Disclosures

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

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

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

Bhopal Gas tragedy (1984)

- Union Carbide Corporation's chemical plant in Bhopal
- 40 tons of methyl isocyanate gas
- Estimates of death range from 150,000 to 100,000 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

Pharmacist uses snowmobile to deliver medicines.
Disaster conditions exacerbate chronic illnesses
• Lack of access to routine health care is a leading cause of mortality after disasters
• Problems of vulnerable populations with chronic illness are inadequately addressed

Great East Japan Earthquake in 2011
• Hospital visits for patients receiving oxygen therapy
• Significant increase in hospitalizations due to COPD exacerbations in the subacute phase (from the third to the fifth week)
• Increase in admissions for pneumonia and exacerbation of COPD in the elderly

associations of wildfire smoke PM2.5 exposure with cardiopulmonary events in Colorado 2011‐2014
• Children displayed significant associations between wildfire exposure and asthma
• Wildfire smoke was associated with higher hospital admissions for asthma

Sustained effects on lung function in community members following exposure to hazardous PM2.5 levels from wildfire smoke
• Spirometry testing showed significant decreases in lung function parameters up to two years post‐exposure

Adverse Health Outcomes after Hurricane Katrina among Children and Adolescents with Chronic Conditions
• Delayed medical care for children and adolescents identified by age, gender, race/ethnicity, health insurance status, and home damage was a significant risk factor

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Pulmonary effects of wildfires

Satellite images from the National Oceanic and Atmospheric Administration

Particulate Matter (PM)

- A complex mixture of extremely small particles and liquid droplets, made up of acids, organic chemicals, metals, and soil or dust particles.
- Particulate pollution is divided into several categories based on its size. E.g., PM10, PM2.5.
- Direct link between the size of PM and potential for health problems. PM2.5 is the component in wildfire smoke of most concern for health.
- In the US, the daily average National Ambient Air Quality Standard for PM2.5 is 15 μg/m³; however, the World Health Organization recommends that daily PM2.5 not exceed 25 μg/m³.

PM2.5 and respiratory system

Inflammatory injury
- PM can interact with the alveolar-capillary cells causing oxidative stress reactions and local and systemic inflammatory responses.
- Structural damage to the lungs and functional deficits in chronic respiratory illness.
- Increases airway hyperresponsiveness.

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.

Air Quality Index (AQI)

- PM can interact with the alveolar-capillary cells causing oxidative stress reactions and local and systemic inflammatory responses.
- Structural damage to the lungs and functional deficits in chronic respiratory illness.
- Increases airway hyperresponsiveness.
**Hospitalizations**
- ED, Physician visits or ED visits AND restricted activity days
- Respiratory, Cardiovascular or other symptoms AND/OR Medication Use
- Subclinical effects with no symptoms

**Deaths**
- EXCESS DEATHS HOSPITALIZATIONED VISITS

**Public Health Impact**
- Size of population affected by exposure to wildfire

**Pulmonary effects of Hurricanes & Flooding**
- Aspiration
- Infection
- Loss of alveolar surfactant
- Pulmonary edema
- ARDS
- Mold
- Ideal conditions
- Opportunists
- B–D-glucan
- Cough
- Airway hyperreactivity
- Influenza-like symptoms
- Ear, nose, and throat irritation
- Decreased lung function

**Respiratory symptoms associated with mold exposure**
- Headaches
- Runny nose
- Sore throat or hoarseness
- Cough, chest tightness, shortness of breath, wheezing
- Skin and mucus membrane irritation
- Severe fatigue and exhaustion
- Nausea and GI problems
- Flu-like symptoms
- Joint and muscle aches
- Cognitive dysfunction
- Unusual nosebleeds and coughing up of blood (rare)

**Morbidity and Mortality Related to Chronic Conditions**
- People are more vulnerable in emergencies and disasters
- Emergencies exacerbate chronic conditions leading to acute complications
- Long-term implications resulting from emergencies and their management

**Question**
- Schools had to be shut in Nov 2019 in this Indian city due to AQI of 421
  - a. New Delhi
  - b. Bangalore
  - c. Mumbai
Learning Objectives

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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.''

- 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

Surge Capacity
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.''

Benchmarks for surge capacity
- Hospital bed capacity
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Phase I and Phase II response

Secondary Surge

Acute Response Phase I

Secondary Surge

Primary care

Pre-Disaster

Phase II

DMAT in Gulfport, MS and New Orleans, LA

Expectation - Acute phase

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
- Immunizations
- Obtaining community resources

Which of the following is a benchmark for surge capacity?
A. Immunization availability
B. Prescription medication refills
C. Ability to close schools quickly
Learning Objectives

1. Review the pulmonary effects of natural disasters.
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3. Describe the technician’s role in triage during disasters that may exacerbate respiratory illness.

What’s our role in disaster management?

- We often hear about doctors and nurses in disaster management.
- Where are our pharmacists and pharmacy technicians?
  - Drugs, vaccinations, counseling.

Pharmacists should have a key role in:
- Planning and coordination of pharmaceutical distribution
- Centralized drug therapy management of patients during disasters
- Pharmacists should also do the following:
  - Ensure appropriate education and counseling of individuals who receive pharmaceuticals from emergency supply in response to a disaster
  - Establish appropriate plans for the financial and operational management of emergency supply chain
  - Ensure proper packaging, storage, handling, labeling, and dispensing of emergency supplies of pharmaceuticals

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 enacting the drug therapy of individuals victims.

GOAL: Minimum of 100 volunteers to staff 24/7 medical care clinic for a week

The MRC network comprises approximately 175,000 volunteers more than 100,000 volunteers.
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

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

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

Medications
- At least a 2-week supply
- Inhalers (be sure inhaler is ready to use)
- Use of medications may be altered in addition to community and state guidelines
- Medication of choice: nebulizer medications
- Monitor peak flow and oxygen levels

Lung Function
- Should be monitored
- Should be admitted to the hospital as a precautionary measure
- Should be hospitalized if no available physician

Hospitalization
- Access lung function with peak flow meter
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 be replenished after disaster?

Nebulizer Supplies

Notify electric company of life-sustaining medical equipment use that requires electricity.
- They may put the area in their priority list after the disaster

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

Asthma Action Plan

Practical guide to understanding, treating and managing asthma.

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

Practice Breathing
Use battery powered/lights only, away from open sources of flame.

Check Breathing
Use battery powered/alarms, if symptoms worsen, increase the dose or frequency of inhaled or oral medications.

Call 911
If symptoms persist, only for an actual or impending life-threatening emergency.

COPD Action Plan

During the disaster

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

Practice Breathing
Use battery powered/alarms, if symptoms worsen, increase the dose or frequency of inhaled or oral medications.

Call 911
If symptoms persist, only for an actual or impending life-threatening emergency.

After the disaster

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

POWER OUTAGES OR FLOODS

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

MOLD AND MILDEW

- Asthma symptoms manifest within 30-120 minutes after exposure.

CLEANING DEBRIS

People with chronic respiratory disorders are more susceptible to CO poisoning.

Prepare for the fire season

BE PREPARED FOR A WILDFIRE

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

- Be ready to act.
- Know the asthma/COPD action plan.
- Maintain a 7-10-day supply of medications.
- 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.

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 EnviroFlash.
- Weather forecasts in local news.

Stability of biologics 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 25°C (77°F) for 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 (CINQAIR®): 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.

Injectable for Asthma Stability at room temperature

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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

a. 13
b. 23
c. 43


Get involved!

Check for open pharmacies: https://rxopen.org
Receive care at community health centers: https://www.directaid.org
Free prescription drugs and medical supplies for low-income individuals at community health centers or 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

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

Get involved!

- National Disaster Medical System (NDMS): publichealthemergency.hhs.gov/ndms/
- Medical Reserve Corps: https://mrc.hhs.gov
- Citizen Corps: www.citizencorps.gov
- American Red Cross: www.redcross.org
- Community Emergency Response Team (CERT), also: TEEN CERT https://community.fema.gov/PreparednessCommunity/s/welcome-to-cert
- You Are the Help You’re Asking for: https://community.fema.gov/until-help-arrives
- National Voluntary Organizations Active in Disasters: https://www.nvoad.org/volunteer/