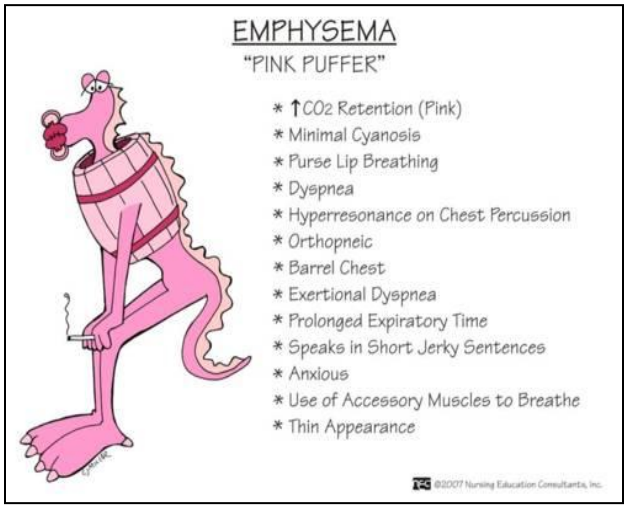
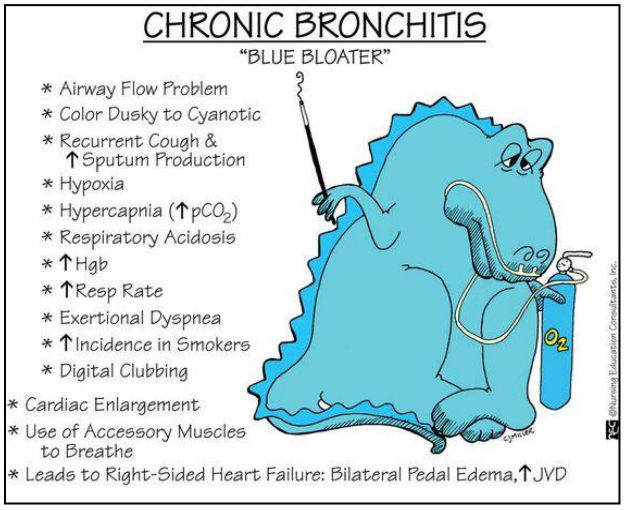
Unit II – Problem 4 – Clinical: COPD

- **Definition:**
  - **It is an irreversible obstructive lung disease which includes emphysema and chronic bronchitis.**
    - ✓ Chronic bronchitis: defined by presence of productive cough for 3 months for at least 2 consecutive years.
    - ✓ Emphysema: there is permanent dilation of air spaces beyond terminal bronchioles with destruction of alveolar membranes.
- **Etiology:**
  - Cigarette smoking is a main cause of COPD (80-90% of COPD patients are smokers). COPD symptoms usually begin after at least 20 pack-years of tobacco exposure. Due to smoking, inflammatory cells will be recruited in the lungs and they will release proteases which will destroy elastin in alveolar wall leading to their destruction and permanent dilation of air spaces.
- **Clinical presentation:**





- **Diagnosis:**
  - **PFT is the diagnostic test of choice. It will show the following:**
    - ✓ Obstructive pattern (FEV1 < 80% and FEV1/FVC ratio < 80%) and results are not reversible with the use of bronchodilators.
    - ✓ Emphysema: ↓DLco; chronic bronchitis: normal DLco.
  - **Chest x-ray:**
    - ✓ Chronic bronchitis: increased pulmonary markings.
    - ✓ Emphysema: hyperinflation of lungs with flattening of diaphragm, tubular heart and increased retrosternal space.
  - **Physical examination**: barrel-chest, clubbing of fingers, clinical features of right-sided heart failure might be seen:
    - ✓ Emphysema auscultation: distant breath sounds.
    - ✓ Chronic bronchitis auscultation: diffuse rhonchi.
- **Management of stable phase of COPD:**
  - Inhaled anticholinergic drugs (e.g. ipratropium bromide) are the first-line drugs in patient with COPD.
  - Inhaled β2-agonists (e.g. albuterol) are used after anticholinergic agents.
  - Home Oxygen: is used in patient with hypoxemia (PaO2 < 60 mmHg; SpO2 < 88%). The goal is to keep SpO2 > 90% especially at night.
  - Smoking cessation.

- **Management of COPD exacerbation:**
  - The most common cause of COPD exacerbation are viral lung infections.
  - **Workup:**
    - ✓ Chest x-ray: showing bilateral interstitial infiltrates of pneumonia.
    - ✓ Pulse oximetry: to determine SpO2.
    - ✓ Arterial Blood Gas (ABG).
    - ✓ CBC (for WBCs and polycythemia).
  - Consider intubation and mechanical ventilation in patients with decreased levels of consciousness, cyanosis, hemodynamic instability and in those with persistent hypoxemia despite adequate oxygen supplementation.
  - **Specific therapy:**
    - ✓ Oxygen supply with venturi mask aiming to keep SpO2 between 88-92%.
    - ✓ Inhaled bronchodilators: short-acting β2 agonists (e.g. albuterol) + anticholinergic agents (e.g. ipratropium bromide) TOGETHER!
    - ✓ Systemic corticosteroids: oral (e.g. prednisone) or IV (e.g. methylprednisolone) for 10-14 days.
    - ✓ Antibiotics: seem to be beneficial in COPD exacerbations despite normal chest radiograms. Antibiotics used are: macrolides or cephalosporins.
    - ✓ Always avoid opiates and sedatives because they may suppress the respiratory system.
    - ✓ Counseling the patient on smoking cessation in the hospital is the single most important intervention.
    - ✓ Teaching patient optimal use of MDIs has been shown to reduce re-admission rates.
  - **Vaccinations**: pneumococcal vaccine (every 5 years); influenza vaccine (every year) and H.influenzae vaccine (if not vaccinated previously).
  - **Prognosis**: FEV1 is the best predictor of survival.

GOLD Disease Stratification Guidelines for Severity of COPD[1,17]

GOLD Stage	Severity	Postbronchodilator FEV_1/FVC	FEV_1, % predicted	Clinical symptoms
0	At risk	> 0.7	≥ 80	Asymptomatic smoker, ex-smoker, or chronic cough/sputum
1	Mild COPD	≤ 0.7	≥80	Breathlessness when hurrying or walking up slight hill
2	Moderate COPD	≤ 0.7	50-80	Breathlessness causing patient to stop after walking about 100 m or after a few minutes on level ground
3	Severe COPD	≤ 0.7	30-50	Breathlessness resulting in patient too breathless to leave the house, breathlessness after undressing, presence of chronic COPD respiratory failure, or clinical signs of right heart failure
4	Very Severe COPD	≤ 0.7	< 30	