# Environmental Impact on the Respiratory System

Jamaica Conference Centre Althea Aquart-Stewart Dept.of Medicine , May 29, 2016 "Poor air quality contributes to and is a consequence of global warming. The burning of fossil fuels to power our homes, businesses, and automobiles, contributes to air pollution. When released into the atmosphere, some forms of pollution trap heat, leading to temperature elevation, and

> Air pollution has direct effects on health, such as worsening cardiopulmonary disease. Annals of Internal Medicine.May 2016



# BACKGROUND

- "Global warming"
- Greenhouse gases which trap heat in the earth's atmosphere
- Increased accumulation of green house gases CO2, CFCs and other pollutants
- Air Pollution
- US Environmental Protection Agency conducts environmental assessment, research & education
- EPA was established by President Nixon

# NATIONAL ENVIRONMENTAL PROTECTION AGENCY (NEPA)

- This is our local equivalent agency for environment protection.
- Is working towards developing an air quality index
- Aims to launch the Jamaica AQI in June 2016
- Air quality looks at particulates, volatile organic compounds e.g benzenes, sulfur dioxide, nitrogen dioxide
- Industry (Caribbean cement Co.) does particulate monitoring in the environment
- Particulates a major concern with our culture of open burning
- Recognize NEPA's limitations –inability to measure dioxins and furans from the burning of plastics

#### **Emissions from industrial facility**





Air Pollution is the introduction of particulates ,biological molecules, or other harmful materials into the earth's atmosphere, causing diseases, death to humans, and damage to other living organisms

## **Bush fire**



#### Fire at tyre storage faility





# OBJECTIVES

- Environmental impact on chest infections
- Environmental impact on the development chronic airway disease and worsening of chronic airway disease
- Work environment and occupational lung disease
- Protective measures

# Air Pollution

- A mixture of solid particles and gases in the air
- Car emmissions
- Chemicals from factories
- Dust , pollen and mold spores maybe suspended as particles
- Monitoring of Air Quality Index in other countries

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#### Smog/Haze over Citv

# **Chronic Airway Disease**

- Outdoor physical activity very difficult for patients with asthma, COPD, any chronic lung disease in situations of poor air quality.
- Complaints of chest tightness, and difficulty breathing in these situations
- Particulate matter exacerbating airway inflammation and hyperactivity
- Stepping up controller medication
- May require emergency room visit.

## **Open Burning of Garbage**





# Environmental Impact on Chest Infections

SARS

# Viral Chest Infectionns

- SARS Severe Acute Respiratory Syndrome- SARS Virus-Coronavirus - Epidemic in 2003 – Infected droplets sprayed into the air through coughing and sneezing from someone infected with the Coronavirus.
- You can catch the SARS virus if you breathe in or touch these particles on hands, tissues or other surfaces.
- H1N1 pandemic -2009- declared a pandemic by WHO global spread
- Local H1N1 outbreak March April 2016- many deaths



# **Viral Chest Infections**

- H1 N1 –like the seasonal flu, can lead to severe pneumonia, severe respiratory distress even ARDS requiring intubation and mechanical ventilation.
- Most vulnerable- patients with chronic diseases diabetes, renal failure, sickle cell disease, asthma, COPD, patients on chemotherapy, the elderly.
- Potential for spread even before you are symptomatic.
  - Cough, fever, sore throat, Stuffy/runny nose, myalgia, chills, headache, fatigue.
- Yearly flu shot important in this group of patients.



# Tuberculosis

- An old disease with a serious impact
- Transmission of disease via aerosol droplets generally 1 to 5 µm that contain the microorganism from an individual with tuberculosis
- Excreting the bacilli in the sputum or in small droplets produced singing, coughing, laughing
- Primary infection
- Reactivation disease
- MDR TB
- XDR-TB





## Impact of Second hand Tobacco Smoke

- Second hand smoke, more environmental tobacco smoke, affects 58 million non smokers in the USA, including 15 million children.
- More than 7,300 cancer deaths
- More than 34,000 deaths from CAD
- 20% 30% increased risk for stroke
- Increased adult onset asthma
  - Annals of Internal Medicine March 01, 2016, Vol 164, Number 5



## Impact of Second hand Tobacco Smoke

- Children exposed to second hand smoke are more likely to have asthma
- Respiratory infections
- Reduced lung function
- Chronic otitis media
- Higher risk for sudden infant death syndrome
- Low birth weight, and premature birth
  - Annals of Internal Medicine, March 01, 2016, Vol 164, Number 5

## Impact of Second hand Tobacco Smoke

- Involuntary exposure to cigarette smoke is likely responsible for some cases of lung cancer seen in non smokers.
- Cigarette smoke has both a gaseous phase & a particulate phase.
- Potential carcinogens have been found in both phases
  - Nitrosamines
  - Benzopyrenes
  - Polycyclic hydrocarbons



# Environmental Imapct in the work place

**Occupational Lung Diseases** 

# PNEUMOCONIOSIS

- Interstitial lung diseases caused by inhalation of inorganic dusts.
- Unfortunately, development of these lung diseases requires many years of exposure – up to 20 years !
- The inhaled inorganic dust , especially the right particle size , is deposited in the distal airways where it excites an inflammatory reaction
- This inflammation may continue for years, sometimes even after the individual is no longer exposed.
- Development of chronic lung disease with scarring & fibrosis

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# PNEUMOCONIOSIS

- Asbestos
  - Asbestos will produce diffuse interstitial lung disease and fibrosis from exposure, but also increased risk of bronchogenic cancer and mesothelioma.
- Beryllium
  - Making fluorescent light bulbs, aerospace, electronic industries
- Coal
  - Coal mining, exposure to large amounts of coal dust
- Silica
  - Usually affects sandblasters, rock miners, quarry workers, and stone cutters.
- Aluminium

# PESTICIDES

- Handling of pesticides in spraying coffee fields
- Agents used for spraying
- Heightened effect in smokers

## CONCLUSIONS Environmental Precautions

- There is no doubt that poor air quality affects respiratory health. May cause or aggravate existing disease.
- Avoid exposure where possible!
- Education on appropriate protective masks which will prevent the inhalation of the particle size to which the individual is exposed.
- Penalties for not wearing masks at the workplace.
- Yearly testing of employees to evaluate for complication of exposures
- Yearly chest X-Rays, Chest CT scans if necessary

## CONCLUSIONS Environmental Precautions

Use spirometry to assess lung function

Use every opportunity to educate about smoking cessation among employees

Encourage yearly flu shots among staff, particularly those who already have chronic diseases

Encourage flu shots in the elderly

Encourage flu shots in the young with chronic respiratory diseases

# CONCLUSION

 Special thanks to Miss Jodi Ann Marston from NEPA who explained NEPA's monitoring, and provided the pics on air pollution.

• NEPA.gov.jm .



