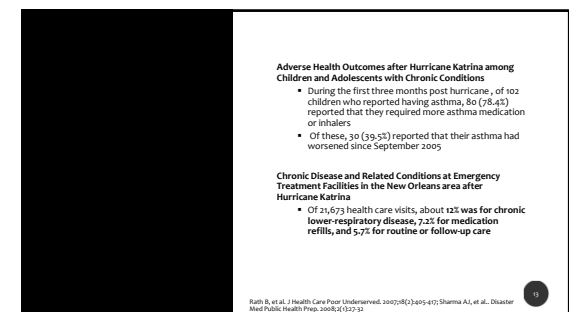
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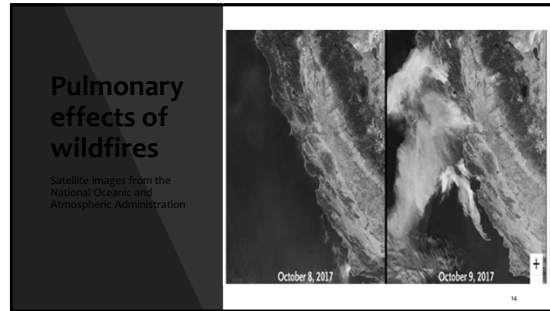
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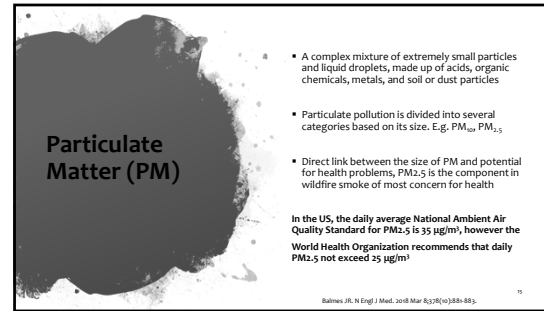
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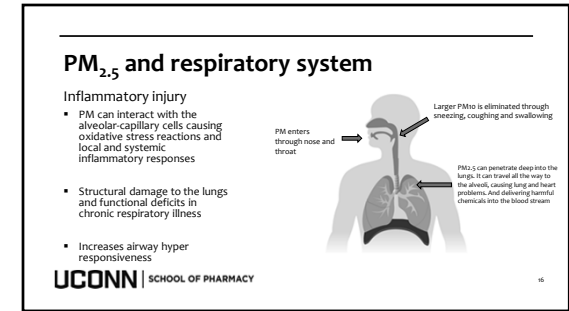
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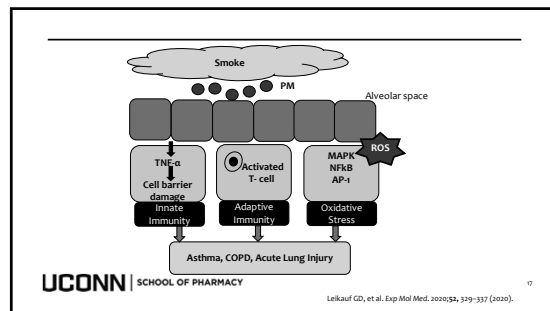
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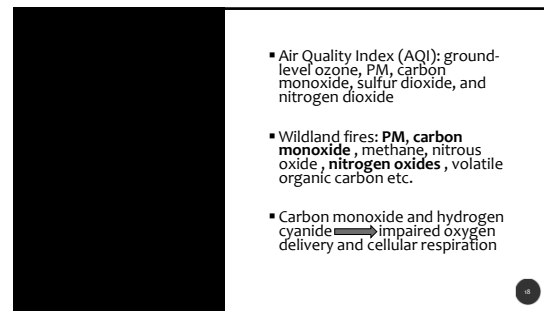
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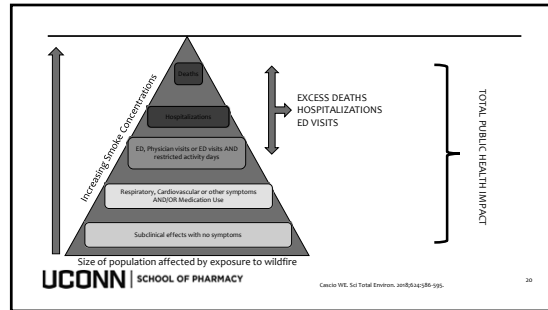
Air Quality Index (AQI)

- A nationally uniform color-coded index reporting and forecasting daily air quality
- Focuses on health effects that may be experienced within hours or days
- Reports air pollutants that are regulated under the Clean Air Act

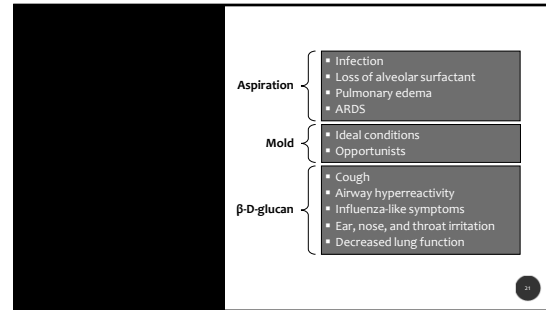
AQI Category and Color	Index Value	Description of Air Quality
Good	0 to 50	Air quality is satisfactory, and all pollution levels are low.
Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Some members of the general public may experience health effects. Members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Hazardous	301 and higher	Health warning of emergency conditions. Everyone is likely to be affected.

Source: The AQI scale includes 10 categories and colors corresponding to the values and health effects reported for the various air pollutants.

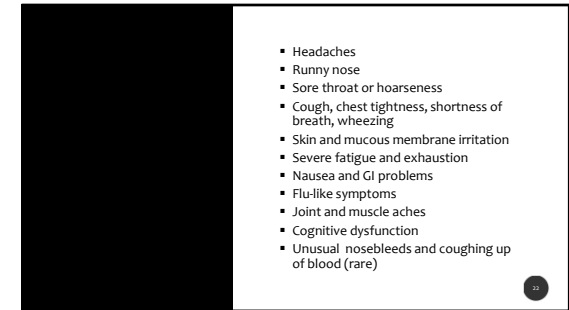
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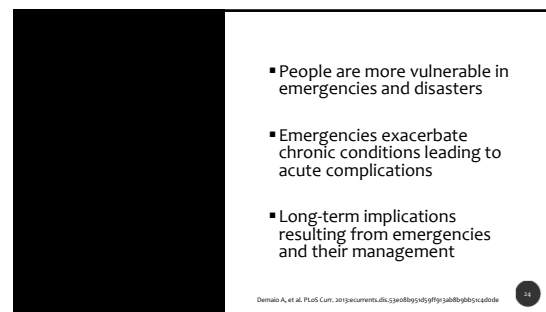
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Organ system	Clinical Effect	Exposure/Agents
Upper airway, nose, sinuses, throat	Rhinitis, Sinusitis, Laryngitis	Fungi, allergens, irritants, PM
Lower airway, lung with bronchial system, alveoli	Bronchitis, Asthma, Allergic bronchopulmonary aspergillosis, toxic alveolitis, pneumonitis	Fungi, allergens, fungal byproducts, fine particles
Combined upper and lower airway	Aspergillosis, fungal rhino-sinusitis	Fungi, allergens, fine particles

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Question

Schools had to be shut in Nov 2019 in this Indian city due to AQI of 472

- New Delhi
- Bangalore
- Mumbai

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<https://www.theweekend.com/photos/india/india-delhi-aqi-472/>

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Learning Objectives

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- 3 Describe preventive clinical management strategies for common respiratory diseases during disasters

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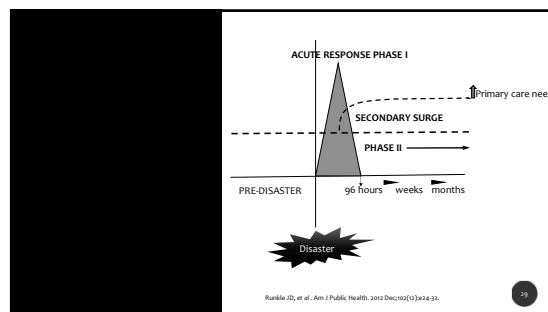
The Agency for Healthcare Research and Quality (AHRQ) defines surge capacity as a "health care system's ability to expand quickly beyond normal services to meet an increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies"

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- Hospital bed capacity
- Medical equipment and supplies
- Population to provider ratios
- Personnel availability
- Prescription medication refills
- Portable triage and decontamination centers
- The ability to legally deliver health services under situations that exceed authorized capacity

Runkle JD, et al. Am J Public Health. 2010 Dec;100(12):1614-20.

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DMAT in Gulfport, MS and New Orleans, LA

Expectation- Acute illness

Study results- More than 40% of the health problems treated at the two sites were related to chronic conditions and the lack of access to routine care

The most common presentation overall was for chronic health conditions

- medication refills (20.6%)
- immunizations (11%)
- obtaining community resources (6%)

Miles MC, et al. Prehosp Emerg Care. 2008 Oct;22(4):443-6.

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Which of the following is a benchmark for surge capacity?

- Immunization availability
- Prescription medication refills
- Ability to close schools quickly

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What's our role in disaster management?



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- We often hear about doctors and nurses in disaster management
- Where are our pharmacists and pharmacy technicians?

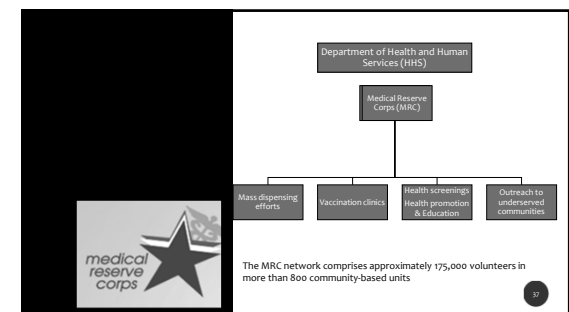
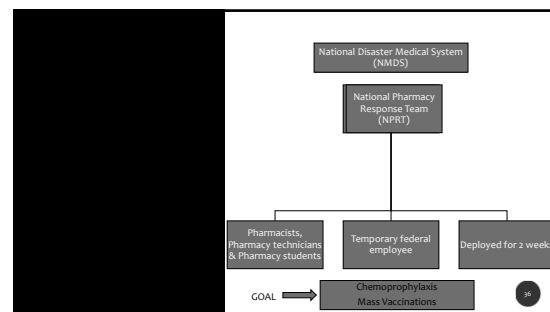
➤ **DRUGS, VACCINATIONS, COUNSELING**

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- Pharmacists should have a key role in the
 - **planning and execution of pharmaceutical distribution**
 - control drug therapy management of patients during disasters
- Pharmacists should aid in the following:
 - Develop guidelines for the diagnosis and treatment of casualties and exposed individuals
 - Select pharmaceuticals and related supplies for national and regional stockpiles and local emergency inventories in emergency preparedness programs
 - Ensure proper packaging, storage, handling, labeling, and dispensing of emergency supplies of pharmaceuticals
 - **Ensure appropriate deployment of emergency supplies of pharmaceuticals**
 - Ensure appropriate education and counseling of individuals who receive pharmaceuticals from an emergency supply in response to a disaster
- **Pharmacists should advise public health officials** on appropriate messages to convey to the public about the use of essential pharmaceuticals in response to disasters
- Pharmacists should collaborate with physicians in managing the drug therapy of individual victims

Am J Health Syst Pharm. 2003;60(19):1999-1995.

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Which of the following is a health system Pharmacist's role?

- A. Maintain appropriate pharmacist to technician ratios mandated by states
- B. Ensure appropriate deployment of emergency supplies of pharmaceuticals
- C. Report to work on time, even if you are experiencing viral symptoms

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Utilization of skills, knowledge and expertise is warranted!

- Medication history
- Triage patients
- Vaccinate in some states
- Restock carts
- First receivers in a community setting
- Volunteer in MRC or other organizations

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Which of the following is a Technician's role?

- A. Take medication histories and triage patients to streamline care
- B. Report to work on time, even if you are experiencing cough and fever
- C. Assume responsibilities usually only allowed for pharmacists

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Planning

During disaster

After disaster

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Medications

- At least 2-week supply
- Maximum frequency of inhaler use
- Antibiotic prescription
- Prescription for metered dose inhaler in addition to nebulizer medications

Lung Function

- Access lung function with peak flow meter

Hospitalization?

- Should the patient be admitted in the hospital as precautionary measure?
- Identify hospital that has available physician

<http://lungcare.net/lung-care-services-for-my/en/lung-diseases/hurricane-preparedness/>

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Oxygen Medical Supply

- Backup cylinder and how many hours will the cylinder last?
- If backup cylinder is used, will they deliver additional oxygen cylinder?
- Emergency contact information and physical address?
- Additional supplies needed to keep the equipment clean for at least two weeks?
- How soon will oxygen supply will be replenished after disaster?

Nebulizer Supplies

<http://lungcare.net/lung-care-services/fort-myers/lung-diseases/hurricane-preparedness/>

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Notify electric company of life-sustaining medical equipment use that requires electricity.


- They may put the area in their priority list after the disaster

<http://lungcare.net/lung-care-services/fort-myers/lung-diseases/hurricane-preparedness/>

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Build A Kit

Have enough food, water and other supplies to support your needs for several days.



Breathe Easy Hurricane Survival Kit

Read!

- 14-day supply of inhalers, nebulizer and other medications
- Back up oxygen cylinder including cleaning supplies
- Portable battery-operated nebulizer machine
- A DC adapter to operate a nebulizer from a car cigarette outlet
- Water and non-perishable foods for 2 weeks
- A small cooler with frozen gel packs
- Flashlight, radio and extra batteries
- Blanket and pillows
- Keep important papers

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ASTHMA ACTION PLAN

Personal Peak Flow

PEAK FLOW	GREEN ZONE	YELLOW ZONE	RED ZONE
100-120	100-120	100-120	100-120
80-100	80-100	80-100	80-100
60-80	60-80	60-80	60-80
40-60	40-60	40-60	40-60
20-40	20-40	20-40	20-40
0-20	0-20	0-20	0-20

Call your doctor if you are in the RED ZONE.

Call 911 if you are in the RED ZONE.

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MY COPD ACTION PLAN

Call your doctor if you are in the RED ZONE.

Call 911 if you are in the RED ZONE.

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Stay Calm

Emotional stress increases heart rate, quickens breathing, makes breathing more difficult and demands more oxygen from the body.

Practice breathing

Practice pursed-lip breathing, diaphragmatic breathing, and conditioning exercises to breathe easier

Use Battery powered lights

Use battery powered lights only, away from open sources of flame

Increase frequency of inhalers

If symptoms worsen, increase the dose or frequency of inhalers or nebulizer or other respiratory medications

Call 911

Call 911, only for an actual or impending life-threatening emergency

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POWER OUTAGES OR FLOODS

- An unopened refrigerator will keep food cold for about 4 hours
- An unopened full freezer will remain frozen for approximately 48 hours

MOLD AND MILDEW

- Remove wet items from the house immediately
- Mold worsens asthma

CLEANING DEBRIS

- Asthma symptoms manifests within 30-120 minutes after the exposure

People with chronic respiratory disorders are more susceptible to CO poisoning

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Prepare for the fire season



BE PREPARED FOR A WILDFIRE

Wildfires can ruin homes and cause injuries or death to people and animals.

Know where to find alerts

Follow the asthma/COPD action plan

Maintain a 7-10-day supply of medication

Check the heating, ventilation, and air conditioning (HVAC) system

Stay indoors with doors and windows closed

Use a portable air cleaner

Wear an N-95 mask

Make an evacuation or relocation plan


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Where to find Air Quality Reports

- [AirNow.gov](#) has current and forecast air quality data and maps
- Residents can sign up for email notices about air quality through a free service called [Emaillink](#)
- Weather forecasts in local news



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Current Conditions

Air Quality Index (AQI) observed at 6:00 PDT

62 Moderate

Health Message: Unusually sensitive people should consider reducing prolonged or heavy exertion.

Note: Values above 500 are considered Beyond the AQI. Follow recommendations for the Hazardous category. Additional information on reducing exposure to extremely high levels of particle pollution is available [here](#).

AQI - Pollutant Details

Ozone	50	Good
Particles (PM10)	29	Good
Particles (PM2.5)	62	Moderate

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- Keep smoke out
- Run a/c with the fresh-air intake closed ("recirculate mode")
- Clean room
- Do not add to indoor air pollution
- Monitor local air quality reports and health warnings
- Avoid ash exposure after wildfire
 - Wear gloves, long-sleeved shirts, long pants, shoes and socks to avoid skin contact
 - Select a respirator that has been tested and approved by NIOSH

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Stability of biologics at room temperature

Injectable for Asthma	Stability at room temperature
Mepolizumab (NUCALA®)	Unopened carton can be stored outside the refrigerator at up to 86°F (30°C) for up to 7 days.
Dupilumab (DUPIXENT®)	Syringes can be stored at room temperature up to 77°F (25°C) up to 14 days
Benralizumab (FASENRA®)	May be kept at room temperature between 68°F to 77°F (20°C to 25°C) for a maximum of 14 days
Reslizumab (CINQUAIR®)	Store diluted solutions at room temperature up to 25°C (77°F), protected from light, for up to 16 hours
Omalizumab (XOLAIR®)	Reconstituted vials good for 4 hours at room temperature

Stability of Refrigerated medications 2015 (hpsm.org)

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Question

The expert panel of key opinion leaders within the field of disaster health recommended pharmacists could undertake ----number of roles in a disaster

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Watson KE, et al. *PLoS One*. 2019 Dec;14(12):e0220292

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- Check for open pharmacies <https://rxopen.org>
- Receive care at community health centers
<https://www.directrelief.org>
Free prescription drugs and medical supplies for low-income individuals at community health centers of clinics
- Contact Medicare
 - Medicare-insured patients contact the plan to determine the closest network pharmacy that is open.
 - If none are open, Medicare will be able to connect patients with another pharmacy
- Insurance overrides "Refill Too Soon" Edit Override to allow for 30-day supply of medications
- State boards may authorize Emergency Dispensing of Prescription Medications

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- Must be activated by the federal government
- Only for uninsured patients
- Provides 30-day coverage for prescription medications and DME to those in federally-identified disaster areas
- 72,000 pharmacies enrolled
- Covers vaccines

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Get involved!

National Disaster Medical System (NDMS)
<https://publichealthemergency.hhs.gov/ndms/>
Medical Reserve Corps
<https://mrcr.hhs.gov>
Citizen Corps
www.citizen corps.gov
American Red Cross
www.redcross.org
Community Emergency Response Team (CERT), also TEEN CERT
<https://community.fema.gov/prepare/learnofcommunity/howtogetinvolved>
You Are the Help Until Help Arrives
<https://community.fema.gov/help-until-help-arrives>
National Voluntary Organizations Active in Disasters
<https://www.nvoad.org/volunteer>

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